

Historical and contemporary perspectives of the sugar industry in sub-Saharan Africa

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Abstract

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Introduction. This paper analyses the trends in sugar and sugarcane production in sub-Saharan Africa, including the core drivers of production by reviewing the current institutional and production arrangements.

Materials and methods. The analysis is based on 35 African countries categorized into 4 regions based on the United Nations M49 classification. A detailed literature review was conducted to explain the observed trends and to provide context for the various institutional and production arrangements. The literature reviewed key sugar-related documents at national level, websites of the core companies producing sugar in each country including their annual reports and previous empirical studies undertaken in the major sugarcane producing countries.

Results and discussion. The sugarcane industry in South Africa has grown significantly over the last 6 decades, with raw sugar production and sugarcane production increasing by 200 and 215%, respectively. In terms of regional production, the average growth rate for raw sugar production over the period 1961 to 2020 was 2, 3, 3, and 13% for Eastern, Middle, Southern and Western Africa regions, respectively. The Eastern and Southern Africa regions produce a major share of both sugar and sugarcane production accounting for 90 and 86% of total production. Yields have consistently remained low and only Eswatini, Malawi, Tanzania, South Africa, Uganda and Zambia have remained competitive and low cost producers in the region. Some countries like Kenya, Uganda, and Tanzania are not self-sufficient and have consistently been net importers of sugar. The countries in question have in the past imposed import restrictions particularly on import tariffs as a way of boosting domestic production.

Threats to steady supply of sugar and sugarcane, especially for countries that depend on rain fed agriculture, have continued to emanate from periodic droughts, particularly the major producing Eastern and Southern regions in the early 1990s. The institutional review revealed that the proportion of sugarcane production supplied by smallholder farmers under outgrower schemes compared to the nucleus estate dictates the stability of sugar production in Africa. Outgrowers dominate the production of sugarcane, as is the case in South Africa (92%) and Kenya (90%), which poses a high risk to the steady supply of sugarcane to the milling company involved in sugar production. This may arise because outgrowers may fail to honor their contracts and engage in opportunistic behavior to side-sell their sugarcane to other offtakers.

Conclusion. Key to resolving the low yields and threats to sustainable sugarcane production in sub-Saharan Africa will be addressing the institutional and production arrangements of sugarcane production, particularly addressing the issues surrounding outgrower schemes that are the major production models.

Introduction

The sugar industry in sub-Saharan Africa is characterized by complexity and diversity with a vast spectrum of participants and stakeholders involved in its production, processing, and distribution. The sugar industry has key aspects that are distinct from those of other agricultural commodities in relation to production traits, trade structures, and related political economy issues (McDonald et al., 2004). The sugar industry is important to most sub-Saharan Africa countries not only in terms of its contribution to Gross Domestic Product but also in terms of its potential to create employment opportunities along the value chain and contributing to rural development (Hassan, 2008). A crucial product in the region, demand and production of sugar is driven by domestic consumption, export markets and international prices. Some of the best-run sugar enterprises have recently suffered greatly from persistently low sugar prices, particularly following the reforms in the European Union sugar industry (Chudasama, 2021). According to the International Sugar Organization (ISO, 2018), sub-Saharan Africa is the fourth-largest producer of sugar in the world, making up around 10% of total world and 5% of global sugarcane production (Macháček et al., 2017; Thibane et al., 2023).

The sub-Saharan Africa region holds a unique position. With below-average per capita consumption and above-average population growth, it has the biggest potential for sugar consumption increase of any region in the world (ISO, 2019). The continent boasts the lowest average per capita consumption of 17.42 kg, which is about 6 kg less than the global average, and a deficit of over 10 million tons (ISO, 2019). The production and consumption dynamics are likely to change given the rate of growth of population of sub-Saharan Africa (Smutka et al., 2011). On the production side, the sub-Saharan Africa region also has potential to increase its market share of sugar on the world market given its favorable climatic conditions, economies of scale, favorable government policies and availability of water and arable land (Hess et al., 2016; Macháček et al., 2017), and recent increase in investment flows in the sugar industry (Chudasama, 2021; Macháček et al., 2017).

The main feedstocks for sugar production are sugarcane and sugar beet with sugarcane alone accounting for about 80% of the total world production of sugar (Macháček et al., 2017; Rumánková Smutka, 2013; Smutka et al., 2011). In sub-Saharan Africa, sugarcane accounts for about 83% of total sugar production (Hinke et al., 2018).

