GTAC/CBPEP/EU project on employment-intensive rural land reform in South Africa: policies, programmes and capacities

Commodity Study
Small-Scale Sugar Production

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Acronyms

AAF - Akwandze Agricultural Finance
AUC – Area under cane
BFAP – Bureau for Food & Agricultural Policy
BFP – Basic Fuel Price
BTI – Board of Trade & Industries
CASP – Comprehensive Agricultural Support Programme
CRLR – Commission on the Restitution of Land Rights
COMESA - Common Market for Eastern & Southern Africa
CPI – Consumer Price Index
CSG – Child Support Grant
DAEA – Department of Agriculture & Environmental Affairs
DARDLA - Department of Agriculture, Rural Development & Land Administration
DBRP – dollar-based reference price
DEDT – Department of Economic Development &Tourism
DoP – Division of Proceeds
DRD – Daily Rateable Delivery
DRDLR – Department of Rural Development & Land Reform
DTI – Department of Trade & Industry
EAC - East African Community
EBA – Everything-But-Arms Agreement
EC – European Commission
ESA – Eswatini Sugar Association
EU – European Union
FAF – Financial Aid Fund
FAO – Food & Agriculture Organization
GDA – Grower Development Account
Ha – Hectares
HPL – Health Promotion Levy ("Sugar Tax")
HS - Harmonized Standard
HSL – Household Subsistence Level
ISO – International Sugar Organization
ITAC – International Trade Administration Commission
IUF - International Union of Food Workers
LCC – Lands Claim Court
LSG – Large-scale sugarcane grower
MAFISA – Micro Agriculture Finance Scheme of South Africa
MCC – Mill Cane Committee
MCP – Miller-cum-planter
MGB – Mill Group Board
MSA – Mill supply area
Mt – Million tons
NAMC – National Agricultural Marketing Council
NCD – Non-Communicable Disease
NDA – National Development Agency
NFG – New Freehold Grower
NIEP - Nkomazi Irrigation Expansion Scheme
OAG – Old age grant
PSF – Price Stabilization Fund
RADP – Recapitalization & Development Programme
REER – Real Effective Exchange Rate
RRV – Relative Recoverable Value
RV – Recoverable Value
SACGA – South African Cane Growers' Association
SACU – South African Customs Union
SADC – Southern African Development Community
SAFDA – South African Farmers' Development Association
SAGIS – South African Grain Information Service
SASA – South African Sugar Association
SASMA – South African Sugar Millers Association
SASRI – South African Sugar Research Institute
SASTA – South African Sugar Technologists Association
SEFA – Small Enterprise Finance Agency
SGDT – Small Grower Development Trust
SIA – Sugar Industry Agreement
SPF – Supplementary Payment Fund
SSB – Sugar-Sweetened Beverage
SSG – Small-scale sugarcane grower
STC – Shukela Training Centre
TFTA - Tripartite Free Trade Area
UAF - Umthombo Agricultural Finance
USDA – United States Department of Agriculture
USM - Umfolozi Sugar Mill
VHP – Very High Polarity (bulk sugar)

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1. Introduction and summary of recommendations

The South African sugar industry has long been one of South Africa's most substantial agro-industries. The South African Sugar Association (SASA) estimates that around R16bn in value is annually created by 85,000 directly employed and 350,000 indirectly employed persons, and ultimately with approximately one million rural lives dependant on these jobs. Every 1,000 hectares (ha) in sugarcane land, the industry estimates, carries an average of 133 permanent and 210 seasonal jobs (SASA 2019; SASA 2019 pers. comm.).[1] [2]

In addition to its sheer magnitude, the sugar industry is distinct from other agro-industries by the inclusion in the 1970s of substantial numbers of black small-scale sugarcane growers (SSGs), farming predominately under 'communal' or 'customary' tenure. The inclusion of small-scale black growers in a 'formal' value chain has been variously attributed to systems of rotating credit (SASYB 1974/5), the command of land resources by traditional authorities and of production processes by miller sugar producers (Vaughan 1992a, Vaughan 1991), and opportunities to accumulate by 'contractors' providing planting, harvest and haulage services (Vaughan 1992b, Munro 1996).

However, SSG numbers largely peaked in the late 1990s/ early 2000s, and thereafter have a steadily declined; to nearly half their numbers by 2013/14 (Dubb 2016). Since the peak of SSG production, the sugar industry retains a number of important support structures and mechanisms (Manstrat 2014, Hurly *et al*. 2015), but has gradually shifted in focus towards supporting land transfers to large-scale black commercial farmers (Armitage *et al*. 2009) and managing the ever present threat of restitution to wide swathes of cane-land (SASA 2019), largely through Joint Venture (JV) arrangements.

