

REVISITING INSTITUTIONAL ARRANGEMENTS AFFECTING SUGARCANE OUTGROWERS AND MILLERS IN UGANDA

BACKGROUND INSTITUTIONAL POLICY PAPER FOR THE 10TH NATIONAL AGRICULTURAL
AND FOOD SECURITY FORUM 2022



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EXECUTIVE SUMMARY

Preamble

Agricultural growth has long been a key driver of poverty reduction in Uganda, and sugarcane production and processing have the potential to contribute to poverty reduction and rural economic growth. Sugarcane is a relatively high-return crop that can improve growers' farm income and access to yield-enhancing crop production technologies and management practices, which in turn can improve their crop productivity and food security. Sugarcane can also generate on- and off-farm employment and value addition within the rural economy. Sugarcane production in Uganda is undertaken on both nucleus estates owned by large sugarcane mills and by farmer-outgrowers, who include small, medium, and large-scale farmers. The participation of outgrowers is vital to the government's goals for the cane subsector, as it is the primary means by which the sugarcane subsector can generate inclusive rural economic growth and reduce rural poverty and food insecurity. Uganda's sugarcane subsector has grown consistently since it was liberalized in 1986, particularly over the past 20 years as cane production increased from 1.5 million MT in 2000 to 5.8 million MT 2020.

Yet, as the sugarcane subsector began to expand significantly, the Ministry of Trade, Industry, and Cooperatives (MTIC) and the Ministry of Agriculture Animal Industries and Fisheries (MAAIF) became aware of several emerging challenges to effective and equitable coordination of sugarcane growers and millers, which they feared could threaten the subsector's ability to generate rural economic growth that was both sustained and inclusive. In response, the MTIC and MAAIF formulated the 2010 National Sugar Policy (NSP), which included seven (7) key recommendations: (i) sector governance and regulation through a National Sugar Board (NSB); (ii) zoning of cane marketing activities; (iii) a framework for fair cane pricing based on market forces; (iv) promotion of public sector sugarcane R&D and (v) sustainable land management; (vi) planning for future expansion of cane growing; and (vii) development of social responsibility projects. The more recent Sugar Act of 2020 further reinforced the government's support for many of these recommendations.

In 2019/20, policymakers and cane subsector stakeholders became concerned by a recent increase in poverty and food insecurity within sugarcane growing communities as well as the collapse of domestic cane prices between 2018-2021. These concerns and a lack of existing empirical research on the cane subsector served as the impetus for this EPRC study. This study's objectives are to assess the extent to which the sugarcane sector is on a path of inclusive and sustainable economic growth, the challenges and opportunities facing cane farmers and millers to jointly achieve those outcomes. The study also underscores whether the current institutional and policy enabling environment is adequate to address those challenges and facilitate such outcomes.

Study methodology

Given the lack of empirical research and data on sugarcane production and processing in Uganda, EPRC implemented a household and community survey in November and December 2021 in 12 districts within the three main cane growing regions of Uganda (Buganda, Busoga, and Bunyoro). The survey included 1,771 households, of which 1,179 were cane growers, and 72 community interviews. This data was complemented by qualitative information collected by EPRC through focus group discussions (FGDs) with farmers and key informant interviews (KII) within these same communities in Nov/Dec 2021 and in stakeholder follow-up discussions in August 2022. Analysis of this primary data was supplemented by secondary data collected from administrative sources (FAOSTAT, MTIC, MAAIF) and review of relevant reports and documents. The study focuses primarily on cane farmers and millers within the sugarcane outgrower scheme as farmer participation is the primary means by which subsector growth can be inclusive and reduce rural poverty.

Results

Economic fundamentals of the cane outgrower scheme

The significant increase in Uganda's sugarcane production between 2000-2020 noted above was driven primarily by an increase in sugarcane acreage from approximately 20,000 ha to over 81,000 ha over that period. These acreage and production increases occurred primarily between 2005-2018, as 12 new smaller-scale mills entered the industry, which increased the country's cane milling capacity and thus the aggregate demand for sugarcane.

Because the new mills were established relatively close to the country's three (3) existing large-scale mills, this generated competition between small and large mills for cane growers and resulted in relatively higher cane prices (and thus incomes) for cane growers. The combination of increased aggregate miller demand for cane and higher cane prices attracted more farmers into sugarcane production. Study results show that cane yield remained static at 28 MT/acre between 2000-2020, which implies that the increase in national cane production over that period (valued at Ugx 535 billion in 2021 prices) was primarily due to expansion of cane acreage rather than improved farm-level cane productivity. Of Uganda's estimated 75,000 acres of sugarcane in 2020, data from the 2021 household sugarcane survey show that smallholder outgrowers account for about 20,000 acres. With an average productivity of 29 MT per acre in 2021, the sugarcane outgrower scheme thus contributed 2.2 million MT of cane (about 37 percent of national output) valued at Ugx 198 billion. The scheme includes approximately 29,000 farming households and creates part-time work for more than 609,000 adults (including family and hired labour).

Key findings

As in most other African countries, large cane mills in Uganda own a nucleus estate but rely on outgrowers for a significant (60 percent) share of the cane input they need to run their mills profitably, while small mills rely completely on farmers. The nature of harvested cane (extremely perishable; low value to weight ratio), the high fixed costs of cane milling, and the high asset specificity of cane milling equipment creates an inherent and strong inter-dependency between the production and processing of sugarcane – and between Ugandan cane growers and millers. Effective coordination of growers' cane supply with millers' cane demand therefore benefits both parties by providing market assurance as well as miller provision of inputs/extension and credit to farmers. Furthermore, effective coordination of the supply of and demand for cane at a national level provides both growers and millers with relatively stable cane prices over time, which reduces investment risks for both. However, in the absence of enforceable contracts that protect both growers and millers from opportunistic behaviour, and given credit and input market imperfections, effective coordination of cane supply and demand is not feasible in the Ugandan context. Yet, such growers would then face the problem of monopsony market power, where a mill would typically set its cane purchase price to an unfairly low level.

While the introduction of competition in cane milling in Uganda led to a number of positive developments for farmers -- increased cane prices (and thus incomes) for cane growers and expanded opportunities for small and medium-scale farmers to grow cane, a high-return crop – the increase in cane milling competition disrupted coordination between the supply of cane (from growers and large millers' nucleus estates) and demand for cane (from large and small mills) at both the local/regional and national levels. This decline in coordination led to several negative outcomes, where the costs were predominantly borne by cane growers:

- Competition for growers between small and large mills disrupted coordination between millers and growers at the local/regional level as some growers registered with large mills began to side-sell their cane to small mills and default on input loans. This contributed to a significant decline in registration of outgrowers by large mills, which has significantly weakened outgrowers' prior assurance of a market for their harvested cane and decreased large millers' perception of the reliability of cane supply from growers.
- The decline in coordination between millers and growers also led to a decline in farmer access to quality extension

on cane production and yield-enhancing inputs on credit, as large millers are the only source for cane extension and inputs on credit for most cane farmers.

- The decline in coordination of the supply of and demand for cane at the national level contributed to an oversupply of cane acreage, which subsequently contributed to a collapse in cane purchase prices from 2018-2021.

Within the Ugandan (and African) context, there is an inherent trade-off between the benefits of coordination and the benefits of competition for a crop like sugarcane. As the Sugar Act 2020 was considered, a debate emerged between two main options: (1) providing effective coordination via zoning (and thus local monopsonies); or (2) providing competition among millers (which resulted in significant financial losses for many farmers when coordination between mills and growers broke down). There is also a third option: a semi-independent, public sector regulatory agency that would oversee cane price negotiations between millers and farmer representatives. This approach is frequently and effectively used in developed economies to regulate natural monopolies such as municipal water or power services provided by a single private company. This approach could potentially be implemented by a National Sugar Board (NSB) as proposed in the 2010 NSP and Sugar Act 2020. Many of the coordination problems noted in this section may have been avoided had a NSB been established with adequate institutional design, capacity, and funding. Additional findings include:

- In recent years, millers have used their relatively greater market power to effectively stop negotiating cane prices with cane growers (individuals and associations). Which has resulted in growers being price takers. This contravenes the Sugar Act, 2020, which calls for the NSB to oversee implementation of a fair and transparent formula for the determination of sugarcane pricing each year.
- Cane yields in Uganda are relatively low at 28 tons/acre and remained stagnant from 2000 to 2020. The relatively low productivity of sugarcane appears to be due to several factors. First, Ugandan cane farmers only have access to 18-month cane varieties that have been recycled for many years, although 12-month varieties with relatively higher yields have been adapted and used in other African countries -- and are currently used by large millers on their nucleus estates. Ideally, the public sector should invest and engage in crop varietal research and development (R&D) for self-propagating crops, as the private sector typically underinvests in them. Unfortunately, there has been no public sector cane varietal R&D in Uganda for decades. Second, use of yield-enhancing inputs such as appropriate inorganic fertilizer and herbicides are relatively low among Ugandan cane growers.
- Among the households that began to grow cane between 2005 and 2020, 28 percent decided to stop by or before 2021. This was primarily due to the increasing difficulty farmers faced in finding a reliable buyer for their cane, and a significant decline in cane prices from 2017 to the present. Farmers who abandoned sugarcane were more likely to be unregistered, poorer, and to have smaller landholdings.
- The study shows that about 50 percent of smallholder outgrowers are located more than 25 km away from the mill to which they most recently sold their cane, which is outside of economic zones that had been proposed in the 2010 NSP as areas in which marketing activities would be financially viable. After the 2020 Sugar Act was signed without a clause to institute zoning of cane marketing activities, millers began to expand their nucleus estates more rapidly, primarily by gaining access to public land. This has heightened fears that the nucleus estates of large mills are crowding-out outgrowers' future opportunities in cane production.
- Only 16 percent of cane growers belonged to a cane grower association in 2021, though 68 percent had been a member previously. Many cane producers report that they did not join a grower association (or left an association) as they perceive that these associations do not adequately support their production and marketing needs. This implies that grower associations do not currently have sufficient capacity to provide such services consistently and sustainably to members.

Recommendations and way forward

The study findings suggest that effective public governance is urgently needed to improve coordination between cane growers and millers, oversee a fair and transparent process for determining cane prices, address new realities in the cane sector, and

support the continued participation of outgrower farmers in the Ugandan sugarcane industry. The 2010 NSP and the Sugar Act 2020 proposed various institutional arrangements to address these challenges, yet virtually none of their recommendations have been implemented to date. This implies that a logical first step for government would be to consult with cane millers and growers to better understand positive and negative developments within the cane subsector since 2005, its current status and emerging challenges. A next step would be for MTIC and MAAIF to revisit both the NSP and Sugar Act, in consultation with other government and private sector stakeholders, as a starting place for designing an effective and informed set of policies, institutional arrangements, and ministerial mandates to best address the current and emerging coordination challenges.

The findings also suggest that the constitution of a public sector agency – such as the National Sugar Board – proposed by the NSP and Sugar Act – is needed to provide the public governance required to address the challenges noted above and thereby enable the sugarcane subsector to fulfil its role within the government's agricultural and industrial sector plans. This discussion will provide an opportunity for MTIC and MAAIF to revisit both the NSP and Sugar Act, recast their mandates, address new realities in the sugarcane sector, and strengthen the institutional policy environment to support the sustainable participation of small and medium-scale farmers in sugarcane production in Uganda.



1.0 INTRODUCTION

The sugarcane industry is one of the key agro-based industries in Uganda with potential to contribute significantly to national socio-economic development. In the past two decades, significant strides have been registered in sugarcane production and processing in Uganda ever since these two nodes of the sugar value chain of Uganda were liberalized in 1986¹. Sugarcane production increased from 1.5 million MT in 2000 to 5.8 million MT 2020, driven predominantly by an increase in land under sugarcane from approximately 20,000 ha to over 81,000 ha over that 20-year period (FAOSTAT, 2021). This significant increase in sugarcane acreage was driven in large part by a significant increase in the number of sugarcane mills between 2005 and 2018, as 12 new smaller-scale mills joined the country's three (3) existing large-scale mills. This significantly increased the demand for sugarcane in Uganda, which in turn attracted more farmers into sugarcane production. This development supports the agro-industrialisation agenda in the Third National Development Plan (NDP/III) 2021-2025 (NDP, 2020), which seeks to promote inclusive rural economic transformation by providing small- and medium-scale farmers with opportunities to transition from semi-subsistence agriculture to a more commercial orientation. Through production of relatively higher-return crops such as sugarcane -- along with food crops²-- semi-subsistence farm households can improve their farm income and access to yield-enhancing crop production technologies and management practices, which in turn can improve their crop productivity and food security (MAAIF, 2016). Sugarcane also provides opportunities for on- and off-farm job creation and value addition in the rural economy.

After five years of rapid expansion of the sugarcane sub-sector (2005-2010), the Government of Uganda (GoU) through the Ministry of Trade, Industry, and Cooperatives (MTIC), and Ministry of Agriculture Animal Industries and Fisheries (MAAIF) formulated the 2010 National Sugar Policy (NSP) (MTIC, 2010), which was later reinforced through

the Sugar Act, 2020 (The Republic of Uganda, 2020). The NSP responded to concerns at the time by government and stakeholders that Uganda had no national policy for the sugar sub-sector, which was needed to provide strategic direction and meet emerging challenges (NSP, 2010). The objective was to create an enabling policy framework to facilitate inclusive and sustainable growth of the sub-sector in the long-term, improve coordination among all the key players in the sugar value chain, and promote rural economic development, modernization of the industry, and improved competitiveness in domestic and regional markets (*ibid*, 2010). In the 2010 NSP, seven (7) high level priority intervention areas (objectives) were earmarked for implementation:

- (i) Establish a sugar sector regulatory mechanism (i.e. a Sugar Board) to oversee, monitor, and arbitrate on major issues in sugar sector and ensure adequate coordination of the supply of and demand for sugarcane in the country;
- (ii) Establish cane growing and marketing zones for the mills to be within economic growing distances;
- (iii) Provide a framework for product pricing based on market forces;
- (iv) Promote R&D into all aspects of sustainable sugarcane production, sugar processing and value addition to by-products;
- (v) Promote sustainable land management practices in order to improve productivity of land and protect against destruction of the surface of land;
- (vi) Review the role of the sugar industry in order to formulate future plans for expansion of cane growing, sugar production and product revenue sharing; and
- (vii) Develop relevant and meaningful social responsibility development projects within sugarcane growing areas.

The Sugar Act, 2020, passed 10 years later, is intended to reinforce key goals of the 2010 NSP, including the development, regulation, and promotion of the sugar industry; the establishment of the Uganda Sugar Board; and related matters. However, available evidence on the performance of the sugarcane sector in producing positive

¹ Beginning in 1986, Uganda's three existing large-scale sugarcane mills were privatized and the market for domestic sugarcane production and milling was liberalized (MAFAP, 2013). Uganda's domestic sugar market retains significant protection from the international sugar market thru a 100 percent import tariff on sugar from outside the EAC (*ibid*, 2013).

² The National Sugar Policy (2010) states that farmers growing sugarcane retain at least one-third of their land for food crops.

economic development outcomes are mixed. For example, recent developments within the sugarcane sector have led to both expanded processing capacity (success) and reduced inclusivity of and benefits to smallholder farmers supporting the outgrower schemes in the sugarcane sector (failure). National development indicators generated by the Uganda Bureau of Statistics (UBoS, 2020) show an unexplained surge in poverty and food insecurity within sugarcane growing communities amidst expanding sugarcane value chain activities. These negative developments suggest that the prolonged inaction by the MTIC and MAAIF to fully implement what the two policy documents set out to achieve is limiting the ability of the sector to ensure and sustain the participation of outgrowers in the sugarcane subsector.

2.0 MOTIVATION

Agricultural growth has been a key driver of poverty reduction in Uganda, particularly between 2006 and 2016 and especially in rural communities (World Bank, 2016; USAID, 2016; Diiro, 2017). However, a recent surge in poverty in some agro-rural communities in Uganda implies that those communities experienced a period of negative economic growth and/or that existing economic growth has not been sufficiently broad-based (i.e. inclusive). In the latter case, while some households may have experienced benefits of economic growth – such as higher incomes and/or better food security – other households may have experienced income losses and increased food insecurity. Two sugarcane growing regions--Busoga and Bunyoro sub-regions--have been among the most affected. The Busoga sub-region remains a home to 1.2 million income-poor persons and nearly 0.4 million persons living in food poverty (UBoS 2020). Therefore, the recent increase in poverty in these sugarcane growing areas questions the extent to which economic growth from the expanding sugarcane cultivation and growth in milling capacity has resulted in adequately widespread increases in incomes of cane growers. At policy level, it is of interest to understand that the implementation of the 2010 National Sugar Policy (NSP), and the Sugar Act, 2020 has been able to safeguard sources of livelihoods, and the sustainable participation of the outgrowers in sugarcane production.