Recent studies in sub-Saharan Africa have focused on production and its determinants (Jones and Singels, 2015; Macháček et al., 2017; Owiti, 2019; Smutka et al., 2011; Tena et al., 2016; Thibane et al., 2023), trade liberalization and export performance (Macháček et al., 2017; McDonald et al., 2004), market structure and competitiveness (Chisanga et al., 2014; Hinke et al., 2018) impact of European Union trade reforms on the African sugar industry (Goodison, 2007; Gotor and Tsigas, 2011; Paha et al., 2021; Richardson, 2009). Maltitz et al. (2019) analyzed institutional arrangements but the study was only focused on 4 southern African countries. While a number of studies have revealed salient features about sugar production in Africa, there is scanty evidence on the core drivers of production, especially the institutional and production arrangements for sugarcane production. Institutional and ramifications not only on the supply of throughput used to ultimately produce sugar but also on the output and price stability of national and international sugar markets. This paper contributes to the ongoing work on the growth of the sugar industry by providing an elaborate and holistic analysis of the sub-Saharan Africa sugar industry from a historical and contemporary perspective. The aim of this research is to review the key features of the sugar market in sub-Saharan Africa not only in terms of production but also in relation to other indicators such as area harvested, yields and institutional arrangements at regional and country level over a long time horizon.

Materials and methods

Materials

The analysis is based on 35 African countries in sub-Saharan Africa categorised into 4 regions based on the United Nations M49 classification widely used by the Food and Agricultural Organization. Data on production, area harvested, yield and raw sugar production by region and country were obtained from FAOSTAT website of the Food and Agricultural Organization. The sub-Saharan Africa geographic sub-region comprises Eastern Africa (22 countries), Middle Africa (9 countries), Southern Africa (5 countries) and Western Africa (17 countries) (UN, 2023). The sub-Saharan Africa countries that form part of this study on average account for 74% of total raw sugar production and 77% of total sugarcane production in Africa. Although Ethiopia, Reunion Island and South Sudan are sugarcane producers, the three countries are excluded in the analysis due to non-availability of data for the period 2015 to 2020.

Methods

This study is descriptive in nature and provides a historical and current perspective of the development of the sugar industry for selected indicators over the past 6 decades (1961 to 2020), where data is available. The analysis is conducted at both country and regional level to highlight regional discrepancies and changes that have occurred in both raw sugar and sugarcane production over the entire analysis period. Some basic descriptive statistics such as means and percentages were used to describe the trends. A detailed literature review was conducted to explain the intuition behind the observed trends and to provide context for the various institutional and production arrangements. The literature reviewed key sugar-related documents at national level, websites of the core companies producing sugar in each country including their annual reports, previous studies undertaken in the major sugarcane producing countries.

Results and Discussion

Trends in sugarcane and sugar production in sub-Saharan Africa

Sugarcane and raw sugar production in sub-Saharan Africa follows similar patterns and trajectories (Figure 1A and 1B).

Between 1961 and 2020, raw sugar and sugarcane production increased by 200% and 215% respectively. Between the periods 1961 and 1970, 1971 and 1980, 1981 and 1990, 1991 and 2000, 2001 and 2010 and 2011 and 2020, raw sugar production increased by 53%, 10%, 4%, 14%, 6% and 8%, respectively. On the other hand, except for the period 1980 to 1990, when sugarcane production reduced by 0.4%, sugarcane production increased by 54%, 13%, 11%, 2%, and 12% for the same periods under review, respectively.

The underlying drivers for this growth are mainly increased local and international demand due to population growth and expansion of sugarcane production brought about by large inflows of foreign direct investment (Ngcobo and Jewitt, 2017). Advancement in technology, use of better production methods and improved cane crop varieties have also contributed to the general positive trend in sugarcane production during this period. It is also worth noting that the area harvested may have contributed to the increase in total sugarcane and raw sugar production. Between 1988 and 2020, the increase in the area harvested coincided with the increase in sugarcane production. Figure 2 shows the correlation between the area harvested and sugarcane production.