At the same time, the sugar industry is currently in a state of general crisis rooted in its diminishing share of a shrinking, tariff-protected domestic market, with approximately half of domestic production currently being exported to a chronically low-priced international market (SASA 2019). Numerous factors have driven the crisis, including the growth of duty-free imports from Eswatini – a South African Customs Union (SACU) partner that is expanding production and diverting existing exports from the European Union (EU) to South Africa; unexplained suspensions of tariff protection (enabling huge amounts of sugar to enter the domestic market at little to no duty); accelerated reductions in industrial demand with the introduction of the Health Promotion Levy (HPL), aka the 'Sugar Tax'; and diminishing retail sales alongside compensatory tariff increases (Kadwa 2019, SASA pers. comm.).

Currently, the industry is involved in discussions with government about formulating a 'master plan' to chart its future path. With South Africa enjoying only marginal preferential access to other protected markets in the US (Conningarth Economists 2013) and Mozambique (DAFF 2017), current hopes have been focussed on diverting (or 'diversifying') sugarcane away from sugar-processing to the production of ethanol-for-fuel and industrial chemicals (Mboyisa & Maphumulo 2019) and on the expansion of the continental protected market (Mandela 2019) – both of which *prima facie* would need to overcome significant obstacles to have an alleviating impact.

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[1] The methodology behind this estimation is not completely clear. As per direct jobs, this appears premised on adding all farmers, mill employees and estimated full-time job equivalents on large-scale farms. According to the industry directory, approximately 7,000 employees work in sugar milling, to which 1,368 large-scale farm owners might be added. Assuming the 19,031,688 tons of cane crushed in 2018/19 and a South Coast large-scale employment rate of 3.12 full-time worker equivalents per 1,000 tons of cane (Visser & Ferrer 2015), approximately 59,379 full time jobs are found in sugar cane production. This brings the total to 67,747. SSGs do not deliver cane consistently each year, and rarely earn sufficient incomes to subsist entirely on these earnings, but currently number 21,581 (of whom 12,019 delivered cane in 2018/19). If 7,536 'beneficiaries' of cane projects are added, this brings the total number of beneficiaries to 96,863. It is not clear how many are employed in SASA's regulatory structures.

[2] It would appear that estimates made by government as to the relative labour intensity of sugarcane are highly inflated. Zalk (2019) reports sugarcane to on average provide 1 job per hectare. By Visser & Ferrer's (2015) estimation, this would require a sugarcane farmer to achieve impossible yields of 321 tons/ha. By the industry's own multipliers, there are approximately 0.133 permanent jobs and 0.21 seasonal jobs per hectare.

In more than a decade of simmering debate about reforming its regulatory structure (SACGA 2013), questions of the industry's 'transformation' have been central in on-going discussions. So far, new transformation commitments have included investing R1bn over five years and the recognition of a new farmers' organization centred on black growers (SASA 2018a, SASA 2018b). The relative capacities of the industry for 'transformation', and the political imperatives thereto, rest in no small part on demonstrating that tariff protection enables the sugar industry to make substantial national socio-economic contributions. The crisis facing the sugar industry is also a socio-economic crisis, one which includes SSGs but extends to employment in rural and mill-area towns where livelihoods are deeply tied to sugar. In many ways, the crisis involves a question of 'jobs preservation' rather than 'jobs expansion'.

However, this report proposes that, even amidst this crisis (and in some ways because of it), the sugar industry's protected status and peculiar regulatory structure provide opportunities to greatly enhance the livelihoods of SSGs in ways unavailable to other agro-commodities. Most of the mechanisms proposed here are based on historical precedent, but could be repurposed to build on the industry's existing transformation efforts, including imperatives to land reform, while at the same time incentivising progress thereto as a competitively rewarded imperative with pro-poor implications – and at scales arguably greater than any other single agricultural commodity. Even if contraction occurs more broadly, such measures would secure and expand sugarcane's livelihood potential for South Africa's poorest and vulnerable citizens. Whether these opportunities might be seized, however, depends on mutual political commitments by the industry and government.

The body of the report is structured as follows. **Section 2.1** provides a broad overview of the general location of the sugar industry's 'Mill Supply Areas' (MSAs), including the typical composition of sugarcane supply from 'types' of producers in the industry's production-based classification system.

Section 2.2 provides a broad overview of the sugar industry's current regulatory structure. Grasping the sugar industry's distinctive structure, and the position of SSGs within it, helps explain why small-scale production has declined over the past decade and a half, and its prospects for expansion. Section 2.2.1 gives a brief overview of the basic representative structure of the South African Sugar Association (SASA), which enjoys statutory powers of self-regulation. Section 2.2.2 reviews the 'Division of Proceeds', the core mechanism that determines the terms of exchange within the industry, and particularly its sugarcane and sugar-processing components. Section 2.2.3 provides a brief review of the operation of the Dollar-Based Reference Price (DBRP), the core mechanism of domestic market protection that largely determines the magnitude of the domestic market.