It is against this background that this study aimed to gather

evidence on the extent to which the sugarcane sector is on a path of inclusive and sustainable economic growth, and whether the current enabling institutional policy environment is adequate to facilitate those outcomes. The study chose to focus particularly on the outgrower scheme for reasons that it houses (takes care of) farm households that are most likely vulnerable to poverty. Specifically, the report contributes empirical evidence to three (3) critical areas of interest in the sugarcane sector i.e.:

- (i) Identify areas of success and or challenges faced by sugarcane outgrowers in particular, coordination of cane growers and millers, and the wider sugar value chain in general;
- (ii) Evaluate the extent to which the areas of intervention earmarked in the 2010 NSP and the Sugar Act, 2020 have been implemented, particularly with respect to strengthening the operations of the outgrower scheme; and
- (iii) Provide policy recommendations that can facilitate sustainable growth of the sugarcane outgrower scheme.

3.0 METHODS

Study findings are derived from data collected from both quantitative (household and community surveys), and qualitative research conducted concurrently during the months of December 2021 over a period of 22 days. A total of 1,771 household of which 1,179 were cane growers; and 72 community interviews were conducted using structured questionnaires in 12 sugarcane producing districts in 3 sub-regions. These included: Busoga in Eastern region (Luuka, Mayuge, Kaliro, Kamuli, Jinja and Iganga); Buganda in Central (Buikwe, Mukono and Kayunga); and Bunyoro in Western region (Hoima, Masindi, and Kikuube). Qualitative data were collected in only 9 districts i.e. Luuka, Mayuge, Kaliro, Kamuli (in Eastern region); Buikwe and Kayunga (Central); and Hoima, Masindi, Kikuube (in Western region). The quantitative household survey data was enriched (triangulated) by qualitative data collected at the same time from a total of 262 respondents (80 percent men and 20 percent women) who participated in *21 sex-disaggregated focus group discussions (FGDs) with farmers*; 19 key informant interviews (KIIs), and 2 Town Halls (Barazas). The participants of both KIIs and Town Halls included

critical stakeholders in the sugarcane value chain i.e., farmers, leaders of farmers associations, technocrats in local government departments, private sector players i.e. contractors and the 3 small millers (Tables 1A to 3A, Annex A). The study also benefited from secondary time series FAOSTAT data in the trend analysis of national level cane production and productivity. Additional secondary data was gathered from reviews of the published documents from mainly the Ministry of Trade Industries and Cooperatives (MTIC) and Ministry of Agriculture Animal Industries and Fisheries (MAAIF).

4.0 THE INTERDEPENDENCY BETWEEN OUTGROWERS AND MILLERS

From the privatization of Uganda's three original large-scale sugarcane mills in 1986 through 2021, the Ugandan sugarcane subsector has grown and changed considerably over time. This includes a period of continuous expansion in cane acreage, production, and milling capacity beginning in 2005, up to a very difficult period for the industry between 2018 to 2021 when cane purchase prices crashed to the lowest, and there was a near-complete breakdown of coordination between cane growers and millers. To understand the root causes and consequences of these developments and changes over time, one needs to first understand how the nature of sugarcane production, harvesting and milling creates an inherent and strong interdependency between the production and processing of sugarcane — and, subsequently, between cane growers and millers.

4.1 Physical nature of harvested cane

4.1.1 Harvested cane is highly perishable

About 24 hours after cutting cane, the extractable sucrose (sugar) content in each ton of harvested cane begins to decline very rapidly. While sucrose is not the only product of potential value from harvested cane³, it is easily the most

valuable. Thus, harvested cane must be transported to a mill and processed within 24 hours of being cut, otherwise its commercial value will decline rapidly. Harvested cane is therefore not a storable crop.

Harvested cane is very heavy, which means that the cost per kilometer of transporting a ton of harvested cane is very high. In addition, the *value-to-weight ratio (value per ton) of harvested cane is quite low*, compared with other crops. Together, the significant weight and low value per ton of harvested cane imply that a cane farmer cannot afford to transport his harvested cane to a mill far from his cane fields as the transport costs involved will be too high for him to be cost-effective. That is, if a farmer tried to transport his cane to a mill far from his cane fields, the transport costs would be too high for him to produce cane profitably — i.e. to earn enough gross cane sales revenue to more than cover his cane production, harvesting, and transportation costs.

The characteristics of harvested cane have profound implications for the relationship between cane growing farmers and millers. First, cane's highly perishability implies that a cane grower cannot afford to harvest his/her cane without first obtaining a mill's commitment to purchase his cane within a mutually agreeable time-period. Second, the significant weight of harvested cane and its low value-to-weight ratio (value per ton) imply that a grower's only profitable marketing option is to sell his cane to a mill relatively close to his cane field(s). Therefore, the profitability of a cane grower is highly dependent on assurance that a nearby mill will purchase his cane as soon as it is harvested.

Cane growers thus have a strong incentive to enter into a binding arrangement with a nearby mill — either before planting or soon after -- in which the mill provides the farmer with assurance that it will both (a) purchase the farmer's cane when it is mature⁴; and (b) arrange a mutually-agreeable time period during which the mill will purchase his cane. In exchange, the farmer provides that mill with assurance that he will sell his cane to them (i.e. not a competing mill). In Uganda, registration is intended to serve as part (a) of this assurance⁵, while a cane delivery permit is an example of

3 Processing harvested cane produces sucrose and two main by-products, bagasse and molasses. Bagasse is the fibrous material remaining after harvested cane has been crushed, soaked, and squeezed to extract its juice (which contains sucrose). The most economic and typical use of bagasse for mills is to generate steam and power (electricity) for their on-site milling operations, though it can also be used to produce particle board or paper (Paturau, 1988). Molasses is a by-product of processing raw sugar into refined (white) sugar. Molasses can be used as an animal feed, exported, or fermented to produce ethyl alcohol (used in sanitizers). Cane juice, syrup, or molasses can be fermented to produce spirits (rum, gin) (ibid, 1988).

4 The varieties of cane grown by farmers in Uganda reach maturity about 18 months after planting — the point at which it typically has the maximum quantity of extractable sucrose per ton of cane

5 In practice, registration does not appear to have been a legally binding commitment between Kikira or SCOU and their growers but was rather a statement of intent that a mill planned to buy a pre-approved acreage of a grower's cane. With the exception of the 2018-2021 period, registering with a mill did appear to significantly improve the probability that a grower could sell to that mill when their cane was mature, in practice. By contrast, farmers registering with Kinyara had to sign a 24-page legal contract.

(b). The nature of harvested cane also implies that a mill can only realistically source an adequate quantity of cane from land relatively close to its mill – whether from its own nucleus estate (i.e. plantation) and/or from nearby cane growers. Thus, large-scale mills also have an incentive to enter into a binding agreement with nearby cane outgrowers to help ensure access to this additional source of cane input.

4.1.2 High and asset-specific fixed costs of entry into the sugarcane processing industry

A private agribusiness that wishes to engage especially in large-scale, commercial sugarcane processing must make a very large up-front investment (i.e., pay a high fixed cost) in milling and other processing equipment, a building for it, and land for both the building and a nucleus estate on which to grow cane, except for small mills⁶. The processing equipment used in large-scale sugar milling is both very expensive and highly specific to its designed tasks, such as: (i) crushing, soaking, and squeezing cane; and (ii) processing cane juice into raw sugar; then raw sugar into refined sugar and molasses. Because the value of this equipment for a use other than processing cane is quite low, it can be described as having “high asset specificity” (Williamson, 1975).

To operate profitably during any given time of the year, a mill needs access to a minimum quantity⁷ of harvested cane large enough that the revenue the miller earns from production and sale of sugar (and related by-products, potentially) more than covers the mill’s monthly and annual operating costs.⁸ An implication of the high fixed costs and asset specificity of cane milling is that once an agribusiness makes this large investment in a mill and land, it must be able to profitably operate the mill for many years in order to pay off its fixed costs (repaying any loans they obtained to purchase the land, building, and processing equipment), pay on-going operating costs over time, and earn sufficient revenue to earn a reasonable return (profit) on its investment. In practice, no large-scale sugarcane mill relies entirely on nearby outgrowers for cane input. This is due to the mill’s strong incentive to ensure some minimum quantity of cane input each year and the impracticality and risk of assuming that outgrower farmers nearby will choose to continue to

grow cane for many years. It is important to note that the larger a mill’s nucleus estate becomes relative to its annual cane input needs, the less cane it will need from outgrower farmers.

It should be noted that farmers that choose to grow cane also must make a significant investment (i.e., incur significant fixed costs), as this effectively ties up their fields with a planted crop. This is because sugarcane is a perennial grass that is planted once, with the *first* planted cane harvested after 18 months; followed by a set of 3-4 re-sprouts (*ratoons*) after each harvest. Therefore, sugarcane locks up arable farmland across several (5 to 8) years with good management that enhances productivity (Yang SI *et al.*, 2021; Niu GF, 2007). The advantages of ratooning come in form of cost savings related to planting labor, fixed cost from purchased seed cane, and soil tillage (Singh SN, et al., 2008; Radha Jain A. 2007). Ratooning is reported to lead to a reduction in costs of 45% with an overall increase in net benefits (Pawar BN, *et al.*, 2000). It is apparent that proper management of ratoon crop has productivity and profitability outcomes. The harvesting of ratoon crop requires accurate records to be captured by mills from growers. This also demonstrates how complex institutional arrangements can get between millers and farmers without adequate records.

In addition, sugarcane has the initial labor and cash costs of field preparation, inputs for planting cane (seedlings and fertilizer), and planting are significant. While a mill may provide some of those inputs to the farmer on credit, the farmer is then obligated to repay that input loan by selling his harvested cane to the mill that provided him inputs.

4.1.3 Coordination of local cane supply and demand thru registration and contracts

As in most other African countries, sugar mills in Uganda that own a nucleus estate are not able to source all the cane they require from their own estate. They also purchase cane from independent farmers within a limited distance of the mill, many of whom are small to medium scale. Each large mill must coordinate the supply of cane they expect to purchase from outgrowers over time to ensure that the monthly and annual quantity of cane they access from the combination of farmers and their own estate is adequate to keep the mill running profitably.

The most common and successful form of coordination is

⁶ Most small mills in Uganda do not invest in nucleus estates.

⁷ The minimum quantity is primarily a function of the mill’s milling capacity, though it may vary somewhat over time given changes in the price of its outputs (raw or refined sugar, etc) and/or inputs (harvested cane, electricity, labour, water, etc).

⁸ Monthly and annual operating costs consist of a share of the fixed costs of the milling equipment and on-going operating costs (i.e., cost of growing or buying harvested cane, electricity, labor, etc).

thru legally binding and enforceable contracts between a mill and a cane grower. These typically include; the acreage that a grower has (or will) plant to cane, an agreement as to how the purchase price will be determined, a commitment by the farmer to sell his/her cane to the mill in 18 months' as well as a commitment by the mill to purchase cane harvested from the agreed-upon acreage at that time, using the agreed method of determining the purchase price. However, it important to note that in the absence of cost-effective and fair local judicial systems and/or an effective public regulatory body or agency, such contracts may not be enforceable by one or both parties, which is the case for contract farming in many developing countries. In addition, small to medium-scale farmers in developing countries most often face a significant disadvantage in negotiating a contract with a mill given farmers' typically poor access to market information, limited experience with legal contracts and procedures, and perhaps insufficient education or training to read and/or adequately understand the contract terms.

In Uganda, large-scale mills and farmers have historically used the process of “registration” to coordinate the mills' need for assured cane input and farmers' need for an assured market. Registration is a process whereby a mill representative meets with a smallholder interested in or already growing cane, records the acreage of the smallholder's cane garden(s), and enters into a formal agreement with the farmer in which the mill commits to buying cane harvested by the farmer from his registered gardens over a specified time period (typically thru the first harvest, though sometimes longer). In turn, the farmer commits to harvesting his/her cane when it matures (18 months) and selling all of it to that mill⁹. Like contracting, registration helps to manage the co-dependency between a mill and cane growers to the benefit of both by coordinating and balancing the supply of farmers' cane and the demand for it by mills. Registration thus serves as an institutional production-marketing arrangement and commitment between a mill and an individual grower that most often is in the best interests of each party.

4.1.4 Coordination of smallholder access to services and inputs thru registration

In addition to registration, mills also offered other kinds of support to some (not all) registered growers, such as extension services; access to inputs (often on credit) such as seedlings, inorganic fertilizers, and pesticides; and access to finance, in some cases. Given that, many small and medium-scale farmers in the cane producing regions have limited access to seasonal credit for agricultural inputs, large mills provided these services and inputs to growers on credit. This was done with the understanding that “aided” growers would sell their cane to the mill, and then millers would deduct the cost of these services/inputs from the gross sales revenue of each grower. This support from mills is in farmers' interests because cane farmers have very limited access to public extension services specific to cane production and marketing, and the financial and credit constraints they face to obtaining productivity-enhancing inputs. This kind of service/input provision is also in mills' interest as it helps ensure a reliable supply of smallholder cane over time as it helps registered growers manage to produce a sufficient quantity of cane (in aggregate) for the mill's needs and be productive enough over time to want to continue producing cane.

5.0 KEY INSTITUTIONAL CHANGES IN THE SUGARCANE SUB-SECTOR FROM 2005-2021

Since the privatization of Uganda's sugarcane milling industry in 1986 and liberalisation of the production and domestic marketing of most crops, there have been several key structural changes in the sugar subsector as well as key changes in its policy environment. Changes in the industry's structure and policy environment have in turn affected institutional arrangements between sugarcane growers and millers, which subsequently affected the opportunities and constraints (i.e. financial incentives and disincentives) faced by each. Many of the key challenges to cane growers and millers that have emerged since around 2010 (discussed below) can be explained as responses by both groups to these institutional changes. Over time, changes in the sub-sector structure led to changes in behavior by millers and growers, which in turn changed performance outcomes for

⁹ These agreements are sometimes made via written and signed contracts and sometimes via a verbal agreement. In practice, registration by some mills (Kinyara) has involved long, written, multi-year, signed contracts that the mill has managed to enforce, while registration by mills in Busoga (Kakira) and Center (Lugazi or SCOL) have been less formal and were not technically legally binding, though were respected by most farmers and those mills prior to 2010 or so, as explained below in more depth.

each.¹⁰

This chapter provides an overview of changes in the sub-sectors structure, the behavior of growers and millers, and outcomes for each over time. Chapters 6 and 7 provide more in-depth evidence and analysis of changes, based on quantitative and qualitative research implemented by EPRC in 2021 and 2022, as described in the Methods section above.

5.1 Regional monopsonies in sugarcane milling from 1986 to 2004

Prior to liberalization of Uganda's sugarcane production and milling industries, there were three large-scale sugarcane mills: Lugazi SCOUL (established in 1924) in Buganda sub-region (Central region), Kakira sugar factory (1930) in Busoga sub-region (Eastern), and Kinyara sugar factory (1969) in Bunyoro sub-region (Western) (MTIC, 2021). From 1986 to 2004, each of these mills were the only mills in their region. Thus potential cane growers near these mills had only one potential buyer of their cane. A market in which there are many sellers of a commodity (or service) but only one *buyer* of it is called a monopsony¹¹. In this situation, the large mill in each region was the sole buyer of the commodity (cane) and thus had market power inherent in this monopsony situation to set the purchase price at which they would buy harvested cane from nearby growers. However, it is important to note that economic theory predicts that a mill in this situation will not knowingly set the price of cane lower than the growers' cost of production, as a mill that is dependent upon farmers for at least some of its annual cane input remains dependent over the medium- to long-term upon the farmers to continue producing cane year after year (as discussed in section 4.1.2 above).