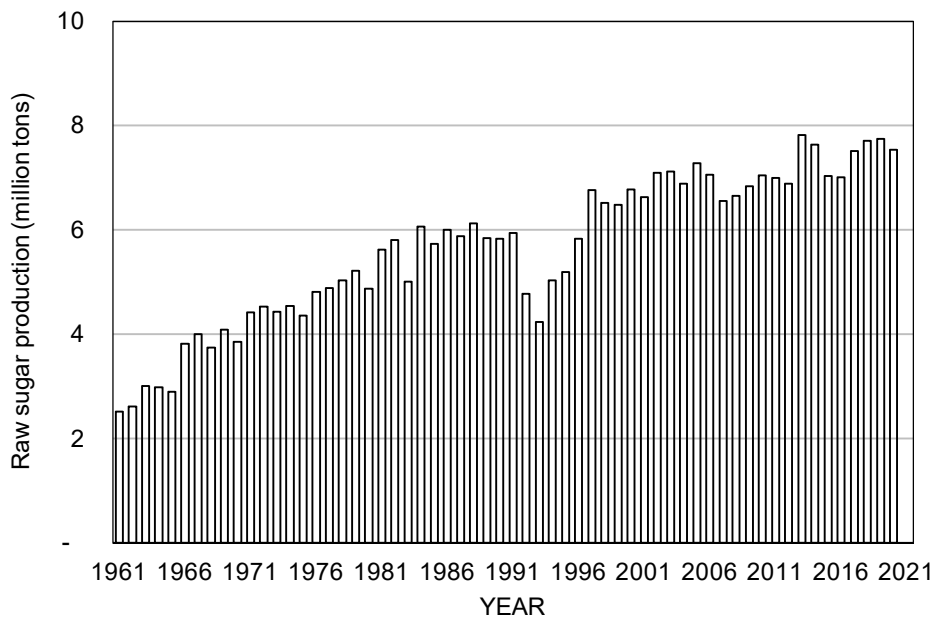


Figure 1A. Raw sugar production in sub-Saharan Africa

Source: FAOSTAT, 2023

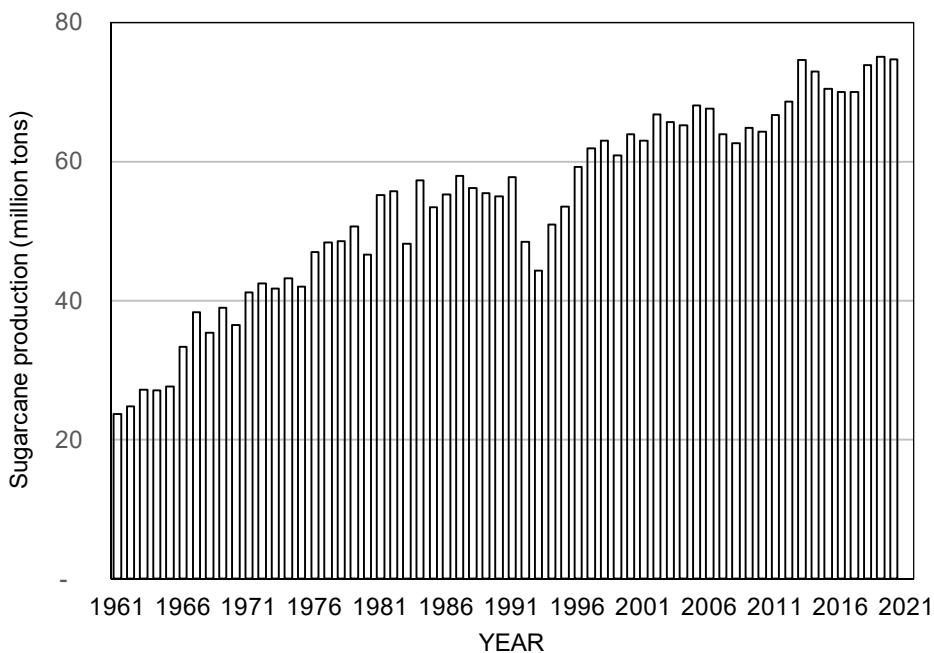


Figure 1B. Sugarcane production in sub-Saharan Africa

Source: FAOSTAT, 2023

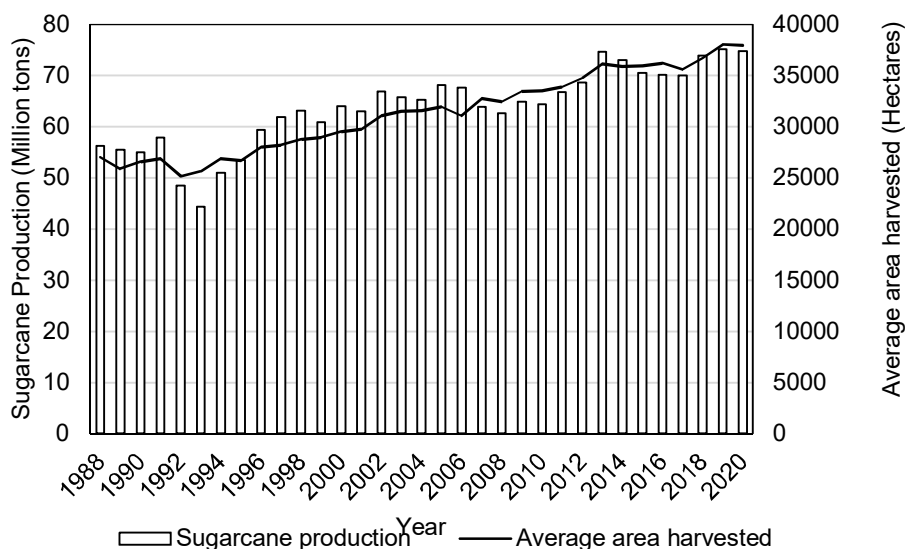


Figure 1. Relationship between sugarcane production and area harvested

Source: FAOSTAT, 2023

Despite the positive trajectory between 1961 and 2020, sugarcane production dipped in some years mainly due to droughts (Hess et al., 2016), especially for countries that depend on rain fed agriculture. Sub-Saharan Africa had in the past numerous severe and protracted droughts in northwest Africa (1999–2002), the Sahel (1970 and 1980), the Horn of Africa (2010–2011) and the southern and southeast Africa (2001–2003) (Masih et al., 2014).

Sugar and sugarcane production by region

Raw sugar and sugarcane production among the regions in sub-Saharan Africa has alternated between periods of growth and decline. The fluctuations in raw sugar and sugarcane production are evident in the Eastern and Southern Africa regions, particularly during the 1991/1992 season due to prolonged drought spells (Sandrey and Vink, 2007). Overall, there has been an upward trend in the production of both commodities (Figure 3A and 3B). The average growth rate for raw sugar production over the period 1961 to 2020 was 2%, 3%, 3%, and 13% for Eastern, Middle, Southern and Western Africa regions, respectively. Sugarcane production, on the other hand, grew by 2%, 3%, 3% and 6% on average during the same period for the respective regions. The Eastern and Southern Africa regions dominate both sugarcane and raw sugar production. The former has recorded significant growth and overtaken the Southern Africa region in sugar raw sugar and sugarcane production, particularly between 2001 and 2020. The Eastern and Southern African regions contribute 90% and 86% to raw sugar and sugarcane production in sub-Saharan Africa.