Section 3 provides a very brief overview of some of the most significant support mechanisms provided to SSGs by various actors. Not all of these mechanisms are dealt with in depth, but most feature throughout the rest of the report. In particular, Section 3.6, considering the progress of land reform, provides a brief overview of very partial national statistics (of questionable veracity).

Section 4 provides a more detailed overview of the industry's crises and controversies highlighted above. Although general in character, each issue has critical bearing on current pressures faced by SSGs and the imperatives for reform. Section 4.1 considers the size of the domestic market itself, and seeks to give a general evaluation of pressures upon it, particularly in relation to sugar imports from Swaziland and elsewhere (Section 4.1.1) and the Health Promotion Levy (Section 4.1.2). It then considers, in brief, the two dominant possible responses to these pressures: diversification into ethanol production (Section 4.1.3) and the formation of an expanded continental free trade area (Section 4.1.4). These sections also sketch the obstacles in the way of each option.

Section 4.2 then considers the Division of Proceeds mechanism. Key concerns include the determination of the 'notional price' (Section 4.2.1) and the 'Recoverable Value' (RV) system of cane payment (Section 4.2.2). Their particular relevance to SSGs is made clearer in Section 4.2.3, where SSGs' historical growth and decline are related to structural reforms in the industry.

Section 4.3 considers the general decline in cane production over the past 15 years. This emphasizes how industry-wide pressures are translating into a generalized and acute pressure on sugarcane

supply. It proceeds with a brief review of the 'cost-price squeeze' facing sugarcane growers, and then turns to a review of regional variations and the shifting composition of cane supply by grower 'type'. It ends with a review of the unevenness of cane supply within the Large-Scale Grower (LSG) and SSG supply segments, showing how pressure results in tendencies to concentration.

Section 5 provides summaries of four independent case-studies of SSG production in different historical and production contexts, in order to illustrate sugarcane's contribution to rural livelihoods under different conditions. Section 5.1 reviews sugarcane's relative contribution to SSGs under the regulatory conditions of the 1980s, comparing relatively 'independent' growers to those organized by miller-based agencies. Section 5.2 reviews research undertaken by the author in 2010-11 about SSGs in the Umfolozi supply area long after regulatory reform, where it was anticipated 'independent' SSGs would emerge more sustainably, but where some of the most substantial declines in SSG numbers and levels of production have in fact occurred. Section 5.3 considers the case of irrigated SSGs in Mpumalanga, where returns to cane in general are much higher, but where difficulties managing irrigation infrastructure have emerged as serious impediments. This section offers a brief review of one irrigated 'co-operative' and seven irrigated restitution schemes, often categorized as 'SSGs' owing to their large beneficiary bases. These have been highly successful according to metrics of productivity, but less so in relation to benefit flows to members/claimants. Section 5.4 reviews a study of two 'co-operative' models of SSG production in rain-fed areas, which are attempting to re-invigorate SSG production by overcoming barriers to scale. While resembling systems in the prior regulatory frame, the lack of effective price support has encouraged sub-contracting and lease arrangements with questionable impacts on livelihoods and generating intense conflicts, raising questions about their sustainability.

Section 6 synthesises the analysis in the previous sections to recommend reforms that would promote and expand SSG production even under prevailing conditions of generalised contraction. In **Section 6.1** it is argued that the most fundamental hinge would be intra-industry price-supports based on domestic market realizations and potential retail market realizations, differentially augmented by consumer premiums similar to a Fair Trade model. These would:

- Substantially exceed existing SSG price-support measures;
- Reduce the 'capture' of industry-supporting tariff protection measures by retailers;
- Augment LSG prices, even given a bias towards SSGs;
- Reduce competitive undercutting by the Eswatini sugar industry to the benefit of some milling companies alone;
- Insulate SSGs from the risks of the world market;
- Remove SSGs' effective dependence on LSGs for finance support;
- Reduce imperatives for government to subsidise SSG production;
- Eliminate disincentives by the current price-support model to expanded production;
- Differentially reward 'transformation', as millers would receive domestic market premiums according to their share of SSG supply (including from restitution projects), particularly those millers hitherto 'punished' by SSG contraction;

These interventions would incentivise millers to maintain and/or expand their share of SSG supply and pro-poor land reform projects.

Section 6.2 argues that SSG production systems would be best enhanced by re-introducing payments for those costs associated with SSG administration (training, extension and logistical oversight by miller and grower agencies) as a 'first charge' from industry gross proceeds, according to SSG areas serviced, and at cost rates established and annually audited by SASA and disseminated to local grower structures. This would:

- Promote cane and sugar production for the domestic market, to the benefit of both growers and millers, hence its defensibility as a 'first charge';

- Promote investment in personnel and equipment in order to improve efficiencies in logistics and services, which often act as scale-related impediments to SSG production, ahead of efforts at land consolidation, which are often conflictual;
- Discourage contractors from undertaking services which are detrimental to SSG returns;
- Promote the provision of services to SSGs by multiple agencies, including miller and grower-based organizations;
- Enhance SSG information and bargaining power in selecting contractual service providers.