During this period, many cane growers chose to be registered with their local mill to help ensure a market for their cane when mature. Some registered cane growers also received "aid" from the large mill, which, depending on the grower, included inputs on credit such as seedlings, fertilizer, and pesticide, as well as extension provided by the mill. The farmers who were "*registered and aided*" by

the mill agreed to an arrangement whereby the cost of each grower's inputs received on credit would be deducted by the mill from the value of the harvested cane that they delivered to it. According to respondents in KILs and FGDs, farmer registration or registration and aided enabled cane growers and the local mill to effectively coordinate the local supply and demand for cane.¹²

5.2 Entry of new sugarcane mills beginning in 2005

The first key change to the structure of cane production and milling in Uganda occurred in 2005, when MTIC granted licenses for two new sugarcane mills to enter the cane milling industry: GM sugar in Buganda sub-region and Mayuge sugar industries in Busoga sub-region (MTIC, 2021). Within the three main cane-producing sub-regions of Uganda (Buganda, Busoga, Bunyoro), two additional small mills were licensed and began operation in 2010 and 2011, followed by 7 more small mills by 2018 (ibid, 2021; see Appendix Box 1 for more details). As of 2020, there were 12 operating sugarcane mills in these three sub-regions, including the three (3) traditional large-scale mills and 9 small mills.¹³

While each of the small new mills had a relatively smaller milling capacity than the three traditional large mills, none of the new entrants had a nucleus estate on which they could produce their own cane input. Therefore, the new mills had to rely solely on cane growers near their mill for cane input. This may explain why many of the new mills were established relatively close to a traditional large-scale mill. The implication of both new mill entry and their proximity to an existing large mill is that (i) for the first time, each of the three large mills faced competition for cane growers; and (ii) cane growers (and non-growers) located within a feasible distance from both a large mill and a new small one now had more than one potential buyer for their cane.¹⁴

The small mills did not offer support (aid) to farmers such as extension and/or inputs on credit. Thus, to compete with a large mill for existing growers, the new mills offered relatively

10 The conceptual approach of this chapter is based on the Structure, Conduct, and Performance model developed by economists Edward Mitchell, Joan Robinson and Joe Bain and used within an economics sub-discipline called Industrial Organization Economics.

11 A monopoly is a market in which there are many buyers of a commodity (or service) but only one seller.

12 That said, more research is needed to better understand miller-grower arrangements during this time period.

13 By 2020, MTIC had granted licenses for sugarcane milling to a total of 33 companies, though 21 of these companies have not yet established an operating sugarcane mill to date Figure 3B, Annex B.

14 Given the nature of harvested cane (section 4.1.2), the extent of miller competition for any given grower would depend in part on the distance between the growers' cane fields and each of the two mills.

higher cane purchase prices than those offered by the local large mill. In response, some cane growers who had been registered with a large mill (or unregistered but routinely selling cane to a large mill) began to sell their cane to the small mill. Existing cane growers who were registered (or were registered and aided) with the large mill at that point in time yet, chose to sell their cane to the new mill were thus “side selling” their cane to the new mill.

In response to competition for growers from new mills, the large mills eventually increased their purchase prices, in hope of retaining registered and/or unregistered cane growers who had previously sold their cane to the large mill. The combination of increased demand for cane (quantity) in competitive areas and the relatively higher cane purchase prices offered by both incumbent and new mills provided a strong incentive to farmers to grow cane. This both attracted many farmers who had not previously grown cane to plant it; and incentivized cane growers (old and new) to increase their cane acreage over time. As MTIC granted additional cane milling licenses between 2005 and 2018, more small mills entered the milling industry and the dynamic described in this section continued. This led to a significant increase in the aggregate area planted to cane in Uganda over this period as well as a subsequent increase in domestic production of raw and refined sugar.

5.3 Decline in coordination between millers and growers

While the introduction of competition in cane milling led to a number of positive developments for farmers near cane mills -- increased cane prices (and thus incomes) for cane growers and expanded opportunities for small and medium-scale farmers to grow a high-return crop -- the increase in cane milling competition led to a decline in coordination between (a) millers and growers within each region; and (b) an increase in the supply and demand for cane at the national level. The decline in coordination led to several negative outcomes, including a decline in registration of cane growers, and in cane grower access to inputs, as well as an oversupply of cane that led to a crash in cane purchase prices from 2018-2021.

5.3.1 Decline in registration

Over time, the increase in miller competition led to a decline

in both the share of cane growers registered with a mill and the share of cane acreage registered; both of which reduced the coordination of supply of cane (from growers) and demand for it (by millers). For example, because the small mills did not register cane growers, when miller competition increased in an area, some growers who had previously been registered with a large mill shifted to being “spot sellers” of cane, while many new growers were never registered (EPRC, 2021a). At the same time, among growers who had registered one or more cane fields with a large mill and later decided to expand their cane acreage, some chose not to register the additional cane acreage (gardens, fields) with the mill (ibid, 2021a).

5.3.2 Decline in cane grower access to inputs and extension

When a registered cane grower who has received inputs on credit and extension from a large mill chooses to “side sell” their cane to a small mill, this implies that the large mill will not be repaid by the farmer for the cost of aid he/she received as originally agreed. As an increasing number of registered and aided growers began to “side sell” to small mills, and fewer existing and new cane growers chose to not register with large mills, this increased the risk to large mills of grower default on input received on credit. Eventually, the large mills in Buganda and Busoga stopped offering inputs on credit to new growers, though for a while they continued to do for reliable growers with whom they had long-term relationships.

Because large mills have been the only reliable source of both yield-enhancing inputs (such as inorganic fertilizer and pesticides) and cane-related extension for many cane growers, the breakdown of miller-grower coordination has resulted in reduced access to such inputs and extension advice for many growers (EPRC, 2021b). By contrast, when faced with no competition (prior to 2005), large mills were relatively more willing to provide such inputs on credit as millers could count on cane growers delivering their cane to the mill as agreed, as farmers had no other buyer of their cane. This decline in cane grower access to yield-enhancing inputs and extension is a significant setback because average cane yields in Uganda are relatively low and have remained stagnant over the last 20 years. Improvements in cane grower productivity are also necessary for growth in domestic production of sugar and by-products to be

both sustained and inclusive — resulting in widespread improvements in farm and household incomes in cane-growing areas.

5.3.3 Increase in the size of nucleus estates owned by large cane mills

As large mills began to face more competition, the subsequent decline in registration and increase in side-selling and input loan default began to reduce the large miller's perception of the reliability of growers in the area to supply the cane needed from outgrowers. In response to this, and likely other factors, some large mills began to increase the size of their nucleus estates. At some point, these nucleus estates also shifted from cane varieties that mature in 18-months to ones that mature in 12-months. These two developments increased each large mill's capacity to produce its own cane input. Barring an increase in crushing capacity (and actual usage rates), an increase in potential cane production by large mills would likely reduce the amount of cane they would need to purchase from independent outgrowers in any given year.

In summary, the entry of new mills into the cane sector introduced competition to the original three large-scale mills, which led to higher cane purchase prices for farmers and more farmers growing this high-return crop. At the time, this development may have appeared to be a uniformly positive development for small and medium-scale farmers near these mills. However, given the absence of effective public oversight and governance of miller-grower relationships, the benefits of the increase in miller competition eventually came at the expense of (a) a decline in coordination of the supply of and demand for cane at both local and national levels; and (b) a decline in farmer access to quality extension on cane production as well as yield-enhancing inputs on credit. This pattern is not unique to sugarcane or to Uganda, as research on coordination and competition within cotton subsectors across a number of African countries found a similar result. Within a context of (i) imperfect credit and input markets; (ii) high asset-specificity of investments by processors; and (iii) weak government provision of public goods and governance in the sub-sector; there is an inevitable tradeoff between the benefits of more competition and the benefits of more coordination (Poulton et al, 2004).

5.4 Oversupply of cane and crash in cane purchase prices (2018 – 2021)

By 2018, the significant growth in cane acreage appears to have exceeded the demand for cane by large and small mills at both the local and national level. Thus creating a situation of oversupply of cane produced. Based on available data on the Ugandan sugar industry and various KIs conducted for this study, an oversupply of cane production appears to be the main factor that led to a steep decline in cane purchase prices from 2018 thru 2021, as discussed more below. Further research and additional sugar industry data is required to better understand the role and nature of cane supply and demand during this time period, along with other factors that may have influenced cane purchase prices.

An oversupply of cane likely explains why large mills in Busoga and Buganda decided to stop registering new farmers in 2018, and to begin to use “cane delivery permits” as a way to ration cane supply the mill needed to purchase from growers. This represented the third key structural change to the sugarcane subsector during the 2000-2021 period. While permits had been long been used by large mills as noted above, they took on much great importance since there were many cane growers whose cane or ratoon had reached maturity (18 months). But these outgrowers were not able to obtain a permit from a mill to harvest and then deliver their cane. As discussed more below, permits have increased grower marketing costs, reduced the transparency and predictability of market access, and even led to cases of corruption in the permit access process and a black market for permits. The combination of no new registration and rationing of permits (even among registered growers) effectively ended market assurance for many growers during this period, leading many farmers to stop growing cane entirely.

5.5 Sugar Act, 2020, and zoning

As the Sugar Act was under consideration by government in 2019/20, the large mills requested that zoning of cane marketing be implemented as recommended in the National Sugar Policy (2010). Opponents of zoning argued that if zoning were implemented, there would no longer be competition between large and small firms. Thus cane growers in many areas would face lower cane prices, and will not be able to consider selling their cane to a mill outside

of their zone. The Sugar Act of 2020 was passed without the inclusion of a recommendation to implement cane marketing zones. In response, large mills responded by continuing to expand the size of their nucleus estates, in part by gaining access to public land. This development has further weakened coordination of cane grower production and miller cane demand, thereby further reducing cane grower market assurance. While the Sugar Act 2020 did not change the status quo regarding cane marketing, it nevertheless represented a fourth key structural change in the sugarcane subsector due to the response by large mills.

Unless cane crushing capacity in a region increases (and/or the actual usage of that capacity), then an increase in a large mill's nucleus estate is likely to decrease the quantity of cane the mill will purchase from growers, and hence the number of farmers that can grow cane. It is vital to note that the inclusion of small and medium-scale farmers in sugarcane production is the predominant way by which the growth in the sugarcane industry directly benefits many small and medium-scale farm households via increased farm income per acre, which subsequently leads to indirect economic benefits to their communities.

Unfortunately, in the absence of a functioning public regulatory agency to facilitate coordination of sugarcane production and milling, it appears that the policy debate over zoning in 2020 could have only considered the following two options:

- 1) The status quo arrangement i.e., No restrictions on farmer cane marketing decisions; no restrictions on newly licensed cane mills (such as their location).
- 2) Zoning (of cane marketing) i.e. Where existing mills are granted geographic zones in which they have exclusive right to buy cane, implying that cane growers in a given zone would have only one marketing option – i.e. one mill to which they could legally sell their cane.

However, these are not the only options. A potential third option could be for MTIC or a public regulatory agency to grant geographic zoning rights to existing mills yet prevent a miller from using its monopsony (market) power to set an unfairly low price for cane in their zone. This would be achieved through oversight by a public regulatory agency charged with negotiating and setting this price, maintain regular consultations with both millers and grower

associations, and adjudicating disputes. In this case, such an agency could apply a “fair”, consistent, and transparent cane price formula that reflects both market values of sugar (and perhaps the value of by-products sold by a mill) as well as production costs of farmers and fixed and variable costs of millers. If properly implemented, this third option could enable the Ugandan sugarcane sub-sector to enjoy the benefits of both coordination (market assurance for growers/millers; miller provision of inputs/extension on credit), and competition (a fair cane purchase price -- that enables growers with adequate land and knowledge of appropriate crop management practices to operate profitably over time; and millers to cover their fixed and variable costs of production and earn a reasonable profit).

Public regulatory agencies are commonly used in high-income countries to oversee “natural monopolies” such as local electric and water companies and protect consumers from monopoly pricing, while also ensuring that consumers pay a rate for electricity and water service that enables the companies to cover their costs and make a reasonable profit. In practice, defining the “fairness” of formulas can be contentious, and information on a supplier's true costs of production are not always easy to obtain, yet it is a necessary challenge to meet, and the outcome is typically much better for all parties than those observed in cases of a monopoly or monopsony situation where there is no attempt to provide regulatory oversight.

It is important to note that for a public regulatory agency such as this to be effective in implementing their mandate, it must be appropriately designed, staffed, and funded. It must also be able to implement its mandate impartially, which implies that its leadership must be protected from “capture” by the more politically powerful actors in the sector¹⁵ (millers, at present) and from potential political whims of a single politician, such as a Minister.

15 “Capture” of regulatory agencies by sector actors with the most wealth and political power (usually large companies) is a challenge in many countries; this likelihood can be reduced with an appropriate governance structure, though is also a function of the underlying level of government accountability and transparency.

6.0 SUGARCANE PRODUCTION IN UGANDA

6.1 National Sugarcane production and productivity

Uganda's sugarcane industry has expanded cane production by three-fold (over 380%) over the last two decades from about 1.5 million tons in 2000 to 5.8 million tons in 2020 (Figure 1B, Annex) (FAOSTAT, 2021). This growth in production is almost entirely explained by expansion of land harvested under cane from (from approximately 20,000 ha in 2000 to over 81,000 ha in 2020), as farm-level sugarcane productivity has remained static at 28 MT/acre over those 20 years. Participants from FGDs and expert KIs revealed that the main sources of additional land for sugarcane growing have included the conversion of forests and public land (especially ranches) to cane growing; farmers allocating more of their arable land to cane, and farmer cane acreage expansion via the land rental market.

Within East Africa, Uganda has the second-highest annual average sugarcane yield (28.7 tons/acre) over the past 20 years, behind Kenya with 30.6 tons/acre yet ahead of Tanzania with 28.2 tons/acre. A comparison of annual sugarcane yield between those three East African countries and Brazil and India over time shows two main patterns. First, none of the countries have managed to consistently improve average yields in the past 20 years (Appendix 2, Figure 2B). Second, average annual cane productivity has varied more over time in Tanzania and Kenya relative to the other countries. Lack of yield growth in these countries is due in part to stagnation in the adoption of yield enhancing technologies such as use of fertilizers and irrigation. A key factor influencing farmers' technology adoption and investment in a crop like sugarcane are the specific institutional production arrangements between growers and millers that can affect farmers' price incentives and access to inputs, which subsequently affect their cane productivity. For example, the decline in Tanzanian average cane yields between 2008 and 2017 is attributed to decreased productivity on government run estates, low levels of input use, and lack of farmer response to increased disease stress. Many farmers did not choose to invest in productivity-enhancing technologies to address those constraints due to low expected returns to cane, which

stemmed from changes in institutional arrangements that discouraged production and investment (Derksen-Schrock et al, 2011).

6.2 Economic fundamentals of Smallholder sugarcane outgrower schemes

Estimates from the quantitative household survey data (Panel A, Table 1) show that during the season between December 2000 and November 2021, smallholders planted about 220,000 new acres of cane and harvested area about 75,000 acres. Given an average productivity of 29 MT per acre, this yielded some 2.2 million MT harvested cane, which represents approximately 37 percent¹⁶ of national cane production that year. This was an outcome from utilising inputs equivalent to Ugx 147 billion (Panel B, Table 1); that generated total income valued at Ugx 197 billion (Panel A, Table 1). However, performance in terms of total gross income (a proxy for wealth created), that amounted to Ugx 50.4 billion for the country, varied dramatically across regions, with Buganda experiencing a loss of about Ugx 3.0 billion in gross income during season.

¹⁶ This share is derived using the 2021 estimate of national sugarcane production of 5.8 million tons by FAOSTAT.