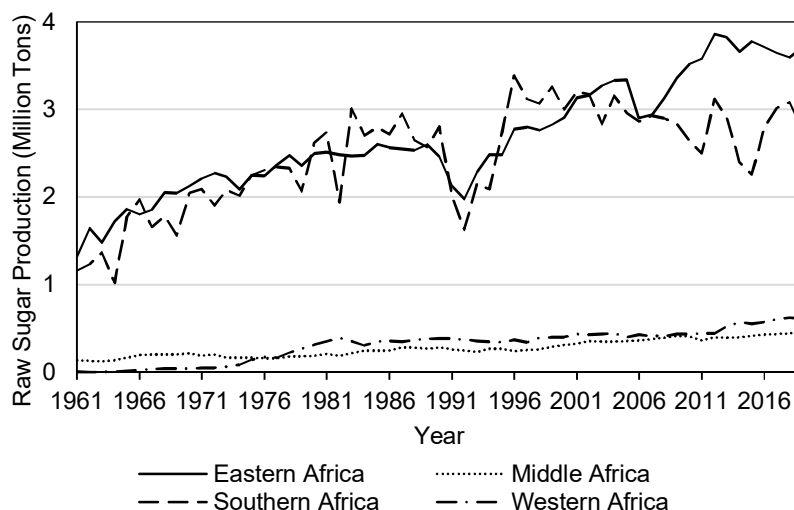


Figure 2A. Trends in raw sugar production by region
Source: FAOSTAT, 2023

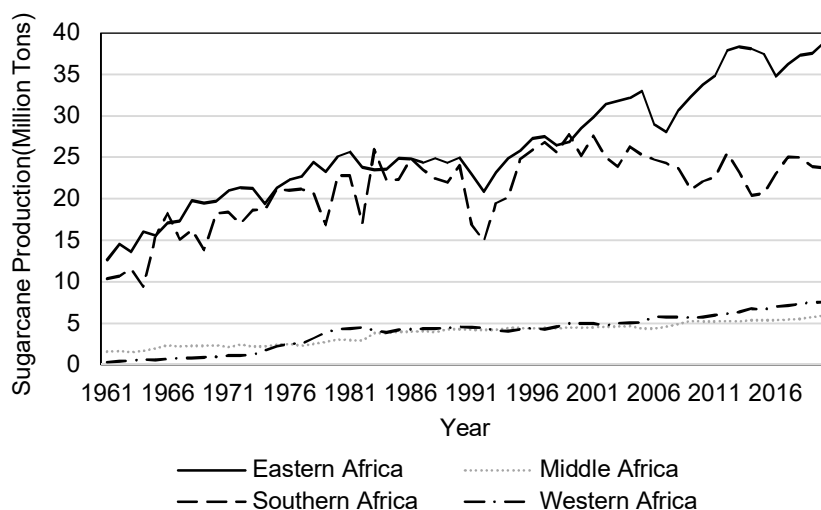


Figure 3B. Trends in sugarcane production by region
Source: FAOSTAT, 2023

The average raw sugar production for Eastern, Middle, Southern and Western Africa regions was 2.64, 0.27, 2.44 and 0.31 million metric tons (MT), respectively. On the other hand, sugarcane production averaged 25.94 million MT, 3.73 million MT, 20.91 million MT and 3.94 million MT for the respective regions. Each ton of sugarcane harvested and processed is expected to produce 120 kg of sugar (FAO, 1984), translating into a conversion rate of 12%. A review of the production trends from a historical and contemporary perspective shows that all the four sub-Saharan Africa regions are not far off this target, with the Southern African region having the highest conversion rate close to 12% (Figure 4).

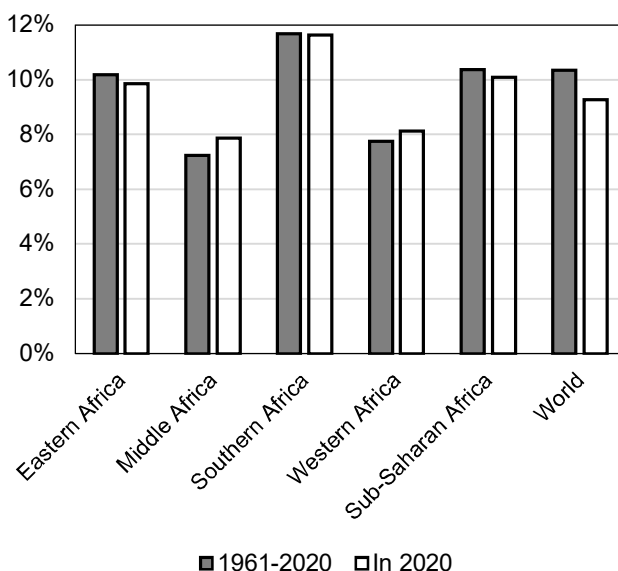


Figure 4. Ratio of sugarcane harvested raw produced

Source: FAOSTAT, 2023

However, this must be interpreted with caution as a low conversion rate below the target might not necessarily imply low levels of efficiency but could be due to the use of sugarcane to produce other competing products such as ethanol, biofertilizers or bagasse for electricity generation.

Countries with high cane yields in Sub-Saharan Africa

The amount of cane harvested per hectare varies depending on several factors including the duration of the growing season, the type of crop, watering system used (FAO, 2023), climatic conditions, types of soil and human factors (Hassan, 2008). Under rainfed conditions, cane yields can vary substantially with good yields ranging from 70 to 100 tons per hectare of cane in the wet tropics while the dry tropics and subtropics can produce crops yields of 110 to 150 tons per hectare with irrigation (FAO, 2023). With this benchmark, it is clear that average yields for most sub-Saharan Africa countries are low. In all of these countries, average yields have either remained essentially stable or declined. Therefore, it is imperative to investigate the causes of such low yields if the sub-Saharan Africa region is to increase its sugar output share on the world market as expanding the area cultivated may prove to be unsustainable. From Table 1, only 12 sub-Saharan Africa countries have had good cane yields on average between 1988 and 2020, albeit some fluctuations, particularly for Zimbabwe, Tanzania and Mauritius. The average cane yields for the 12 countries have been in the recommended range of 70 to 100 tons per hectare.