These measures would promote local contractors ability to operate at service and cost-competitive levels;reduce tensions between efficient project management and SSG returns; and limit the capacity of millers to use SSGs as a means of 'cost manipulation'.

Section 6.3 describes how the above mechanisms would provide a basis to 'rationalize' SSG logistics and production in a flexible manner adaptable to a wide range of livelihood 'portfolios' and grower capabilities, at little to no risk of debt. Essentially, with enhanced premiums as described in section 6.1 and improving logistics through the steps proposed in section 6.2, local growers' organizations and co-operatives would be responsible for co-ordinating planting periods. SSGs would select contractual agencies to undertake planting at their own expense, including a limited rent to the SSGs themselves, in return for proceeds from the first cutting, less a slight share of net premium to the registered SSG. Subsequently, SSGs could select contractors to undertake tasks of clearing, weeding, top-dressing and chemical application. This would:

- Regularize and formalize vernacular models of expansion that proceeded in the period of rapid SSG growth in the 1990s, and which resemble models of re-entry into cane by growers who had hitherto dropped out;
- Provide a predictable basis of establishing cane without debt, hence reducing risk to expanding SSG production and SSGs own risk in undertaking cane production;
- Incentivise contractors to have a direct stake in SSG's cane quality, and hence planting and transport performance;
- Reduce imperatives for SSGs to enter into group arrangements outside of commensalities of interest and trust which otherwise accentuate conflicts and free-rider problems;
- Allow SSGs without substantial labour, capital and training endowments, or for whom these represent a substantial opportunity cost per task, to undertake and earn incomes from sugarcane cultivation;
- Allow those with substantial labour, capital and training endowments, and for whom these do *not* represent a major opportunity cost per task, to earn greater premiums from directly undertaking production.

Section 6.4 provides a more tentative set of recommendations (requiring further research as to its impact) to promote 'green harvesting' of cane instead of cane-burning. While potentially ultimately complemented (or replaced) by returns to animal feed/co-generation, it is recommended that funds from the HPL be utilized to subsidize 'green' cane at a per ton rate for both SSGs and LSGs, and paid either directly to growers undertaking direct labour or hire in harvesting, and otherwise to harvesting contractors. Benefits could include:

- Health benefits to cane workers no longer contending with health risks from fire hazards and smoke inhalation;
- Environmental benefits from the reduction of CO^2 emissions;
- Improvement in air quality and hence health of residents in areas surrounding sugarcane farms;
- Incentives for higher quality employment on LSG and SSG farms;
- Additional labour premiums to SSGs undertaking direct harvesting, and, otherwise, to contractors managing harvest;
- Reduction in risk of 'runaway' cane fires among SSGs that interfere with logistics;

- Potential synergies with SSG livestock production, and a reduction in tensions faced by SSGs generated by choices between 'cane or cattle';
- Augmenting soil health with residues from leaves and tops.

Section 6.5 argues that these reforms would immediately benefit not only those within the existing boundaries of the communal areas, but also beneficiaries of large land restitution projects, which are already considered 'SSGs'. Here, reforms would further facilitate opportunities to leverage existing redistribution mechanisms in a pro-poor manner. In essence, government could utilize its PLAS programme to acquire areas adjacent to SSG supply areas to reduce land hunger; directly and indirectly enabling SSGs and 'accumulating' contractors to flexibly expand their area under cane according to their own capacities (and supported by mechanisms above); and grounding beneficiary selection in local ethical concerns for need and community, while enhancing security of tenure outside traditional authority jurisdictions. New cropping areas could be allocated (along with access to communal grazing lands) by standards of median land-size to land-poor homesteads, and then homesteads with children unable to establish independent homesteads, while allowing those with large tracts of land to expand their land portfolios under condition of surrender of existing land to neighbours (e.g. 1.5 new hectares in return for each hectare surrendered). Rights to land settlement and use would be permanent, alienable only by direct sale, and not by using land as debt-security. This would:

- Reduce competition for land between grazing and sugarcane cultivation;
- Reduce perceptions of prejudice and elite capture by privileging the relatively needy;
- Allow 'accumulators' to access new lands through land reform in a manner that also augments the holdings of their neighbours;
- Allow expansions of SSG land holdings and area under-cane to occur according to their existing capacity for marginal expansion, and without risk to socially and geographically-embedded livelihood portfolios.
- Strengthen the ethical elements of local communal tenure systems while de-linking security of tenure from traditional authority
- Allow vernacular land markets to emerge on a 'willing-buyer/willing seller' basis, and not on debt-based forms of alienation as the result of 'shocks' or risky undertakings –including those relating to cane, which may stir resentment.