Table 1 Total output, input costs, income, and on-farm labour uptake on smallholder sugarcane farms in Buganda, Busoga, & Bunyoro, 2020/21

Measured total input and output indicators ¹	Buganda	Busoga	Bunyoro	Total
Panel A: Total production, area, productivity and income				
Quantity of Harvested cane (million) MT	0.39	1.15	0.61	2.16
Quantity of cane Sold(million) MT	0.35	1.12	0.56	2.03
Area planted ('000) acres	31.79	160.73	25.58	218.10
Area harvested ('000) acres	14.34	46.69	13.56	74.58
Yield (MT/acre)	27.52	24.63	45.15	28.91
TOTAL INCOME	34.76	107.93	54.52	197.22
Panel B: Total input costs				
Cane Seed (Billion Ugx)	5.70	18.15	1.23	25.08
Inorganic Fertilizer (Billion Ugx)	1.31	1.95	1.17	4.43
Organic Fertilizer (Billion Ugx)	0.16	0.01	0.00	0.16
Herbicides, pesticides (Billion Ugx)	1.93	1.83	0.15	3.92
Private extension (Billion Ugx)	0.09	0.15	0.02	0.27
Rented land (Billion Ugx)	5.38	15.41	0.80	21.59
Tractor hire (Billion Ugx)	2.43	10.93	2.04	15.39
Hired labour (Billion Ugx)	20.36	43.87	11.74	75.97
TOTAL COST²	37.36	92.30	17.15	146.81
TOTAL GROSS INCOME	(2.59)	15.63	37.37	50.41
Panel C: On-farm labour Indicators ³				
Children (male & female)	7,165	16,606	10,372	34,143
Adult female	47,028	190,036	47,740	284,804
Adult male	41,578	232,885	49,475	323,938
Total	95,771	439,527	107,587	642,885

Source: EPRC Sugarcane Household Survey (2021),

Notes: 1) Figures are imputed aggregated total across households; 2) Excludes costs of household labour and transport; 3) Number of individuals (family or hired) that engaged in on-farm labour in cane production in 2021; this should not be interpreted any given number of full-time annual or seasonal jobs generated in 2021.

The aggregate cane yield in Bunyoro sub-region of 45 tons/acre is considerably higher than the averages in Buganda (27.5 tons/acre) and Busoga (24.6 tons/acre) (Table 2). The aggregate sample average of 28.9 tons/acre is essentially the same as estimates of national cane yield in 2020 from FAO (29 tons/acre), which estimates that Uganda's annual national cane yield has barely changed from 2005 thru 2020 (Figure 1B, Annex). About 29,000 farming households engage in cane production in Uganda (Panel A, Table 2) and more than 640,000 labourers -- mostly from rural areas -- are engaged in full- or part-time work on smallholder cane farms (Panel C, Table 1).

Table 2 Farm household cane growing status by sub-region, 2021

	Buganda			Busoga			Bunyoro			Total		
	Weighted	cases	%	Weighted	sample	%	Weighted	sample	%	Weighted	sample	%
Panel A: Cane growing status in 2021												
Currently growing cane	4,394	238	54.97	20,474	472	52.91	3,801	273	61.21	28,669	983	55.51
Past cane grower	522	25	5.77	10,475	150	16.82	367	21	4.71	11,364	196	11.07
Non-cane grower	5,521	170	39.26	21,512	270	30.27	3,464	152	34.08	30,497	592	33.43
Total	10,437	433	100.00	52,461	892	100.00	7,632	446	100.00	70,530	1,771	100.00
Panel B: Entry of current outgrowers¹												
Before 2005	367	19	7.98	3,256	74	15.68	299	20	7.33	3,922	113	11.5
2006-2011	739	48	20.17	3,051	85	18.01	806	39	14.29	4,596	172	17.5
2012-2021	3,288	171	71.85	14,167	313	66.31	2,696	214	78.39	20,151	698	71.01
Total	4,394	238	100.00	20,474	472	100.00	3,801	273	100.00	28,669	983	100.00
Panel C: Current outgrower arrangements (2021)												
Registered & aided	2,228	112	74.17	1,305	40	25.64	3,103	217	94.76	6,636	369	68.84
Registered but not aided	247	14	9.27	3,740	80	51.28	26	3	1.31	4,013	97	18.1
Not registered and no	206	7	4.64	510	12	7.69	51	5	2.18	767	24	4.48
Multiple arrangement	257	18	11.92	505	24	15.38	40	4	1.75	802	46	8.58
Total	2,938	151	100.00	6,060	156	100.00	3,220	229	100.00	12,218	536	100.00

Source: EPRC Sugarcane Household Survey (2021)

The sugarcane subsector has yielded mixed smallholder participation outcomes. The study shows that more households took up cane growing during the period between 2012 and 2021 (Panel B, Table 2). And over 40,000 households, at one point participated in sugarcane growing between 2005 and 2021. But by the time data were collected in December 2021, this number had declined to about 29,000 (Panel A, Table 2). That is, about 28 percent of smallholder outgrowers had abandoned cane growing, with the highest attrition rate (33.8 percent) occurring in Busoga sub-region (Panel A, Table 2). This implies that one in every three cane farmers in Busoga have abandoned cane growing.

Box 1: Field account of sugarcane sector developments following the entry of new mills beginning in 2005
Benefits of competition:

- The sugarcane sub-sector became more inclusive because the number of farmers increased, and were able to sell to more processing mills i.e. Mayuge Sugar, Kaliro Sugar, Kamuli Sugar, GM, Sezibwa, Victoria, Bwendero, and Hoima Sugar, in addition to Kakira and Lugazi SCOL and Kinyara.
- Competition increased demand for sugarcane among mills leading to:
 - (i) All sugar mills (large and small) to embark on a campaign to promote sugarcane growing (at the peak of the competition) to meet the increasing demand for sugarcane as investment in milling capacity in the country expanded;
 - (ii) In Bunyoro sub-region both small and large mills in 2016 committed to help farmers start growing cane, but under unclear tenure arrangements for supplying sugarcane;
 - (iii) Millers started to pay rather high market sugarcane prices to outgrowers ranging between Ugx 136,000 -175,000 per ton country wide around 2016 and 2017;
 - (iv) Sugarcane farmers earned more income and better livelihoods. This attracted the attention of the wider farming community in the sub-regions of Bunyoro, Busoga and Buganda regions to venture into this 'less demanding - high income' earner compared to other crops;
 - (v) The outgrowers started to internalise the benefits of operating in

a rather competitive market environment (earning high prices than before). So, farmers responded by allocating more resources (land, labour and matching inputs without any more need for support from millers) to sugarcane production. But this undertaken without committing to register fields to specific millers; and

- (vi) A rise in independence and self-sufficiency in use of sugarcane yield enhancing inputs among sections of farmers. To the extent that some outgrowers opted to have loose ties with millers - without entering input contracts (the so called registered but not aided).

Unintended Outcomes:

- The sector become competitive but weakly regulated – which disrupted the fundamental processor-miller institutional arrangements (of registering cane fields). This led to four (4) negative growth impacts:
 - (i) Cut-throat competition for cane among millers located close to each other. For instance, five out of the eight operating small mills are located near the 2 large mills (Kakira and Lugazi SCOL);
 - (ii) Less commitment from millers to guarantee a secure market access, and access to inputs for outgrowers;
 - (iii) Disabling the capacity of millers to have a data base to efficiently monitor volumes of cane from the outgrowers; which most likely led to production of excess sugarcane beyond processing capacity in the country. Mainly driven by a new pool of *problematic* farmers, "the spot sellers", who never registered fields with millers.

6.3 Expansion in milling capacity

Available secondary data from MTIC (2020) indicate that 33 mills had been licenced by 2020, with a combined milling capacity of 71,850 tons per day, compared to only 21,700 tons per day provided by the 4 mills before 2005 (Figure 3B, annex). However, results from the community survey (Table 3) reveal that only 12 of the 24 licenced mills are operational within the study sub-regions (Buganda, Busoga, and Bunyoro). The study further shows that these 12 mills have a combined licenced processing capability of 32,525 tons per day (Table 3). It is also important to note that, the licensed mills by MTIC has not actualised into operational mills country wide (Table 3B, Annex B).

Nevertheless, cane processing is still dominated by four large mills - Kakira, Lugazi SCOU, Hoima and Kinyara (Table 3 &

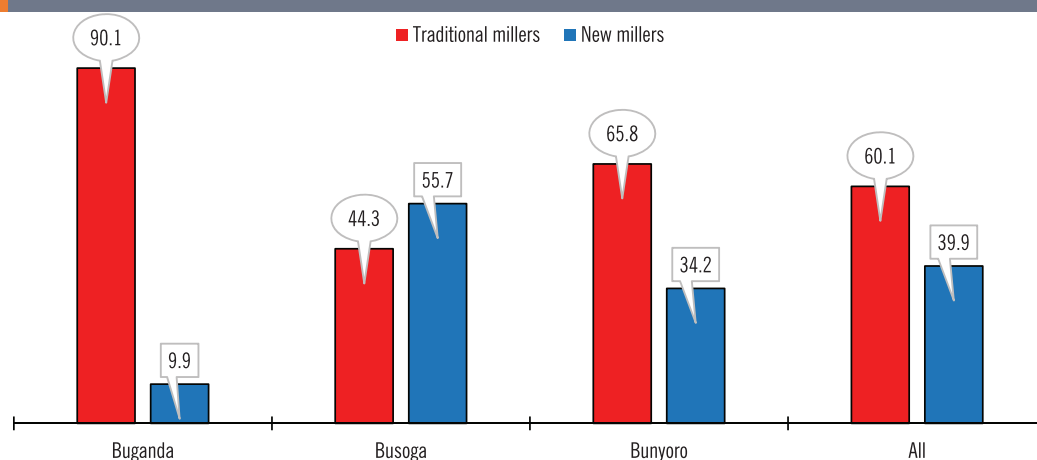
Figure 1). It is also important to note that: (i) currently, each sub-region has an average of four operational mills (Table 1); (ii) there are indications of intense competition between new smaller mills and traditional large mills within Busoga sub-region. This finding is corroborated by information in Figure 1 showing that more farmers (about 56 percent) in Busoga sold cane to the new smaller mills in 2020/21 than large mills; and (iii) there are instances where cane farmers are compelled to sell their cane to a mill in a relatively distant sub-region. For instance, communities reported that some farmers from Bunyoro sell cane to two small distant mills (Victoria), which are located in the Buganda sub-region (Table 3). This has been inevitable because, as the sector has expanded, over 50 percent of smallholder cane growers operate outside the 25 km 'economic zone' growing distances proposed in the 2010 NSP (see Section 5.2, Panel C Table 9, Figure 5B, Annex B).

Table 3 Reported share of farmer sugarcane sales by subregion and mill (%) and licensed processing capacity of mills, by sub-region (2021).

Location (sub-regions)	Name of the mills (year founded)	Licenced processing Capacity (MT/day?)	Where hhs in your area sold mostly			
			Buganda	Busoga	Bunyoro	All
Buganda	Lugazi SCOU (1924)	4,000	42.86	3.61		13.73
	GM sugar (2005)	2,500	28.57	8.43		12.42
	Ssezibwa sugar mill (2012)	1,200	11.9			3.27
	Victoria sugar factory (2018)	1,500	7.14		3.57	2.61
Busoga	Kakira sugar factory (1930)	7,500	2.38	31.33		17.65
	Mayuge sugar industries (2005)	1,500		21.69		11.76
	Kamuli sugar factory (2010)	1,500	7.14	15.66		10.46
	Kaliro sugar factory (2011)	1,500		19.28		10.46
Bunyoro	Kinyara sugar factory (1969)	9,000			35.71	6.54
	Hoima sugar factory (2016)	1,500			35.71	6.54
	Kyenjojo sugar factory (2016)	75			14.29	2.61
	Bwendero sugar factory (2018)	750			10.71	1.96
TOTAL		32,525	100	100	100	100
			(n=18)	(n=36)	(n=18)	(n=72)

Source: EPRC (2021) Sugarcane Community Survey; and MTIC (2021). Notes: Large-scale mills have names in bold letters.

Figure 1 Figure 1: Proportion (%) of farmers' cane sold to traditional (large) and new (smaller) mills, by sub-region, 2020/21 season



Source: EPRC Sugarcane Household Survey (2021)

7.0 EMERGING CHALLENGES IN THE SUGARCANE SECTOR

This section uses study results to explain and illustrate some of the main challenges that have emerged in the sugarcane sector that have had negative effects on cane growers, processors, and the sugar sector, particularly since 2018. It is important to emphasise that many of these challenges were foreseen by technocrats within the MTIC and MAAIF as early as 2010 and were described in the 2010 NSP. A key objective of the NSP was to provide a strategy and institutional framework through 7 recommendations (noted in Introduction), which if implemented would facilitate the coordination needed between growers, millers, and government to ensure the sustained, inclusive development of the sugarcane subsector. Unfortunately, it appears that the subsector's failure to implement the NSP recommendations contributed to the emergence of many challenges that have become more problematic over time. The decline over time in adequate coordination between sector participants has created an environment in which it is doubtful that financially sustainable and inclusive growth in cane production and processing can return without significantly improved coordination.

By 2018, significant growth in national cane acreage appears to have resulted in a situation where there was more mature cane supply at the regional and national

level in some months than mills could process. In other words, the combination of cane supply from growers and large mill's nucleus estates exceeded the demand for cane, which resulted in an oversupply of cane production. In this situation, large mills prioritized their own cane acreage (when mature) for processing, and all mills ostensibly were not able to purchase as much cane from growers as was offered to them. As discussed in more detail below, this led to significant financial losses for all growers as cane purchase prices declined rapidly over 2018-2021, and significant reductions in market access for some growers, particularly those who were unregistered.

7.1 Entry into and exit from sugarcane growing by farmers

As noted above, 11,364 (28 percent) of outgrowers who had cultivated cane at some point have abandoned the crop as of 2020/21, with the highest (33.8 percent) attrition rate occurring in Busoga sub-region. Cane growers said that their decision to begin cane cultivation was mainly driven by high prices of cane relative to other crops (80% of cane growers) as well as peer influence (38.8%) (Figure 2a). Failure to sustain the markets for cane produced by farmers, followed by price disincentive partly explains the abandonment of cane growing by some households (see Figure 2(b)).

7.1.1 Inability to harvest cane at 18 months

Over 74 percent of sugarcane farmers reported that they are

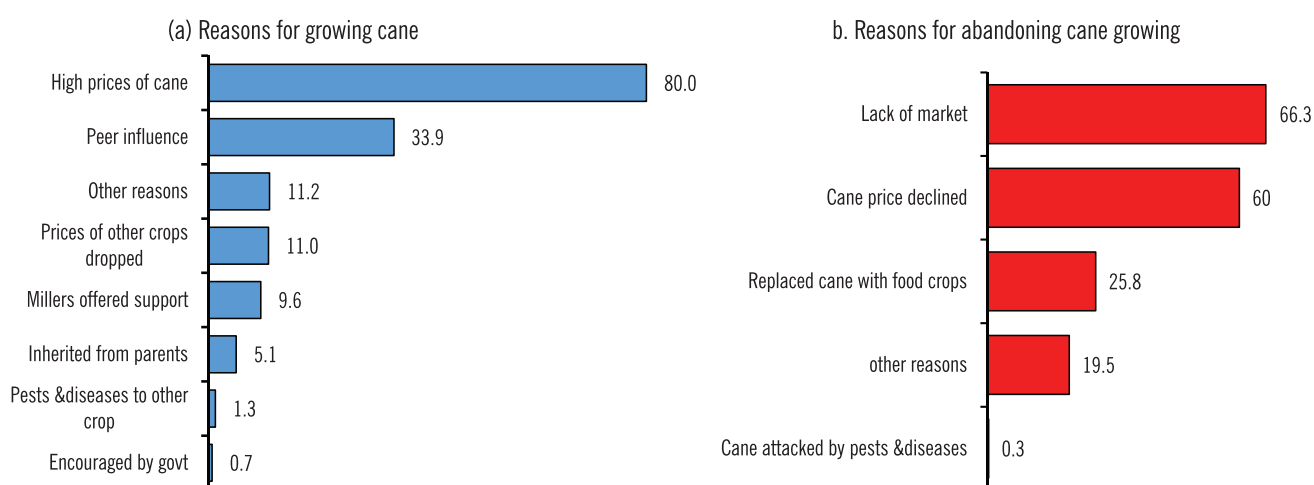
currently stuck with overgrown cane that is older than 18 months (Table 4). Furthermore, 86 percent -- about nine (9) out of every ten (10) farmers -- stated that the reason they had not yet harvested their cane was because they were unable to access a cane delivery permit from a mill (Figure 2). The permit problem seems to have been more severe in Busoga and Buganda respectively than in Bunyoro (Table 4).