Table 1

Top 12 sub-Saharan Africa countries with high cane yields

Country	Average Yield (hg/ha) (1988-2020)	Average Yield (hg/ha) in 2020	Variance
Senegal	1,130,827	1,147,597	16,770
Malawi	1,058,137	1,078,256	20,119
Zambia	1,036,815	1,035,811	1,004
Burkina Faso	998,233	1,020,816	22,583
Eswatini	980,008	969,331	10,677
Chad	963,092	1,043,764	80,672
Zimbabwe	883,324	753,994	129,330
Kenya	839,416	758,452	80,964
Tanzania	813,591	700,052	113,539
Mauritius	722,882	599,591	123,291
Mali	709,718	725,057	15,339
Burundi	706,977	690,109	16,868

Source: FAOSTAT, 2023

Main Sugar and Sugarcane Producers in sub-Saharan Africa in 2020

In 2020, sub-Saharan Africa's share of total world sugarcane and raw sugar production was both 4%. The top 10 producers account for about 78 percent of total sugarcane and 81% of raw sugar production in sub-Saharan Africa. South Africa is the largest producer and has dominated the sugar industry over the years producing 2.1 million MT of sugar and 18 million MT of sugarcane in 2020 (Figure 5A and 5B). Apart from South Africa, none of the top 10 countries produce above 1 million MT of raw sugar and above 5 million MT of sugarcane (except for Eswatini, Kenya and Uganda that produce slightly above these thresholds). It is worth noting that despite being major producers, countries like Kenya, Uganda, and Tanzania are not self-sufficient and have consistently been net importers of sugar (Chisanga et al., 2014; Sandrey and Moobi, 2015). The countries in question have in the past imposed import restrictions particularly on tariffs as a way of boosting domestic production (Andae, 2018; Kalagho, 2014; Olingo, 2018). Among the major producers, only Eswatini, Malawi, Tanzania, South Africa, Uganda and Zambia are competitive due to their low cost of production (Gro Intelligence, 2015; Sandrey and Vink, 2007; SASA, 2023b), although somewhat this conclusion may be contentious due to various distortions that characterize the sugar industry. The European Union sugar reforms are likely to reduce demand for African sugar (Paha et al., 2021; Viljoen, 2014) although some African countries could still benefit from the European Union market under the African, Caribbean and Pacific Group of States (Viljoen, 2014) and other various Economic Partnership Agreements.

In this section, we review the various institutional and production arrangements that drive the observed trends in yields and production of raw sugar and sugarcane discussed in previous sections. To analyze the various institutional and production arrangements in sub-Saharan Africa, we collated recently published literature on sugarcane dynamics across some of the major sugar producing countries.