Section 6.6 concludes with a broad illustrative estimation of the employment benefits of such an SSG-centred strategy. It begins with a review of changes to the DoP required for the above measures to take effect, and the combined pricing differentials these would imply. It then divides estimated net proceeds from SSG cane, under the assumption of full household labour commitments, by the minimum wage. This provides an indication of the value potentially created in SSG production, whatever its distribution between homestead and hired labour. Across rain-fed and irrigated SSGs, this estimate suggests that, depending on yield, current SSG production could be elevated to the level of between 13,000 - 31,000 'minimum wage equivalents'. Should SSG production expand to its historic level, this could result in a near doubling of employment within some of the poorest and most employment-deprived areas in the country.

2. Overview of the structure of the South African sugar industry

2.1 Location and general characteristics of major South African Mill Supply Area (MSAs)

The South African sugar industry is located in the provinces of KwaZulu-Natal and Mpumalanga. This geographic distribution flows from three factors. First, the high water needs of sugarcane production means that it is in the relatively high rain-fall areas of coastal KwaZulu-Natal, or in irrigated areas of Northern KwaZulu-Natal and Mpumalanga. Secondly, sugarcane's high perishability after harvest requires swift transport to processing facilities, so that sugarcane farms typically are confined within a ±30km radius of mills. Thirdly, relative proximity to the coast is important for export.[3]

In the industry, sugarcane farms are broadly sorted three 'types' of grower:

- **Miller-Cum-Planter (MCPs)** usually refers to sugarcane estates owned directly by millers, but sometimes also includes 'group' schemes, such as in restitution cases. These account for approximately 8% of cane production from 2009/10-2018/19 (SACGA 2019a).
- **Large-scale growers (LSGs)** denote larger independent sugarcane producers. These number around 1,368 and account for the vast bulk of cane supply – approximately 83% from 2009/10 – 2018/19 (SACGA 2019a). Historically, these growers were exclusively white, but today their number also includes larger independent black[4] sugarcane growers, usually beneficiaries of land reform, known variously as New Freehold Growers (NFGs) or Land Reform Growers (LRGs). NFGs are not consistently separated in annual statistics, but in 2018/19 were reported to number approximately 345 and accounted for 9.17% of production (SASA 2019). Complicating reporting further is that the contemporary LSG category may also include production from large group schemes, including restitution (SACGA pers. comm.).
- **Small-scale growers (SSGs)** historically referred to black sugarcane producers farming largely under customary tenure in (rainfed) KwaZulu and (irrigated) KaNgwane. While submission codes indicate around 18,600 registered growers (with 12,000 submitting cane in 2018/19), as with LSGs, these also include some group schemes. From 2009/10 – 2018/19, those submitting under SSG codes accounted for approximately 9% of cane production (SACGA 2019a; pers. comm.).

As illustrated in Map 1, the sugar industry is typically sub-divided into five agro-supply regions, or 'Mill Supply Areas' (MSA). Sugarcane farms supply 14 mills owned by six sugar companies among which three predominate: Illovo Sugar (now a subsidiary of Associated British Foods), TSB (now a subsidiary of RCL) and Tongaat-Hulett. In addition, there are three 'independent' mills: two 'co-operative' mills, the Umfolozi Sugar Mill (USM) and UCL; and the 'BEE' Gledhow Mill.[5] In addition, the three major sugar companies own and/or have significant interests in sugar mills across the region, including Swaziland, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe (Dubb *et al*. 2017).

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[3] Historically, coastal proximity was intimately related to the British colonial roots of the sugar industry in the Natal colony. The early industry was centred on export-orientated plantations combining sugarcane production and sugar processing, and relying on indentured Indian labour. The proscribing of indentured labour and political impetus to open Zululand to white settlement following the Anglo-Zulu war saw the first establishment of the centralized miller-processing model, with newly settled white sugarcane farmers supplying large mills alongside an increasing focus on domestic supply (Richardson 1982, Halpern 2004, Minaar1992). The irrigated regions of Mpumalanga were established subsequently in the 1960s apartheid era with the first mainly Afrikaans sugar company, Transvaal Suger Beperk (Tsb) (Van Biljon 1970, Nedbank 1976).

[4] 'Black' is utilized in an expansive sense of those racially discriminated against under apartheid. In 2013/14, 78% (n=2817) of NFGs included those classified as 'African', 21% (n=77) 'Indian' and 1% (n=3) 'Coloured' (Ntshangase 2016).