Table 4 Share of smallholder participation in sugarcane harvesting and marketing in 2020/21 (%)

Cane grower harvesting	Buganda	Busoga	Bunyoro	All
Harvested cane in 2020/21 (%)	50.1	53.0	52.4	52.6
Cane harvested at least 17 months (%) (among those who harvested in 2020-21)	54.3	52.5	39.8	51.7
Age of unharvested cane (among growers who have not yet harvested)				
< 18 months (%)	28.4	24.8	33.1	25.9
> = 18 months (%)	71.6	75.3	66.9	74.1
Reasons for not harvesting yet				
No permit and no market (%)	87.4	95.0	2.9	86.3

Source: EPRC Sugarcane Household Survey (2021)

Figure 2 Reasons given by farmers for entering and exiting cane growing (%)



An implication is that if farmers are unable to harvest cane when it is ready to be harvested (18 months), their investment to date in the crop (inputs, labour, and land) remains effectively locked-up on sugarcane fields. In addition, the longer that a farmer's cane remains unharvested after it matures and reaches its maximum of extractable sucrose content (at 18 months, for varieties used by Ugandan growers), the more that this extractable sucrose content (commercial value) will decline¹⁷ – and hence, a farmer's gross revenue from selling cane. If the share of cane growers unable to harvest cane at 18 months was as high from 2018-2020 as it was in 2021, this could potentially explain why a recent resurgence of poverty was observed in cane growing regions. This development would also present a challenge for these cane-growing regions in meeting the NDP III development goal for wealth creation.

The rationing by mills of farmer cane delivery had resulted in some farmers not being able to harvest and sell their cane even though it was more than 25 months old – by which time its extractable sucrose content (main commercial value) would

¹⁷ For the cane varieties predominantly used by independent Ugandan cane growers, its maximum extractable sucrose content reaches its maximum level at 18 months, begins to decline between 20-24 months, then falls rapidly at 25 months and beyond.

have declined significantly. For instance, a representative of Busoga Sugarcane Growers Association (BSCGA) in Luuka district, in one of the KII gave estimates that only 20 percent of the smallholder outgrowers with registered cane fields (by the time of the study), managed to get permits from Kakira the only large mill in Busoga sub-region (Eastern region) – which he strongly attributed to excess cane that had been grown in the region. The problem of failure by farmers to harvest cane at 18 months was in some instances compounded by the rationing of cane delivery to mills. For instance, in Luuka district, one of the farmers in a FGD reported that *“in November 2020, he was given a permit authorising him to deliver 50 tons out of 5,000 tons that were ready to be harvested. And moreover, getting that permit involved a lot of bribery a factor he attributed to having surplus cane and low crushing capacity of mills in the district”*.

While both registered and unregistered growers had difficulties obtaining permits, it should be noted that most growers who had unharvested cane at 18 months or older were unregistered. This is an example of the inherent risk for growers if they choose to not register with a mill – and conversely, the benefits of registration for growers. This also demonstrates why it would be beneficial to both growers and millers to have legally binding and enforceable contracts.

The lack of binding and enforceable agreements also results in growers bearing most of the risk of adequate market access as compared to mills – particularly during a period in which cane supply is larger than demand. On the other hand, millers would benefit from legally binding and enforceable contracts as this would improve their assurance of cane input from growers as well as loan repayment.

7.1.2 Persistent decline in cane prices since 2018

The regional farm-level sugarcane prices reported by farmers during FGDs and by technical experts show since 2017, prices received by farmers have been declined by 33 to 44 percent, depending on the region (Table 5, Panel A). The prices for 2020 and 2021 noted in these interviews are consistent with the figures generated from the quantitative survey information presented in Panel B, Table 5 during field work in December 2021. This is consistent with KII evidence indicating a national oversupply of cane relative to miller demand. From the five years of available regional-level data, it also appears that cane prices from 2019 to 2021 were more similar across the three sub-regions than they were in 2017 and 2018.

Table 4 Farmer-reported sugarcane prices by region (nominal Ugx/metric Ton), 2017-2021

Source	Year	Buganda	Busoga	Bunyoro
Panel A: Qualitative KIIs & FGDs				
	2017	175,000	162,000	135,000
	2018		148,000	120,000
	2019		95,333	95,000
	2020	97,000	95,667	105,000
	2021	97,000	93,667	90,100
Panel B: Quantitative survey				
Median	Dec 2021	97,000	95,000	91,000
Mean	Dec 2021	95,282	92,782	97,907

Source: EPRC FGD Field Work (2021)

Figure 3 Trends in prices of sugarcane & Brown sugar (2010-2022)


Source: MTIC 2022

This decline in cane prices reported by farmers is confirmed by the overtime trending in prices reported by MTIC (Figure 3). However, Figure 3 also shows that to some extent cane prices received by outgrowers is influenced by market prices of brown sugar. In addition, Figure 3 shows that producer prices rebounded rapidly in 2022 after over 10,000 farmers had abandoned cane. This supports the supply-demand imbalance explanation above (in this Section 7.1.2) because of a weakly regulated sector, and consequently the breakdown in institutional production arrangements between millers and outgrowers following the entry of small new mills beginning in 2005 as explained in Box 1.

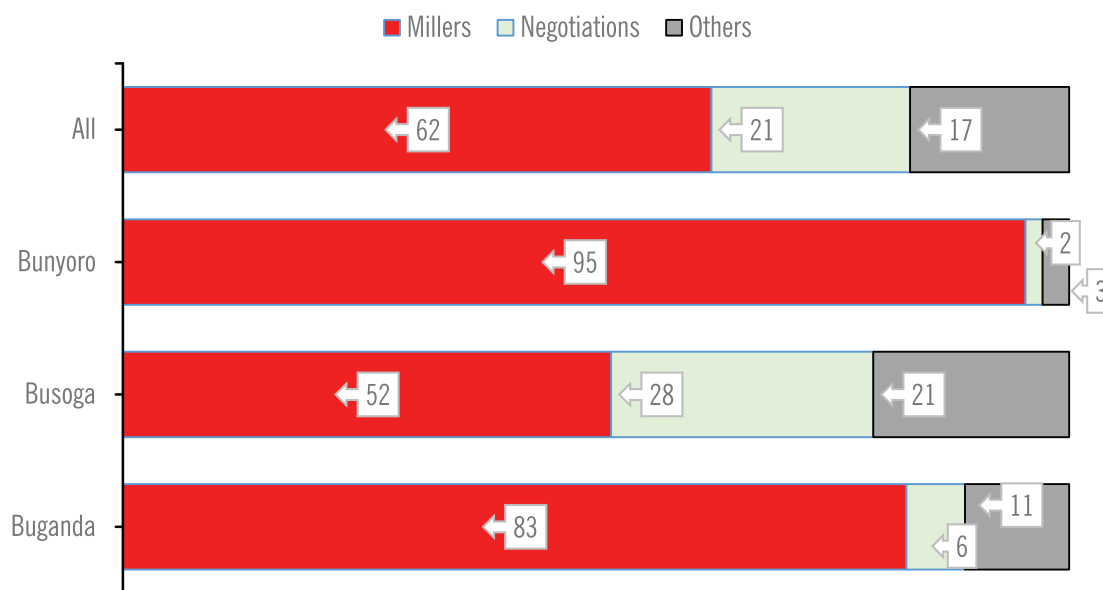
7.1.3 Determination of cane purchase prices

When asked if cane prices are determined primarily by millers, negotiation between millers' representatives and farmers (individually or thru grower associations), or other institutional arrangements (such as a price formula), nearly all farmers in Bunyoro and Buganda (95 and 83 percent, respectively) and half of farmers in Busoga (52 percent) responded that prices are primarily determined by millers alone (Figure 3). Cane farmers interviewed claim that the steady decline in prices beginning in 2018 is due to millers using their greater local market power relative to farmers to

set cane prices lower. Some farmers also believe that the relative uniformity of prices (Table 5) across regions in 2021 suggests that millers from different regions are colluding with each other against farmers. This is because prices reported by 2017 differed across regions (Table 5).

In a follow-up targeted meeting with millers, the research team was informed that different mills have different pricing mechanisms. Millers in Busoga and Buganda apply a World Bank formula¹⁸ (with minimum of 50,000 UGX/ton); and Kinyara has a pricing committee that sets prices every year (in July) and informs farmers of the new price. However, more research is warranted to determine the extent to which millers' relative market power can explain the decline in cane prices since 2018 as compared with other potential factors such as aggregate cane and sugar market forces, an excess of the domestic supply of cane and/or sugar relative to domestic and export demand for Ugandan sugar, changes in international prices of sugar, and/or trade policies of countries that are major importers of Ugandan sugar, etc.

¹⁸ The inability by millers to expound on the so-called World Bank (WB) formula was interpreted to mean prices set by market forces. This is because the WB is known to be responsible for the economic liberalization agenda in the country.

Figure 4 Cane grower perceptions of how cane prices are set (% of growers)

Source: EPRC Sugarcane Household Survey (2021)

Cane farmers' perceptions of how cane prices are determined suggest that in recent years, millers and farmers have not negotiated prices. This implies that farmers are left to be price takers due to their lack of market power relative to millers, which was reported to be the case before 2013 as well (MAFAP, 2013).

A situation in which either millers or farmers set cane prices unilaterally is not what either the 2010 National Sugar Policy or The Sugar Act 2020 proposed for the sector. The NSP recommended that the cane price be determined by negotiation between representatives for millers and grower associations as mediated by a Sugar Board. The Sugar Act 2020 goes further by providing a cane pricing formula that would be implemented by a Sugar Board, though the formula is either not adequately described or in error, as it does not include the price of any output of the cane crushing and refinement (such as the domestic market price of raw and/or refined sugar).¹⁹

It is important to note that the third (3rd) specific objective in the 2010 NSP is to **“provide a framework for product pricing based on market forces”**. This objective was

included because growers had previously told government of their frustration with what they perceived to be a lack of fairness and transparency in cane pricing, and government predicted that the process of cane prices determination would remain a contentious issue between growers and millers without public sector oversight and mediation of the process (NSP, 2010). The Sugar Act thus refers to a previously used cane pricing formula, though stated that it should be negotiated by representatives from millers, growers, and the government. The Sugar Act, 2020, also called for use of a cane pricing formula, though to date, government has not taken any action to oversee and mediate implementation of a formula. In order for a cane price formula to be “based on market forces”, it would have to include a current domestic market price(s) of sugar, such as the domestic wholesale price of raw and/or refined sugar, as relevant market value measures for sucrose²⁰. It would also likely need to consider current domestic input prices of both millers and growers. The NSP 2010 also called for growers to earn a share of revenues earned by millers from the sale of sugar by-products, which is an additional point of contention between growers and millers.

In the absence of an effective public regulatory agency

¹⁹ The cane pricing formula in the Sugar Act 2020 is $C \times R \times D$. Where - C=Weight (Tons) of sugar cane; R=Rendement (tons of sugar made per every 100 tons of sugarcane); and D= Percentage to be negotiated by concerned parties as decided by the Board and the minimum, shall be 50%. This formula is not functional unless it includes a unit price of raw and/or refined sugar, presumably the prevailing domestic wholesale market price.

²⁰ While the cane pricing formula in the NSP 2010 includes the price of sugar, the formula in The Sugar Act, 2020, surprisingly does not – nor the price of any other output of cane processing. This latter formula is inoperable without a product price or measure by which cane would be valued at any given point in time, which appears to have been an oversight.

for the sugar industry – such as the Uganda Sugar Board sanctioned to be established under Part II of the Sugar Act, 2020 -- neither millers nor growers are obligated to agree to and abide by a sugarcane pricing formula. Economists predict that a likely outcome of that institutional arrangement is that millers will choose to use monopsony or oligopsony power to set cane prices below the level at which millers could make a fair profit from their cane milling activities while also enabling growers to receive a price that also provides them with a fair profit.

7.1.4 Scarcity of cane delivery permits

7.1.4.1 Decline in cane market access

Study results generated from the qualitative survey (farmer FGDs and expert KII) revealed that at the peak of the national surplus supply of cane in 2018, millers in Eastern and Central regions (Kakira, Mayuge, Kaliro, Kamuli, SCOUT, and GM) began to use “cane delivery” permits to ration the quantity of cane they purchased from growers in a given month, thereby limiting the ability of growers to sell their cane to the mill when it matured. While permits had been long been used by large mills, they took on much greater importance from 2018-2021 as national cane supply (acreage at or beyond maturity) exceeded miller demand. During this period, many farmers who had been registered were unable to sell their cane for many months beyond maturity (when cane reaches its optimal value), if at all. While registered growers were considerably more likely than unregistered ones to be able to access a permit once their cane was mature, some registered growers were nevertheless unable to obtain a permit until many months later, when their cane’s extractable sucrose level had diminished.

This situation highlights again the benefits for growers of entering into legally binding and enforceable contracts with millers, as such contracts would provide growers with more reliable market access. It would also benefit millers in the long-term by reducing their risk of insufficient supply of cane from growers. At present, it is not clear if growers or millers could enforce such contracts, though a public sector regulatory agency could improve the likelihood that contracts are respected through both mediation of negotiations between growers and millers (ideally through a grower association) and improved coordination of supply and demand at a regional and national level. It is important to note that the refusal by millers to purchase all the mature

cane on grower’s land in their respective areas is not illegal or even unexpected: “rationing” is inherently what a market is intended to do when there is an imbalance between demand and supply of a commodity. Periods in which the demand and supply of cane could be significantly out of balance is also what economic theory would have predicted when MTIC began to grant licenses to new mills without: (a) adding certain license conditions – such as requiring them to be located within some specified distance of existing mills; and (b) public sector oversight of miller-grower institutional arrangements.

7.1.4.2 Emergence of unofficial costs to access permits and rent-seeking by non-growers

It was reported during farmer FGDs and expert KII that the scarcity of permits provided by millers promoted the proliferation of additional, unofficial costs for farmers to sell their cane to mills (Table 6). The emergence of these unofficial costs to pay middlemen has increased growers’ operating costs and thus reduced the profitability of sugarcane production (Table 6). As cane prices declined to less than Ugx 120,000 per ton (Table 6) in Kayunga district (Buganda), it became increasingly difficult for farmers to break-even – i.e. to cover both their prior operating costs and the new unofficial costs (Table 6) under a weakly regulated but seemingly competitive sugarcane marketing environment.

Table 6 Smallholder cane harvesting and marketing costs (Ugx/metric Ton) in December 2021

	Activity	Cost (Ugx/MT)
Official	Transport	30,000
	Cutting	20,000
	Loading	10,000
Unofficial	Permit Owner	30,000
	Driver	20,000
	Supervisor	10,000
	TOTAL	120,000

Source: EPRC qualitative survey – Field Work (2021)

While most farmers who accessed a permit were able to obtain it directly from a mill (98 percent), there is evidence of a black market for permits, particularly in Buganda where 6.9 percent of farmers accessing a permit reported a source

other than the mill (Table 7, panel A). In some cases, permits are issued by millers to influential people in government who do not grow cane yet have sought to obtain and sell permits for profit – i.e. rent seeking. Other individuals have also engaged in this rent-seeking effort, effectively forcing some cane growers with a legitimate request for a permit to have to obtain one from these rent-seeking individuals – for a fee. In other cases, individuals with access to a permit are buying cane from growers who lack one, extracting a fee from the grower, and then selling the cane to a mill (Table 7, panel B). The individuals are thus a new set of ‘invisible’ actors in the sugarcane subsector who are exploiting the scarcity of permits -- and hence the high value of them for farmers with mature cane – to make money. This kind of rent-seeking activity is more visible in Buganda and Busoga (Table 7, panel B and C). This group of actors are said to be persons of various categories: (i) elites and influential people from government i.e. military generals, members of parliament (MPs), and resident district commissioners (RDCs) with capacity to deal with mill supervisors to get permits; (ii) those who own important assets like tracks to transport cane, and can withstand the long lead times to get paid by the millers; (iii) some are leaders of farmers’ associations who have decided to profiteer from positions as leaders.