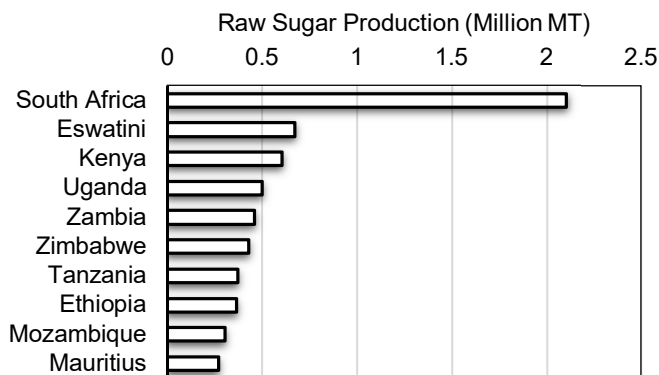


Figure 5A. Main sugar producers in sub-Saharan Africa in 2020

Source: FAOSTAT, 2023

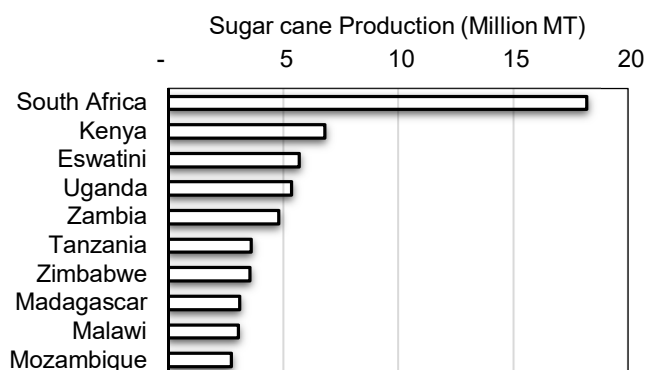


Figure 6B. Main sugar cane producers in sub-Saharan Africa in 2020

Source: FAOSTAT, 2023

Institutional and production arrangements of major sugarcane producing countries

The sub-Saharan African sugar market's reliance on smallholder farmers for production is one of its distinguishing features. Although there are some large-scale plantations, especially in South Africa, Kenya, and Zambia, most of the region's sugar is produced by small-scale farmers who grow sugarcane on small plots of land. These farmers frequently lack access to cutting-edge equipment and inputs, which can reduce their yields and competitiveness. For most African countries, sugarcane is produced under outgrower schemes. Typically, for Africa's top sugarcane producers, the nucleus estate plantation, in which the milling companies farm their own land, incorporates the surrounding producers as outgrowers.

Outgrower schemes can be defined as “a contractual arrangement for a fixed term between a farmer and a firm, agreed verbally or in writing before production begins, which

provides resources to the farmer and/or specifies one or more conditions of production, in addition to one or more marketing conditions, for agricultural production on land owned or controlled by the farmer, which is non-transferable and gives the firm, not the farmer, exclusive rights and legal title to the crop” (Prowse, 2012).

These outgrowers may be single farmers or farming communities organized into trusts, cooperatives, or businesses and enter into a contract to cultivate sugarcane especially for a processing plant or milling company (von Maltitz et al., 2019). Such schemes allow the farmer to have guaranteed access to markets, technology, skills and inputs (Prowse, 2012). The key aspects to stability of the sugar industry and constant supply of sugar and sugarcane production for such outgrower schemes relate to land ownership and land management. Table 2 highlights some of these aspects.

Table 2

Production arrangements for major sugarcane producing African countries

Country	Number of Core Companies	Sugarcane crushed (million tons/annum)	Sugar produced ('000 tons/annum)	Ownership	Outgrower production (% of total cane production)
Malawi	2	2.4 (2021) (↑9%)	279 (↑17%)	State-run trust, Individual outgrowers	22% (Illovo Sugar)
Eswatini	3	1.9 (2022) (↓8%)	270 (↓6%)	Outgrowers through shareholdings	41% (RES), 63% (Illovo)
Zambia	3	3.2 (2021) (↓4%)	468 (↓15%)	Outgrower-owned trust, Company 14 year lease	44% (Zambia Sugar PLC)
South Africa	6	4.84 (2021) (↓6%)	535 (↓11%)	Joint Venture with millers, Cooperative,	92% overall. 88% (Tongaat Hulett), 60% (Illovo Sugar)
Kenya	16	0.4 (2019) (↓23%)	24 (↓30%)	State-owned, Outgrower-owned	90% overall

↓ and ↑ Denotes percentage decrease and increase from previous year respectively/interannual change

Source: Various sources (Bomett et al., 2020; Chisanga et al., 2014; Illovo, 2023c, 2023b, 2023a; Malawi Investment Forum (MIF), 2020; Royal Eswatini Sugar Corporation (RES), 2023; Samboko and Dlamini, 2017; SASA, 2023a; Tongaat and Hulett, 2023; von Maltitz et al., 2019)

The proportion of sugarcane production supplied by outgrowers compared to the nucleus estate is likely to dictate the stability of sugar production given. This may be particular the case for sugarcane production in Africa which is dominated by smallholder outgrowers (von Maltitz et al., 2019). When outgrowers dominate the production of

sugarcane, as is the case in South Africa (92%) and Kenya (90%), this poses as a high risk to the steady supply of sugarcane to the milling company involved in sugar production. This may arise because outgrowers may fail to honor their contracts and engage in opportunistic behavior to side-sell their sugarcane to other offtakers (Chisanga et al., 2014). This may be widespread for markets that are not monopsonistic in a given location or indeed if the market is less concentrated, such as the Kenyan sugar milling industry. There is overwhelming evidence on side-selling with regards to such contractual arrangements for various crops (Alemu et al., 2021; Blackmore et al., 2018; Ewusi Koomson et al., 2022; Mugwagwa et al., 2020). This risk may be lower in case of Malawi, Eswatini and Zambia, in which outgrowers supply 16, 41 and 44%, respectively. However, even for such countries with relatively low proportions of outgrower sugarcane supply, other risks may emanate from decisions about investing in other enterprises and not adhering to laid down production methods. This is typically common in cases where agricultural plots for sugarcane production are individually owned (Samboko and Dlamini, 2017).