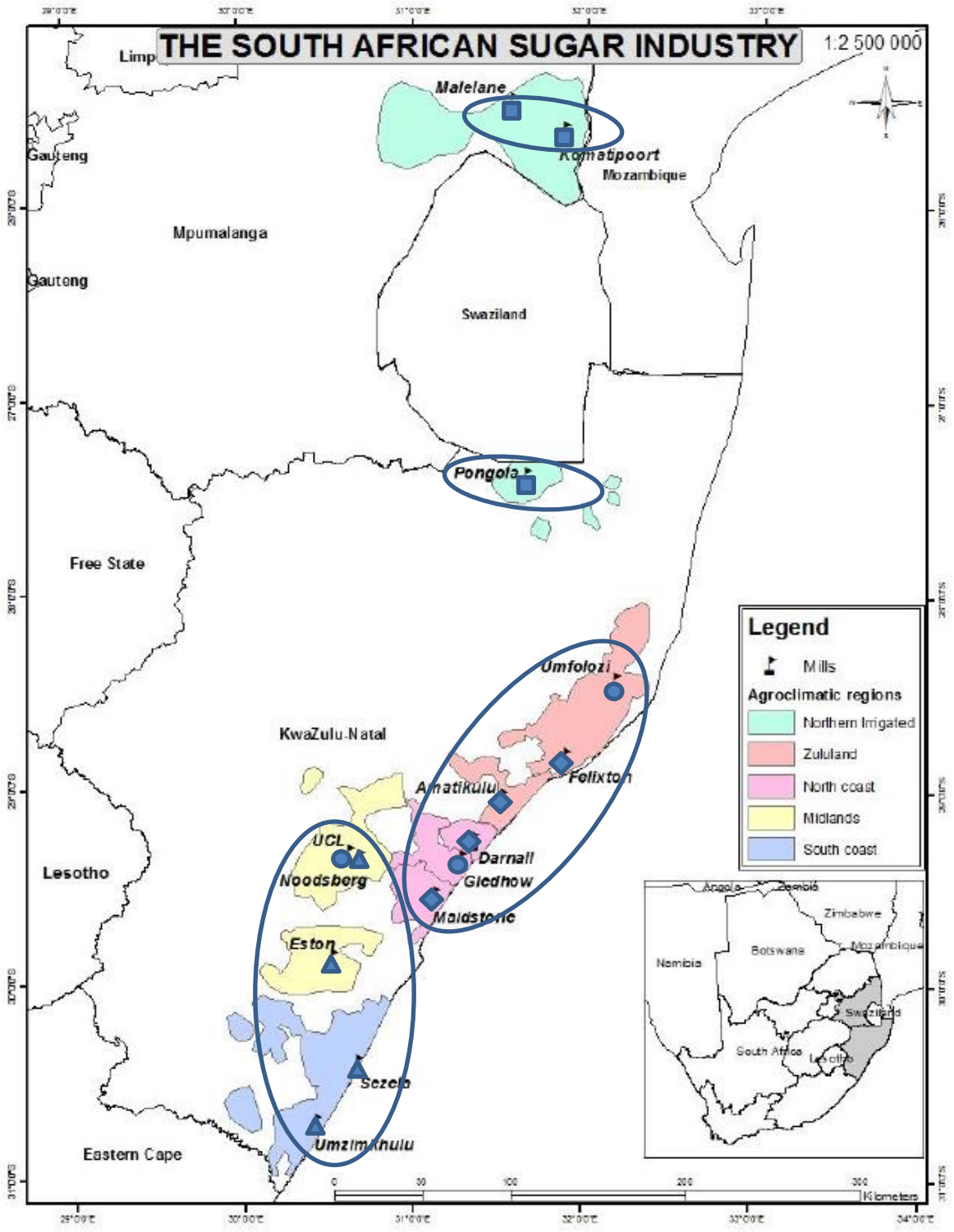
[5] Both the Umfolozi and Gledhow sugar mills were previously owned by Illovo, but disposed of in BEE sales to entities owned by the Sokhela family. Subsequently, the Umfolozi mill was re-acquired by supplier sugarcane growers. Currently, the Umfolozi mill is owned 76.87% by supplier sugarcane entities and 23.13% by NCP Alcohols (USM 2019). The Gledhow sugar mill is currently owned 34.9% by the Sokhela's Ushukela Milling, 30% by Illovo, 25.1% by restitution claimants represented by the Gledhow Growers' Share Trust, and 10% by SAPPI (Gledhow 2019). UCL is a combined sugar and timber company owned by its farmer-suppliers.