For growers in Bunyoro sub-region who signed contracts with the large mill Kinyara, access to permits was technically not a challenge as Kinyara would both decide when to harvest a contracted farmer’s cane and provide the labour and transportation themselves²¹. Yet, these growers were nevertheless adversely affected by the oversupply of cane from 2018-2020 because Kinyara did not always harvest their cane when mature, in which case a grower’s cane value would fall. In addition, some growers in this situation reported facing “unofficial costs” to selling their cane. For example, it was reported that for a contracted farmer to have their mature cane harvested and delivered to the mill by Kinyara’s cane harvesting program, some had to pay an unofficial fee of Ugx 500,000 to field supervisors appointed by the miller in order to get on the program’s list. Contractors hired by millers to harvest cane also sometimes demanded that farmers give them a goat in addition to food for cutters and track drivers. In a farmer FGD, it was mentioned that in Kikuube district (Kimwenamabale sub-county):

“more than 90% of the poor farmers are frustrated by long delays to have cane harvested by the miller and cannot pay bribes to supervisors. Farmers are selling cane fields for

21 Apparently, such conditions were specified in these contracts, though it appears that many farmers were not fully aware of the contract terms due to the contract length (24 pages or more), legal language, and/or growers’ education or literacy constraints.

Table 7 The dynamics of farmer access to and use of permits in sugarcane harvesting and marketing (% of farmers)

	Buganda	Busoga	Bunyoro	All
Panel A: Permit accessibility				
Have access to permit to sell cane	72.2	37.9	6.9	38.6
Source of permit				
Miller	93.1	99.5	97.6	97.7
Other agent	1.1			0.3
Trader (middlemen)	1.8			0.5
Other farmer	2.0	0.5		0.9
Others sources	2.0		2.4	0.6
Panel B: Cane sold to:				
Miller	78.0	47.8	95.3	58.8
Other agent	3.2	9.2	2.0	7.3
Trader (middlemen)	12.8	29.3	2.1	23.1
Transporter		11.7		8.4
Farmer group		0.8		0.5
Other farmer	4.3	0.9	0.6	1.4
Others	1.7	0.4		0.5
Panel C: Farmer sold Cane to permit owner				
	88.3	99.8	68.6	95.9

Source: EPRC Sugarcane Household Survey (2021)

Ugx 1 million for 3 harvesting cycles (for a spell of about 6 years) to middlemen who connive and receive insider information from some unscrupulous mill management staff”.

7.1.4.3 Location of farmer cane sale, market uncertainty, and current cane growing status

To better understand why some cane growers have decided to continue to grow cane while others have not, we analysed quantitative survey data from both types of growers on the location where they sold their cane, and 48.7 percent sold cane from their farm, while 42.6 percent have been able to sell their cane at the mill (Table 8). By contrast, farmers who abandoned cane were much more likely (about 73 percent) to have sold cane at their farm, while only 18 percent were able to sell cane at a mill (Table 8, panel A).

Table 8 Farmer location of cane sale, number of cane millers a farmer has sold to previously, and cane growing status

Responses	Still growing cane in 2021	Abandoned cane growing	All
Panel A: Farmer's location of cane sale¹			
At the farm	48.7	72.9	55.5
At the mill	42.6	17.8	35.6
At the collection centre	0.1	0.0	0.1
Never sold	8.6	9.3	8.8
	100.0	100.0	100.0
Panel B: Number of millers farmer sold cane in the past			
One miller	83.3	95.9	85.1
More than one miller	16.7	4.1	15.0
Total	100.0	100.0	100.0

Source: EPRC Sugarcane Household Survey (2021).

Notes: 1) responses for farmers who have abandoned cane growing refer to the year in which they last sold cane.

There are several reasons why the location of a farmer's cane sale may be related to his/her likelihood of continuing to grow cane or stopping it, particularly in recent years. First, a farmer's gross sales income from selling cane to a mill is based on both the quantity of cane delivered (in tons) and the purchase price per ton. If a farmer is not able to be physically present when his/her cane is weighed by the

mill²², this significantly reduces the transparency of the sale, from the farmer perspective, opening the potential for opportunistic behaviour by a mill. If a mill representative underreports the true weight of a farmer's cane, this farmer's income will be reduced.²³ This includes farmers under contract with Kinyara, as their contract does not allow them to harvest or deliver their cane to the mill – Kinyara handles this -- thus these farmers are not likely present when their truck loads of cane are weighed at the mill²⁴.

Second, farmers who are unable to access a permit and have to resort to selling their cane to a rent-seeking individual with a permit will have to pay an additional, unofficial fee to that individual – apart from transportation costs to the mill. If farmers have to pay unexpected, unofficial costs to sell their cane, their net earnings from the sale will be lower, which could increase the likelihood that they decide to **abandon cane production**.

Another potential factor that can explain why some growers continue with cane is that those who sold cane to more than one mill in the past are somewhat more likely to continue growing cane (Table 8, Panel B). This could indicate that such farmers are able to improve their market access by selling to more than one mill. Yet, if farmers who have sold to more mills in the past happen to have more cane fields than other farmers, this could imply that they have more total cane acreage, which we would expect would improve the probability that a farmer continues with cane.

7.2 Decline in miller registration of sugarcane fields

Registering cane fields by millers is a key pillar of coordination between millers and outgrowers of the supply and demand of cane at a local level. This is undertaken by representatives of a mill in consultation with the chairman of the local village council (LC1). Registration of cane fields takes place either before sugarcane is planted (as in Bunyoro sub-region), or when a sugarcane field is 1 to 6 months old (as in Buganda

²² Each mill has a scale it uses to weigh a farmer's cane, which is measured as the weight of a truck with the farmer's cane minus the weight of the truck after the cane is unloaded.

²³ While the study does not have evidence that underreporting the weight of farmer cane deliveries occurs in cases where a farmer is not present. It would be naïve to conclude that this could not potentially happen. No mill, wholesaler, or other marketing agent would buy a commodity at a given price per kg or ton from a farmer (or trader) they do not know without themselves or a trusted third party being present when it is weighed.

²⁴ In addition, farmers contracted with Kinyara do not always receive detailed information about the costs of labour and inputs used by Kinyara employees on the farmers cane fields, which suggests that farmers are not in a position to know whether or not they are receiving a fair accounting of their true production costs.

and Bunyoro). This is when critical information is compiled by a miller to establish long-term assurance of their access to harvested cane and outgrower access to assurance by the mill to begin to buy their harvested cane at 18 months.

The quantitative survey data captured farmers' historical sugarcane production arrangements with mills (Table 9). This data shows that the 41,800 smallholder outgrowers in these three sub-regions could be categorized as follows: 74 percent (31,049 growers) had been registered and aided at one time – received inputs and/or services on credit (Panel A, Table 9), 16 percent (6,492) had been registered but not aided; and 10 percent (4,259), had neither registered nor been aided by any mill. This latter group were thus “spot sellers”, meaning that they waited until their cane was mature to try to find a buyer – they relied on the “spot market” for cane. However, the essence of this categorisation was largely abandoned by large mills in Buganda and Busoga at the time of the study in 2021, as the decline in farmer registration and increase in default on input loans led them to stop offering aid to any new growers as well as any grower that had defaulted previously.

In Bunyoro and Buganda, 76 and 97 percent of first-time growers were both registered and aided by large mills, respectively, as compared with 22 percent in Busoga (Table

9, Panel A). By contrast, most first-time growers (60 percent) in Busoga were registered (without aid). However, since 2005, the practices of registering cane fields and extending input loans (aiding) by large mills declined, with the decline being more pronounced among farmers who started to grow cane in the period 2012 – 2021 (Table 9, panel B). This result from the quantitative household survey is confirmed by information gathered from farmer FGDs and expert KIIs (with association leaders) that indicated that large mills in Busoga and Buganda largely stopped registering cane fields in 2018.

It is important to note that the number of years a farmer has been dealing with the same miller tends to be longer among registered and aided farmers on average (8 years) compared with growers who were registered but not aided (5.3 years) and with unregistered farmers (2.5 years) (Table 9, Panel B). Likewise, for each of the three categories of grower-miller institutional arrangements (*i.e. registered & aided; registered & not aided; and spot sellers*), the share of growers located within 25km of the mill to which they sold in their first year is very similar to the share of growers further than 25km from that mill (Table 9, Panel C). Most farmers who reported growing cane are located within 100km of the closest mill, with more than half (50 percent) operating further than 25 km from the mill to which they last

Table 9 Cane growers' institutional arrangement with a mill the year they first sold cane to any miller.

Responses	Registered and aided (n=31,049)	Registered but not aided (n=6,492)	Not registered and not aided (n=4,259)	Total (n=41,800)
Panel A: Region	Share of growers (row %) by institutional arrangement with mill			
Buganda	75.6	8.5	15.9	100.0
Busoga	22.3	60.3	17.4	100.0
Bunyoro	96.7	0.7	2.6	100.0
Panel B: Time period	Share of growers (row %) by institutional arrangement with mill			
Before 2005	57.9	40.2	1.9	100.0
2006-2011	51.8	42.6	5.6	100.0
2012-2021	47.5	33.8	18.7	100.0
Average years selling to same mill	8.1	5.3	2.5	5.7
% of growers still selling to same miller	75.2	68.1	39.6	67.6
Panel C:	Grower average distance to mill (Km)			
Within 25Km	50.9	35.5	13.7	100.0
> 25Km	47.8	37.9	14.4	100.0

Source: EPRC Sugarcane Household Survey (2021).

sold cane (Figure 5B, annex). This has practical implications for the strategic objective 3 in the 2010 NSP, which called for implementation of zoning of cane marketing and defined cane growing zones for mills as the area within a 25 km radius of the mill. That said, it is not clear from the NSP how the 25 km distance from mill recommendation was derived. If the NSP assumed that growers more than 25 km from a mill would be too far from the mill to deliver cane to the mill and still remain profitable, the survey data indicate that such an assumption is not valid.²⁵

The significant decline in registration of sugarcane gardens beginning in 2018 has *four* (4) major implications. *First*, it significantly reduces the exchange of information provided by a grower to a mill regarding the grower's acreage of cane and its age, which in aggregate provides mills with information about expected local grower cane supply. It also provides information for growers regarding the mill's intent to purchase the farmer's cane (or not) at maturity (18 months). *Second*, indeterminate, a keeping track of cane fields through registration is important for market assurance for outgrowers --who can sell the most cane and effective sugar content to a mill if their cane is harvested at 18 months (not later), and who need the mill to acquire their harvested cane within 24 hours of harvest. *Third*, it inhibits millers from extending input credit to growers without fear of default. This is an important factor in ensuring sugarcane farm level productivity and profitability (a fundamental indicator of sugarcane sector performance). Fourth, registration of cane fields is one way to generate a data base that will guide the sustainable development of sugarcane production and processing. This requires that millers and growers coordinate, mainly via registration of cane fields. This information helps millers estimate the quantity of cane produced each year to plan appropriately for the processing capacity of the mill.

It is important to note that registration of sugarcane gardens is one fundamental pillar that is critical to ensure the sustainable participation of smallholder outgrowers in the cane growing business; that has suffered due to implementation gaps in the 2010 NSP and the Sugar Act, 2020 as a consequence of market failures.

7.3 Limited access to public support to smallholder outgrowers for extension, inputs, and R&D

The study discovered that over 95 percent of input and extension support extended to smallholder outgrowers is provided on credit by millers and is largely (88 percent) paid for by farmers (Figure 4B, annex B). Further analysis in Table 10 broken down in time intervals (before 2005 to 2021), shows that the share of growers receiving inputs on credit from large mills has declined over time²⁶ (Panel A, Table 10). For example, in Buganda, the share of growers receiving inputs on credit from SCOUT fell from an average of 86 percent prior to 2005 to 82 percent in the 2006-2011 to 60 percent in 2012-2021 (Table 10, Panel A). In Busoga, the share of growers receiving inputs on credit from Kakira fell from about 35 percent prior to 2005 to an average of only 5 percent from 2012-2021. By contrast, nearly all farmers in Bunyoro received inputs on credit from Kinyara up until 2011, then 89 percent between 2012-2021. It is likely not a coincidence that the sub-region with the highest cane yield in 2021 – Bunyoro, at 45 MT/acre) – is the one where most growers received inputs on credit, as compared with yields in Buganda and Busoga, with yields at 27 and 25 MT/acre, respectively (Table 1, Panel A).

²⁵ In addition, given differences in road availability and quality within and across sub-regions, defining a zone based on a maximum "cost effective distance from the mill" would not result in the same distance for every village.

²⁶

Small mills do not provide inputs on credit

Table 10 Share of growers that received input credit support from millers when they first started growing cane, by type of input, time period, and region (2005-2021)

	Time Period	Buganda	Busoga	Bunyoro ¹	All
Panel A: Received support when they started growing cane (%)					
	Before 2005	85.6	34.5	100.0	44.3
	2006-2011	81.7	31.2	96.2	50.7
	2012-2021	60.0	4.7	89.1	25.0
Panel B: Category of input credit from millers					
Extension	Before 2005	100.0	100.0	-	100.0
	2006-2011	100.0	61.1	-	83.5
	2012-2021	47.4	64.3	30.0	46.3
Seedling	Before 2005	100.0	4.7	-	22.4
	2006-2011	100.0	100.0	-	100.0
	2012-2021	96.5	64.3	100.0	95.2
Fertilizers/herbicides	Before 2005	89.7	-	-	16.7
	2006-2011	82.2	-	-	47.2
	2012-2021	27.2	-	33.3	31.6
Financial credit	Before 2005	12.8	-	-	2.4
	2006-2011	-	-	-	-
	2012-2021	-	-	-	-
Others	Before 2005	10.3	4.7	-	5.7
	2006-2011	-	-	-	-
	2012-2021	7.0	64.3	46.7	14.3

Source: EPRC Sugarcane Household Survey (2021).

Note: 1) While nearly all growers in Bunyoro received inputs on credit from Kinyara sugar – the sole mill there until 2016 – the EPRC survey was not able to record input-specific information for these farmers. The reason is that Kinyara’s contracts with farmers stipulated that the mill would apply any/all inputs to the growers’ cane fields; and growers reported that Kinyara often did not give them specific information about what inputs were applied, rate of input application, unit costs of specific inputs, etc. Thus, these growers were not able to indicate which inputs they had received on credit from Kinyara.

Further survey analysis also shows that in the most recent time period (2012-2021), cane seedlings are the most frequent input provided by millers on credit – received by 95.2 percent of growers (Table 10, Panel B). Grower access to inorganic fertilizer and herbicides on credit from millers declined over time in Buganda from 87 percent of growers in 2006-2011 to 27.2 percent in 2012-2021.

There are two key implications of these results. First, the decline from 2006 onward in grower access to inputs and/or extension on credit from large millers coincided with the

entry of small mills into the cane subsector. Because small mills who entered had no nucleus estates of their own, they located themselves near existing large mills and offered higher cane prices to try to lure growers away from the large mills and entice other farmers to begin to grow cane. When large mills began to lose growers to the new mills, large mills raised their cane prices. Thus, the introduction of competition in cane milling led to higher cane prices for growers. However, after a number former growers registered and aided (or just registered) with large mills began to “side sell” their cane to the new mills – with some of growers defaulting on their input loans in the process – this increased the large mills’ financial risk of grower input loan default and reduced the reliability of large mill’s access to registered growers’ cane when mature. These increased risks led the large mills in Buganda and Busoga to stop providing inputs on credit (beside seedling material) to new growers and to some former growers. The implication is that while competition improved the purchase prices per ton of cane received by growers, it reduced their access to yield-enhancing technologies, which in turn likely reduced grower’s yields and thus tons of cane sold to millers. It may also reduce their yields in the longer term if soil fertility declines over time.

The second key implication is that it appears that large mills – the private sector – are essentially the only provider of seedlings for new growers and replanting for existing growers. Ideally, the public sector should invest and engage in crop varietal development, as the public good nature of many crop varieties usually result in underinvestment in varietal development by the private sector. For example, Large mill nucleus plantations have been using 12-month cane varieties, but they have not made this available to their registered farmers. Yet, Eswatini has developed cane varieties that mature more quickly (12 months instead of 18) and are higher yielding on average than varieties in Uganda, but Uganda has not had any public sector R&D on cane varietal development efforts for many years, which could perhaps be tested in and adapted to Uganda.

The 2010 NSP included key objective IV – promotion of public sector R&D for sustainable sugarcane production – in recognition of the lack of it at the time. Focus on cane seed varietal development to promote productivity improvements at the farm level is vital for sustainable growth in grower incomes and in the industry as Ugandan cane yields have remained relatively low and stagnant over the past 20 years. Cane seed is also the largest input cost item of cane outgrowers, amounting to Ugx 25 billion in the 2020/21 production season – over 17 percent of total costs. This possibly explains why growth in sugarcane production at the national level is being fostered by expanding area planted but not through productivity enhancement (Figure 1B, Annex).