These risks however may be averted through use of block plantations, mostly used in all the 5 countries highlighted as shown in Table 3.

Table 3

Institutional Arrangements for Sugarcane Production in Africa

Type of outgrower scheme	Type of fields	Institutional structure (establishment and support)
Irrigated, rainfed	Block plantations, individual fields	Government in charge of land, loans and sales. Farmer Associations purchase cane and controls marketing links to millers. Industry associations exist without supporting legislation.
Irrigated	Block plantations	Government scheme initiation and support; strong industry associations supported by legislation.
Irrigated	Block plantations, individual fields	Government provides funding and land in some cases. Milling and outgrower Companies: oversees all farming activities. Industry associations exist without supporting legislation.
Irrigated, rainfed, hybrid	Block plantations, individual fields	Community and Industry: Support; strong industry associations supported by legislation.
Irrigated, rainfed	Block plantations, individual fields	Government currently owns 5 out of the 12 operational milling companies. Milling Companies oversees all farming activities. Industry associations exist without supporting legislation.

Source: F.O.Licht, International Sugar and Sweetener Report, 2022

Most of the outgrower projects reviewed had land tenure rights alterations from individually owned land to block plantations, while in some cases governments or traditional leaders allocated land to farmers in blocks prior to the establishment of the outgrower project. Heavy government support and ownership is prevalent in countries like Eswatini and Kenya. Out of the 12 operating milling companies in Kenya, 5 are owned by the government although there are ongoing plans to privatize some of them owing to inherent inefficiencies of the state owned enterprises that have hampered production and contributed to the current sugar deficits (Bomett et al., 2020). For other countries, government involvement is mainly in the nascent

stages by initiating some projects, while for some projects that were initiated by the milling companies, government did provide some funding and technical support. Farmer associations and outgrower companies are mainly involved in the marketing aspects and overseeing farming activities carried out by the farmers. Strong institutional and industrial support is key in ensuring a win-win situation between the outgrower companies and the farmers. This is the case in South Africa and Eswatini in which some sugar associations, backed by legislation involved in enhancing the welfare of the farmers play a critical role in relation to the pricing of sugarcane.

Conclusions

1. Sugar and sugarcane production has increased by 200% and 215%, respectively over the last 6 decades. The Eastern and Southern Africa regions produce a lion's share of both sugar and sugarcane production accounting for 90% and 86% respectively of total production in SSA.
2. Despite the positive trajectory, SSA only accounts for a meagre 4% of the world's sugar and sugarcane production. SSA has immense potential to increase sugarcane and sugar production at global level given the availability of arable land and its rich endowment of natural resources.
3. The upward trajectory in sugar and sugarcane production between 1961 and 2020 coincided with the expansion in area cultivated and not necessarily the increase in yields. Yields in SSA are quite low, averaging 56 metric tons against a benchmark of 70 to 100 tons per hectare with only 12 countries producing above this threshold.
4. The institutional and production arrangements in Africa highlight the importance of outgrower schemes and smallholder farmers in the sugarcane value chain. Their dominance in the supply of sugarcane to milling companies, particularly in South Africa (92%) and Kenya (90%) poses as a high risk to the steady supply of sugarcane given the reported opportunistic behavior to sell their sugarcane to other offtakers, hence abrogating their contracts.
5. Key to resolving the low yields and boosting Africa's share on the global market will be addressing the institutional and production arrangements of sugar and sugarcane production, particularly addressing the issues surrounding outgrower schemes that are the major production models. This will entail improving extension services and incentives to outgrowers, organization of farmers into associations, enhanced adoption of modern technology and inputs (improved sugarcane varieties) and improving irrigation facilities especially in the light of increasing adverse weather conditions associated with climate change.

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