Table 1 summarizes some of the key features of the different MSAs. Moving from north to south, these include:

- **Northern Irrigated**: Theses areas include TSB's Malelane and Komati mills in Mpumalanga, as well as its Pongala mill in northern Kwazulu-Natal. Because cane production here is irrigated, these mill-areas tend to achieve above-average yields (mean 90t/ha from 2007/08 – 2016/17) and cane quality, measured in terms of the industry standard of Recoverable Value (RV) (mean 13% from 2009/10 – 2018/19). Hence, even though they comprise only 17% of the area under cane (AUC) from 2009/10 – 2018/19, at around 61,000 ha, they while are responsible for a mean of approximately 27% of sugar and cane production over the 2000/01 - 2017/8 seasons. From 2009/10 – 2018/19, approximately 10% of cane production originated from farms using a SSG code.
- **Zululand**: These mills include USM and Tongaat-Hulett's Felixton and Amatikulu mills. (The Entumeni mill was purchased by Tongaat-Hulett before closing in the 2004/05 season.[6]) These mills accounted for approximately 22% of sugar production over the 2000/01 - 2017/8 seasons and their MSAs a somewhat lesser mean of 23% of area under cane (83,000 ha) from the 2009/10 – 2018/19 seasons. This significantly concerns the MSA's low average yields, of 55 t/ha from 2007/08 – 2016/17, particularly from those supplying Tongaat-Hulett's Amatikulu (45 t/ha) and Felixton (53 t/ha), and lesser RV%. These two MSAs received lower than average rainfall, but also included the greatest proportions of cane supply from SSG codes (17% and 19%, respectively).
- **North Coast**: Included here are the independent 'BEE' Gledhow mill and Tongaat-Hulett's Maidstone and Darnall mills. These mills accounted for approximately 17% of sugar production over the 2000/01 - 2017/8 seasons and 21% of AUC (approximately 79,000 ha) from the 2009/10 – 2018/19 seasons. The MSAs reached similar average yields of 55 t/ha as in Zululand, despite enjoying higher average rainfall, particularly at Darnall (46 t/ha) and Gledhow (49 t/ha). Notably, Tongaat-Hulett's Maidstone MSA achieved high average yields of 68 t/ha. Growers submitting on SSG codes accounted for approximately 7% of production overall, but approximately 9% of production at Togaat-Hullett's Darnall and Maidstone mills.
- **Midlands**: Comprising the independent UCL mill and Illovo's Eston and Noodsberg mills, these MSAs accounted for approximately 18% of sugar production over the 2000/01 - 2017/8 seasons and 23% of AUC (approximately 85,000 ha) from the 2009/10 – 2018/19 seasons. They are notably the highest performers in the rain-fed areas, achieving mean yields of 74 t/ha and RV of 12.6% despite receiving some of the lowest average rainfall in the industry. Only about 4% of production emanates from submissions on SSG codes.
- **South Coast**: Comprising Illovo's Sezela and Umzimkulu mills, these MSAs accounted for approximately 15% of sugar production over the 2000/01 - 2017/8 seasons, and their suppliers 16% of AUC (approximately 61,000 ha) from the 2009/10 – 2018/19 seasons, but predominately from the Sezela. They receive far higher than average rainfall and achieve average yields at around 61 t/ha. About 7% of cane production was submitted under SSG production codes, with Sezela claiming 9% compared to 5% at Umzimkulu.

[6] The Entumeni mill used to be categorized in terms of a 'Thugela' MSA, together with Amatikulu. Amatikulu is still sometimes considered to be the sole mill in a 'Thugela' MSA, but is also sometimes treated as incorporated into Zululand. Here, Amatikulu is placed within the Zululand MSA, particularly because of its similar characteristics to the Felixton MSA.

Map 1 South African Mill supply areas



Source: Singels et al. (2018).

* Added shapes indicate mill owners, ● – Independent/other ◆ - Tongaat-Hulett ▲- Illovo ■ – Tsb.

**Added ovals indicate predominant sugar companies in each region, namely Illovo in the South Coast and Midlands, Tongaat-Hulett in the North Coast and Zululand, and TSB in the Northern Irrigated regions.