Results from the quantitative household survey (Table 10; and Figure 4B in annex B) are consistent with findings from qualitative extracts of expert KII and FGDs transcripts. For instance, the chairman of a farmers’ association (Mayuge district), pointed out that; *“apparently, sugarcane is not among the “priority crops” benefiting from public investment initiatives under MAAIF and the National Agricultural Research Organisation (NARO) (i.e. R&D, extension, technology transfer). Therefore only farmers who have been long in the sugarcane growing business and have built resilience through a formidable asset base are ones who are able to withstand the “low price – surplus cane shock” of 2019-2021”*.

A district production officers (DPO) in Kayaunga (one of the districts in Buganda) clearly stated; *“DPO office does not support sugarcane though it is among the priority crops*

because mills have their own agronomists who distribute and manage the input loans. No public technical support is extended to sugarcane because sugarcane is under MTIC not MAAIF”.

Additionally, the district commercial officers (DCO) of Hoima (one of the districts in Bunyoro) mentioned that: *“Our role in the sugarcane sub-sector at the local government level is minimal because sugarcane falls under heavy manufacturing. The district commercial office deals with micro, small medium enterprises”*. Regarding access to cane seed – the input that mills most frequently extend to farmers, leaders of the district farmers’ associations in Bunyoro sub-region were of the view that: *“some of the large millers in this part of the country have institutionalised their grip on technology transfer between and across outgrowers -- with overbearing negative effects on productivity and profitability. Millers evoke the 18 months mandatory maturity period before cane is harvested to technically ring-fence access to and use of (more) productive and short maturing (12-15 months) cane technology by outgrowers.”*

7.4 Weak Cane Growers’ Associations (Horizontal coordination)

Under the right conditions, cane grower associations have the potential to support its members in various ways. For example, a cane grower association (CGA) can facilitate members’ access to information regarding cane production, marketing, and institutional arrangements with mills in their area. A typical example could be a grower association facilitating members’ access to information from private or public extension agents regarding cane production and marketing. In Tanzania, one CGA provides services for its members that are not provided by mills, such as transportation of harvested cane from a farm to a mill or miller depot. Theoretically, a CGA can have the collective bargaining power of growers (assuming most growers in the area are part of CGA) to negotiate better terms from a mill regarding market access conditions/reliability, improved transparency of the price determination process, and better cane price. This is all contingent, however, on the CGA having leadership with the capacity to provide adequate organization/coordination for growers and ability to negotiate with mill on behalf of the association, as well as effective and transparent CGA governance and sufficient trust among members. In practice, building an effective CGA often requires some government

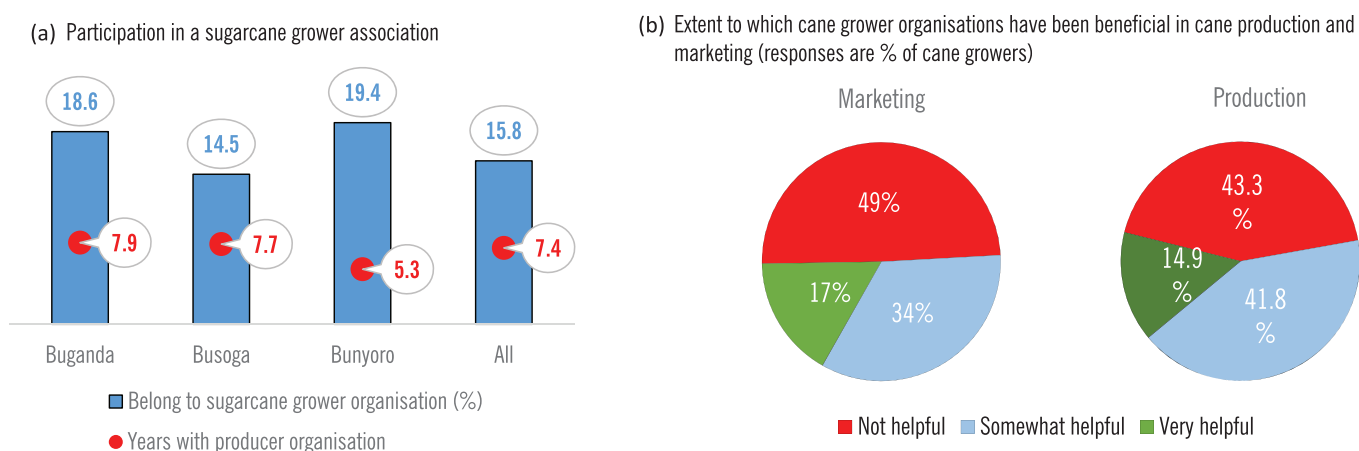
support through leadership training, technical support (say, with price negotiation), initial financial support to help the CGA get up and running, and improved association access to financing – such as for purchase or hiring of transportation services for member. Part I of the Sugar Cane Act, 2020 and objective eight (8) of the 2010 NSP provide a framework for the creation of functioning outgrower associations.

While there are active cane grower associations (CGA) in the three sub-regions visited during this study, they are quite weak. For example, only 16 percent of farmers currently growing sugarcane in the three sub-regions visited were members of a CGA in 2021 (Figure 4a), though 65 percent of current and former cane growers had belonged to a CGA before but had stopped. The average duration of grower membership in a CGA is under 7.4 years (Figure 4a). The main reasons why smallholder outgrowers do not belong to a sugarcane growers' association is because they perceive that they are not beneficial to members' cane production and marketing (Figure 4b). It is interesting to note that in Bunyoro -- where CGA membership is somewhat higher (19.4 percent), membership maintenance is somewhat shorter (5.3 years) than in Buganda and Busoga (7.9 and 7.4 years, respectively). The low rates of CGA membership and relatively short membership periods across each of the three sub-regions suggest that these organizations lack the capacity to effectively provide services of value to their members (farmers). This suggests that existing Ugandan CGAs face a dilemma as on one hand, provision of tangible

benefits to their members appears to be vital to retaining members, yet on the other hand, member retention is vital to the survival and financial sustainability of membership-based associations (Nathan A. Vincent and Cynthia M. Webster, 2013).

Qualitative data from FGDs and KIs provide information to help us better understand the reasons why efforts to organise farmers into various cane grower associations in the three main cane-growing regions of Uganda has not yielded positive outcomes to date. For example, the research team established that sugarcane farmers' associations faced significant constraints to providing desired services to farmer (members) if millers do not cooperate and/or engage with the associations. Explanations include: (i) Associations depend on deductions administered by mills to collect fees to enable CGAs to fund activities that can help maintain farmer participation in the CGA; (ii) Farmers claim that millers do not like the idea of outgrower associations, and try as much as possible to undermine the leadership of associations; (iii) Ever since the 2019 Sugar Bill was passed into law (the Sugar Act, 2020), large millers stopped negotiating with farmers on any matter, and this resulted in associations losing any bargaining power in contract enforcement; and (iv) During field work, the study team observed examples of seemingly “non-self-governing” farmer associations that appeared to be fronted by a miller and working on an agenda set by the miller.

Figure 5 Cane grower participation in cane grower associations



Box 2: How financial problems facing cane growers (current and former) may explain increases in poverty in cane growing sub-regions (exclusion tendencies)

Rapid decline in lack of coordination between grower cane supply and miller demand

- FGD with growers suggested that sugarcane production ceased to be profitable for many growers beginning in 2017 - 2018 when millers began paying increasingly lower cane purchase prices;
- Under conditions of surplus cane, the benefit of market access and assurance (as a pillar in the miller-farmer institution) waned even for the aided outgrowers (with input loan contracts with millers)
- Some farmers could no longer sell cane: In 2021, some farmers had cane over 40 months old that was too old to extract any value other than turning it into free fuel to the community;
- Grower FGDs revealed that with surplus cane production in 2018, all (100% of) outgrowers in Masindi district (Bunyoro sub-region) started to sell cane which was over 25 months old. Farmer termed situation as 'chaotic sugarcane marketing environment.'
- A high share (90%) of Community Survey respondents said that many farmers across the three regions had abandoned cane growing

Grower inability to sell their cane could not repay their input loan obligations

- The interest on loan arrears keeps accumulating even if a miller fails to buy outgrower cane at 18 months as previously agreed upon by both parties.
- With overgrown cane in the fields, farmers were still obligated to pay high interest rates on input loans e.g. in Buganda region 1.8% per months (about 22% annually); Bunyoro - Hoima district 2% (24% per annum); Masindi (Bunyoro) 1.35% (17% per annum).
- Some large millers in Bunyoro sub-region unilaterally stopped the program of aiding outgrowers in 2020, but outgrowers are still bound by contracts signed in 2016. In addition, some millers continued charging aided outgrowers with overgrown cane (over 40 months) 'crippling' 100% interest recovery on input loans.

One sided outgrower scheme contracts

- It was reported during FGDs and KII that in Bunyoro sub-region, that aided outgrowers in 2016 signed '*one-sided 24 page contracts*' not endorsed by millers that have since allowed millers to plant cane on farmers' land unabated;
- Millers have become *de facto* "lessees" on aided outgrowers cane fields for unspecified periods of time – while claiming ownership of cane. Subsequently, about 25% of farmers have abandoned their cane fields, but the millers use the records in the contract to continue growing cane on these fields.

Expansion of nucleus estates

- The expansion of nucleus estates by large mills reduces the need for them to coordinate with growers, especially under conditions of a national surplus of cane acreage;
- Continued corporate expansion of nucleus estates limits inclusion in cane production by smallholder farmers. Since the 2019 Sugar Bill was signed into law, nucleus estate expansion has continued.
- KII with experts associated the continued expansion of nucleus estates by large mills with estimates that it costs a miller about Ugx 60,000 to produce a ton of sugarcane as compared to Ugx 120,000 or more by an average farmer to break-even;
- KII and FGDs respondents attributed part of large mills nucleus estate expansion to government officials allowing mills to increasingly engage in sugarcane production on public land with the following effects;
 - (i) Giving public land to millers undermines the whole essence of smallholder inclusive development in the sugarcane sub-sector;
 - (ii) Smallholder farmers' inability to sell overgrown cane locks up their land and investment in cane, resulting in significant financial losses, which are not consistent with the government's objective of wealth creation.

Absence of a public regulatory agency for sugarcane, such as a Ugandan Sugar Board (USB)

- Without a public sector regulator to check the market power of millers and oversee implementation of a sugarcane pricing formula, millers set cane prices that are likely lower than what they could afford to pay and remain profitable.
- In 2018, sugarcane prices started to fall below the Ugx 120,000 per ton required to break-even (including the emerging unofficial costs of permit access). This has resulted in many farmers having to leave cane production, as illustrated in Table 2, Section 4.2 and Figure 2, Section 5.

8.0 EMERGING ISSUES AND WAY FORWARD

This paper provides insights on a number of challenges that sugarcane growers experienced in recent years, some of which might have been avoided had the priority intervention areas outlined in the 2010 NPS and the 2020 Sugar Act been implemented beforehand. These challenges, and ways to address them, include the following:

- In the absence of a National Sugar Board (NSB) to oversee and regulate the activities in the sugarcane sub-sector, the governance of cane grower sales to millers is largely determined by millers. Without the NSB, miller and grower coordination has declined significantly. Under such circumstances, the survival of the sugarcane outgrower schemes is under threat due to increased market uncertainties among growers, as exemplified by the fact that 28 percent (over 11,000) of smallholder outgrowers have abandoned cane growing. The uncertainties in the market are aggravated by the exclusion of cane farmers in price-negotiation, the use of sugarcane delivery permits by mills as a way to ration the oversupply of cane (from 2018-2021), continued expansion of miller-owned nucleus estates, and the weakness of cane farmer associations. These developments further reinforce millers' disproportionate market power relative to growers regarding cane price determination. The 2010 NSP recognized this challenge for growers and thus called for public sector support for capacity building of cane grower associations to improve their bargaining power with millers. Both the NSP and the 2020 Sugar Act called for use of a cane pricing formula to be implemented and overseen by a public sector regulatory body (such as a NSB) to help ensure that growers received a fair price.

- Large mills have expanded the size of their nucleus estates in recent years, perhaps due to the decreased predictability of cane supply from growers, as large mills faced increasing competition for cane growers. Their inability to convince the government to include a provision for zoning appears to have further prompted them to enlarge their nucleus estates, most recently by gaining access to public land from government officials. However, nucleus estate expansion by the large mills is heightening growers' fears that this expansion by large mills – which process about

60 percent of cane produced by farmers -- is beginning to crowd-out cane growers by reducing large mills' demand for smallholder cane. This could significantly reduce the ability of the sugarcane industry to serve as source of inclusive economic growth in rural areas. This has led some to request that parliament pass additional laws in support of the 2020 Sugar Act that would regulate millers' access to public land.

The study found that about 50 percent of cane growers are located more than 25 km from the closest mill. This implies that half of all cane growers are beyond the 25 km radius "economic zones" that were initially proposed in the 2010 NSP. This was debated again during the 2020 Sugar Act consideration but was not included in it. Some farmers contend that there is a need to review options for administrative zoning instead of geographical zoning. Under administrative zoning, the MTIC would require all cane growers to register with a local cane grower association, which alone would have the authority to sell cane to a designated mill. This option would require significant strengthening of the capacity of cane farmer associations. While this option might be popular among growers and some members of parliament (consulted during the study results validation workshops). The history of efforts by governments, and donor partners to create effective financially sustainable farmer associations from the ground up shows that many such efforts are not successful, and those that are rely on a number of favourable conditions specific to the context.

- Cane yields in Uganda are relatively low at 28 tons/acre and have remained stagnant from 2000-2020. Almost all growers access seedlings from millers (or other farmers in some areas), as there has been no cane varietal R&D in Uganda for many years. However, farmers currently only have access to 18-month cane varieties that have been recycled for many years. Although 12-month varieties with relatively higher yields have been adapted and used in other African countries -- and are currently used by large millers on their nucleus estates. The 2020 Sugar Act has called for the MAAIF (through the NARO system) to expedite the establishment of the National Sugar Research Institute (NSRI). Which would work to breed, adapt, and test improved cane varieties in Uganda, study and monitor pests and diseases and develop treatment strategies, and crop management practices. The NSRI would then work with public and other extension services to disseminate this technology to growers. Stronger grassroots cane grower associations could help improve

growers' access to extension information on cane production and marketing; and facilitate grower access to improved cane varieties and potentially other inputs.

CONCLUSION

The main objective of this study was to assess the current and historical institutional arrangements between smallholder cane growers and millers, the extent to which such arrangements have facilitated (or not) inclusive and sustained economic growth in cane growing areas of Uganda, and the extent to which the objectives and recommendations of the 2010 National Sugar Policy and the 2019 Sugar act are being realized. The study is based primarily on primary data collected by EPRC in December 2021 that consisted of a large farm household survey and qualitative FGDs and KIs in three of the main cane-growing sub-regions of Uganda, as well as available secondary data and existing reports and studies. The five main findings of this study are as follows:

- 1) Twenty-eight (28) percent of households interviewed that grew cane at any time between 2005 and 2020 decided to stop growing cane. This was primarily due to the increasing difficulty farmers faced in finding a reliable buyer for their cane, and a significant decline in cane prices from 2017 to the present.
- 2) Second, in recent years, millers have used their relatively greater market power to effectively stop negotiating cane prices with cane growers. This contravenes Part VII of the Sugar Act, 2020 that recommends that a National Sugar Board (NSB) would oversee implementation of formula for the determination of sugarcane pricing each year.
- 3) From 2018 to 2021, large miller registration of growers declined significantly, and growers' access to cane delivery permits to was significantly impeded during this period of oversupply of cane in Uganda. This significantly weakened outgrowers' prior assurance of a market for their harvested cane from year to year. Large millers also stopped the provision of inputs on credit to registered growers in two regions, which disrupted the existing system of input support from millers to registered growers. Effectively the only source of input credit and extension support for small- and medium-scale cane growers were millers.
- 4) Large mills began to expand the size of their nucleus estates as a response to competition from new, smaller mills that entered the subsector without estates of their own. Which led to decreased reliability of large mill access to grower cane as some former growers began to sell to the new mills and in some cases default on input loans. After the 2020 Sugar Act was signed without a clause to institute zoning of cane marketing activities, millers began to expand their nucleus estates more rapidly, primarily by gaining access to public land. This has heightened fears that the nucleus estates of large mills are crowding-out outgrowers' future opportunities in cane production.
- 5) While 68 percent have belonged to a cane grower association at some point, only 16 percent still participate in one. Based on reported farmers' perceptions, it appears that cane grower associations do not currently have sufficient capacity to consistently provide adequate support for growers' cane input, production, and marketing needs.

The study finds that there is an urgent need to strengthen the institutional policy environment of the sugarcane sector to support continued participation of smallholder farmers in the sector. Smallholder participation in this sector is the predominant way in which the cane sector can be inclusive – i.e., increase the household incomes and food security of many smallholder farmers in cane growing areas. The study findings imply an urgent need for discussions among government and sector stakeholders regarding the status and future of outgrower participation in the sugarcane subsector.

In particular, the findings point to the need for the constitution of the Sugar Board as recommended by The Sugar Act, 2020, to provide the public governance needed to improve coordination between millers and outgrowers, oversee a fair and transparent process for determining cane prices over time, address new realities in the cane sector, and support the sustainable participation of smallholder farmers in sugarcane production in Uganda. The inclusion of smallholder cane growers in the cane sector is the primary means by which it can contribute to increases in rural farm household incomes, food security, and rural employment in cane growing areas.

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ANNEX A

Table 1A: Number and shares of FGD of participants per FGD, by district and gender of FGD

	Participants per FGD			FGDs
	District	Male (78%)	Female (22%)	
Buganda (n=9) 4.9%	Kayunga (n=9)	6	3	2
Busoga (n=143) 78.1%	Kaliro (n=30)	26	4	2
	Kamuli (n=13)	12	1	2
	Luuka (n=63)	54	9	5
	Mayuge (n=37)	27	10	4
Bunyoro (n=31) 16.9%	Kikuube (n=11)	6	5	2
	Hoima (n=10)	6	4	2
	Masindi (n=10)	6	4	2
Total N=183		143	40	21

Source: EPRC Fieldwork (2021)

Table 2A: Number of attendants of town halls by stakeholder group and gender

Sub-region	District	Attendants of Town Halls by Gender													TOTAL
		Farmers (48.3%)			Farmers association (11.7%)			Local government (38.3 %)			Contractors (1.7%)			Miller	
		M (72%)	F (28%)	Total	M (86%)	F (14%)	Total	M (83%)	F (17%)	Total	M (100%)	F	Total		
Bunyoro	Masindi	7	4	11	1	0	1	11	1	12	1	0	1	-	25(42%)
Busoga	Mayuge	14	4	18	5	1	6	8	3	11	0	0	0	-	35 (58%)
	Total	21	8	29	6	1	7	19	4	23	1	0	1	0	60 (100%)

Source: EPRC Fieldwork (2021)

Table 3A: Total number of participants in FGDs, KIIs, and Town Halls by gender

	Male (80%)	Female (20%)	Total
FGDs	143	40	183
KII	19		19
Townhalls	47	13	60
Total	209	53	262

Source: EPRC Fieldwork (2021)

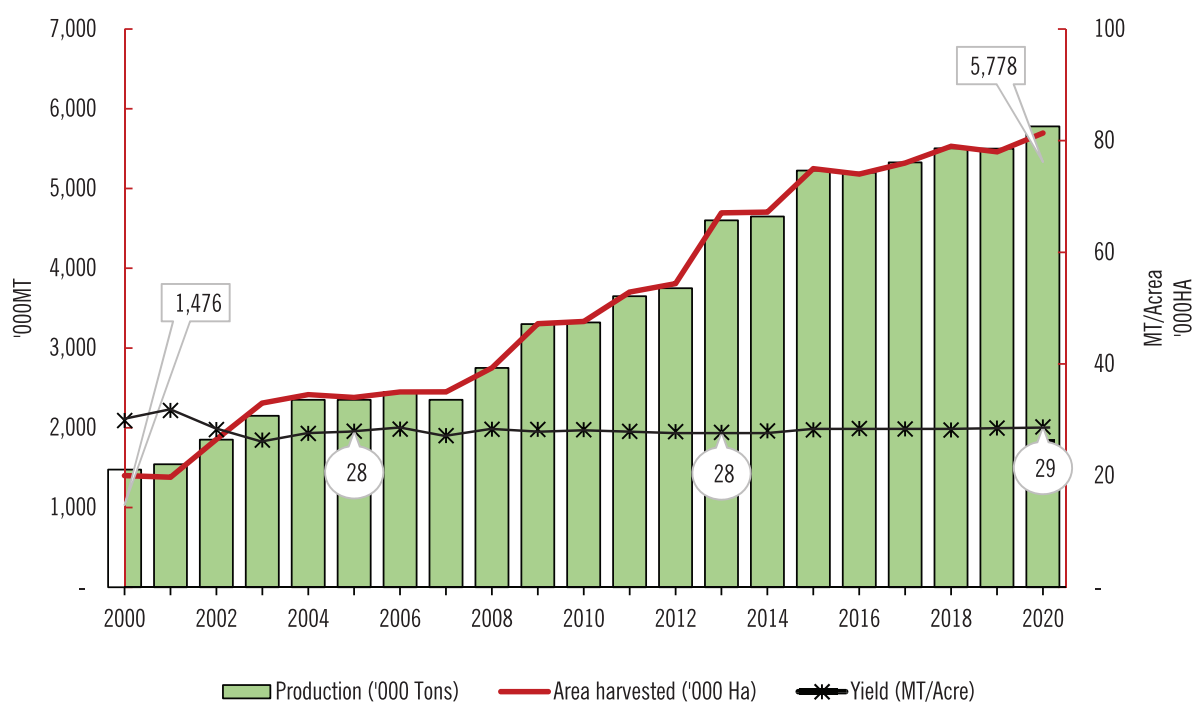
Table 4A: Household characteristics of current cane growers, past cane growers, and non-cane growers (2021) (weighted sample)

	Currently growing cane		Past cane growers		Non-cane growers		Total	
	Total	%	Total	%	Total	%	Total	%
Panel A: Sex of household head								
Female	4110	14.34	1156	10.17	9304	30.51	14570	20.66
Male	24559	85.66	10208	89.83	21193	69.49	55960	79.34
Total	28669	100.00	11364	100.00	30497	100.00	70530	100.00
Panel B: Education level of head								
No formal education	2,588	9.03	796	7.00	5,526	18.12	8,910	12.63
Some primary	7,699	26.85	2,248	19.78	10,989	36.03	20,936	29.68
Completed primary	4,952	17.27	2,558	22.52	6,965	22.84	14,475	20.52
Some secondary	6,051	21.11	1,677	14.76	2,386	7.82	10,114	14.34
Completed ordinary level	4,213	14.7	2,280	20.06	2,981	9.77	9,474	13.43
Above ordinary level	3,166	11.04	1,805	15.88	1,650	5.41	6,621	9.39
Total	28,669	100	11,364	100.00	30,497	99.99	70,530	99.99
Panel B: Age group of head								
18-34 yrs	5,563	19.4	1,894	16.67	6,072	19.91	13,529	19.18
35-54 yrs	13,737	47.92	7,265	63.93	14,946	49.01	35,948	50.97
55-64 yrs	4,728	16.49	1,558	13.71	4,645	15.23	10,931	15.5
> =65 yrs	4,641	16.19	647	5.69	4,834	15.85	10,122	14.35
Total	28,669	100	11,364	100	30,497	100	70,530	100
Panel C: Registration status at start of growing cane								
Not registered	16,477	57.47	9,944	87.5			26,421	66
Registered at start	12,192	42.53	1,420	12.5			13,612	34
Total	28,669	100	11,364	100			40,033	100
Panel D: Market assurance at start								
No market assurance	5,975	20.84	4,227	37.2			10,202	25.48
Secured market	22,694	79.16	7,137	62.8			29,831	74.52
Total	28,669	100	11,364	100			40,033	100
Panel E: Registration status in 2021								
Registered & aided	6,636	54.31	864	43.11			7,500	52.74
Registered but not aided	4,013	32.84	291	14.52			4,304	30.26
Not registered and not aided	767	6.28	777	38.77			1,544	10.86
Multiple arrangement	802	6.56	72	3.59			874	6.15
Total	12,218	100	2,004	100			14,222	100
Panel F: Asset index quintile								
lowest	3,254	11.35	2,146	18.88	8,891	29.15	14,291	20.26
Second	4,465	15.57	2,306	20.29	7,714	25.29	14,485	20.54
Third	5,281	18.42	2,660	23.41	5,732	18.8	13,673	19.39
Fourth	5,774	20.14	2,151	18.93	6,166	20.22	14,091	19.98
Fifth	9,895	34.51	2,101	18.49	1,994	6.54	13,990	19.84
Total	28,669	100	11,364	100	30,497	100	70,530	100
Panel G: Mean farm size and productivity								
Yield (MT/acre)	10.73		22.86				11.84	
Land size (Acre)	14.82		3.48		2.50		7.67	
Size of parcel under cane (acre)	7.34		0.53				3.08	
Household size	6.84		6.82		5.70		6.35	

Source: EPRC sugarcane household survey (2021)

ANNEX B

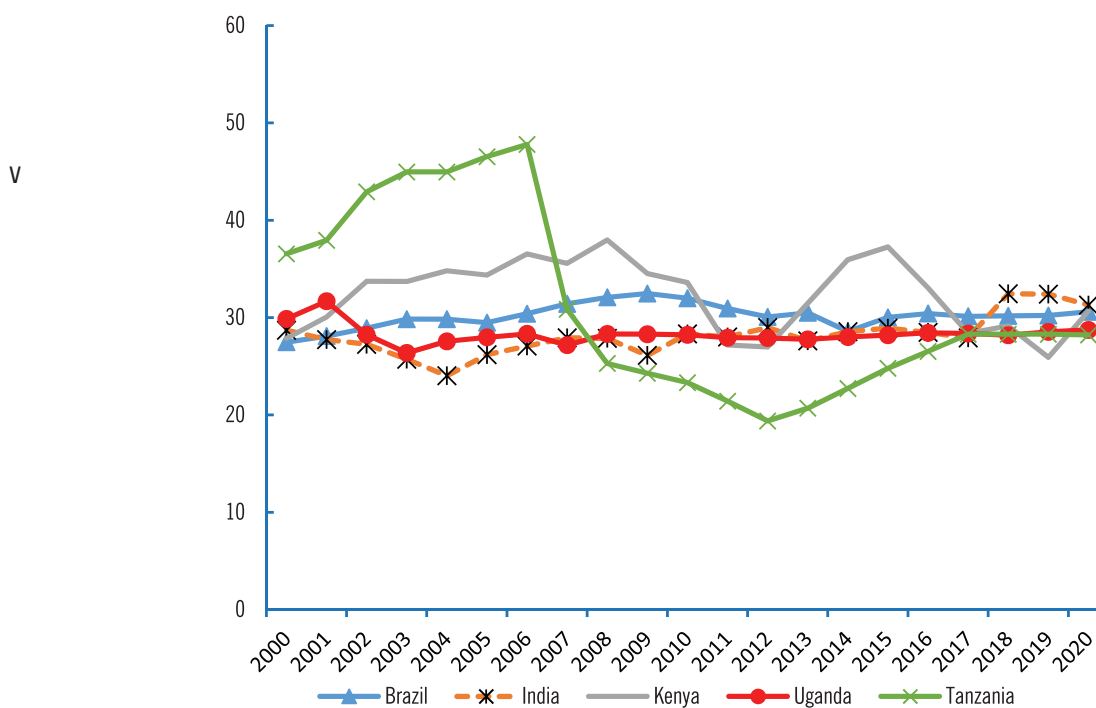
Figure 1B: Trends in sugarcane production, area harvested and yield in Uganda (2000-2020)



Notes: The statistics are aggregate

Source: FAOStat (2020).

Figure 2B: Annual Sugarcane Yield (Tones/acre) of Brazil, India, Kenya, Uganda, and Tanzania, 2000-2020



Source: FAO Stats 2022

Figure 3B: Number of licensed and operational sugarcane mills and milling capacity in Uganda from 1924 to 2020

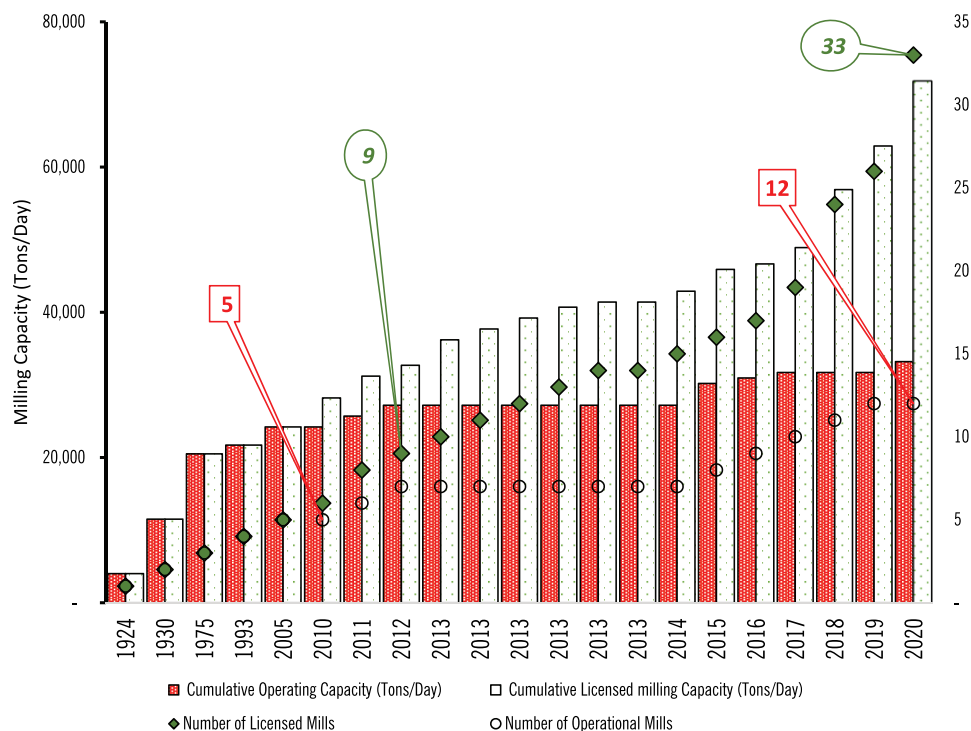
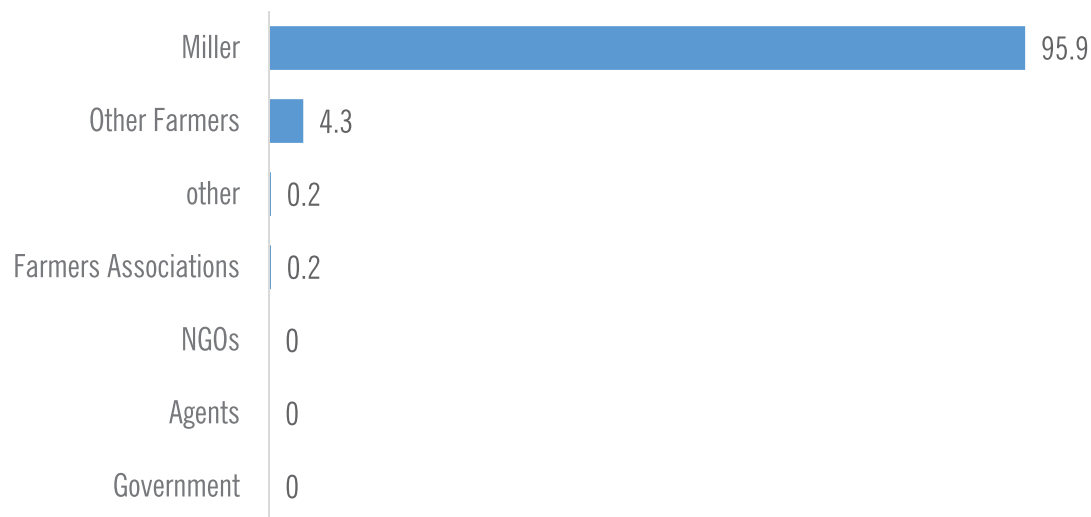


Figure 4B: Historical farmers self-reported main (%) sources of support when they started growing cane



Source: EPRC sugarcane household survey (2021)





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10 YEARS OF QUALITY PRODUCTS
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