Table 1 Comparison of mean characteristics of different mill supply areas

		Sugar	Rainfall	Cane	Yield	RV%	AUC	MCP	LSG	SSG
		Tons	mm	Tons	t/ha	%	Ha	Tons	Tons	Tons
	Mean period	2000/01 - 2017/18**		2000/01- 2018/19***	2007/08 - 2016/17****			2009/10-2018/19*****		
Northern Irrigated	ML	200,839	323	1,640,855	91	13.2	19,713	178,011	1,362,647	107,809
	KM	262,463	350	2,143,517	93	13.1	24,489	155,338	1,611,547	330,531
	PG	138,804	425	1,252,924	82	12.4	16,773		1,156,544	57,442
	Sub-total	602,106	362	5,037,295	90	13.0	60,975	333,350	4,130,738	495,783
Zululand	AK	147,259	504	1,269,229	45	11.9	37,407	71,209	1,041,987	229,504
	FX	210,565	561	1,869,479	53	11.7	28,035	164,986	881,725	248,627
	UF	124,664	524	1,108,049	67	11.9	17,915		990,305	110,407
	Sub-total	492,667	537	4,329,831	55	11.9	83,357	221,954	2,914,017	588,538
North Coast	MS	131,677	585	1,194,723	68	11.6	24,486	323,172	457,391	74,570
	DL	122,081	582	1,085,273	46	11.6	22,429	86,547	667,084	75,111
	GH	128,667	649	1,153,983	49	11.6	31,764		1,099,018	58,163
	Sub-total	375,642	601	3,376,860	55	11.6	78,680	409,719	2,223,494	207,844
Midlands	UCL	86,982	550	722,837	78	12.5	19,297	27,680	764,411	21,740
	ES	147,809	434	1,223,729	80	12.6	35,661	56,000	1,258,895	51,933
	NB	159,928	533	1,386,931	67	12.6	30,456		1,169,801	65,327
	Sub-total	394,719	501	3,333,497	74	12.6	85,413	83,680	3,193,107	139,000
South Coast	SZ	230,560	870	1,955,379	61	11.8	36,055	156,342	1,139,521	121,680
	UK	114,709	772	843,260	62	12.5	24,144	105,125	729,827	41,641
	Sub-total	332,523	855	2,798,639	61	12.1	60,199	261,466	1,869,348	163,321
Total		2,197,658	*605	18,876,123	61	12.3	368,624	1,310,169	14,330,704	1,594,486

*Weighted average of rain-fed areas only, author's calculations.

** Compiled from 'review of milling season' statistics, author's calculations.

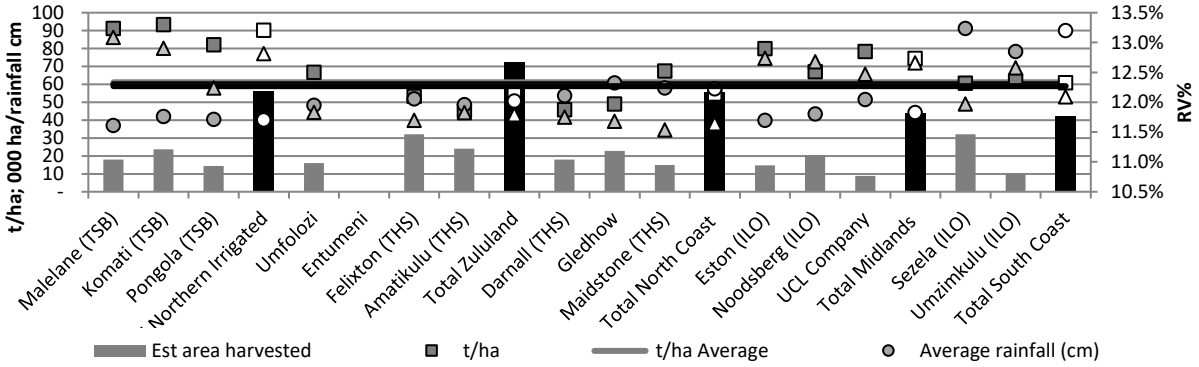
*** Compiled from SASA (2009, 2019), authors calculation.

**** Compiled from 'review of agricultural season' statistics, author's calculations.

*****Compiled from SACGA 2019a, author's calculations.

Source: SASA (2019, 2009), SACGA (2019a).

Figure 1 Comparison of mean (2007/08-2017/18) yield, rainfall, estimated area harvested across MSAs



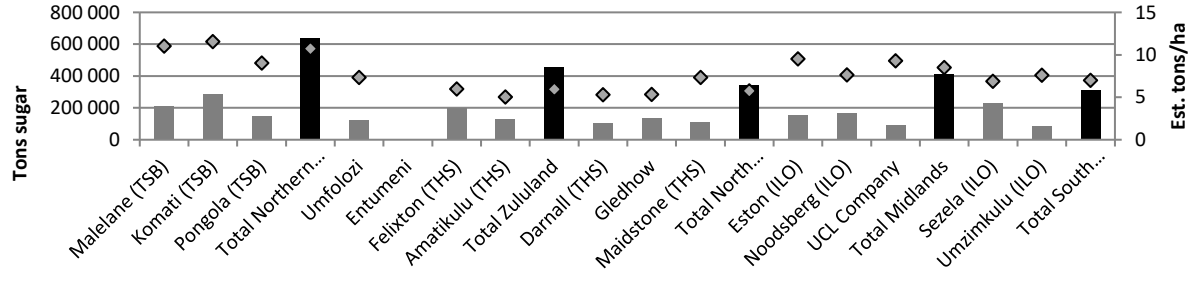
*Yields & RV compiled from 'review of agricultural season'.

**Average yields refer to rainfed average, weighted by proportion of cane supply in SASA (2009, 2019).

***Rainfall compiled from 'review of milling season' statistics and reflects rainfall in immediate vicinity of the mill, and may not reflect that over cane areas.

**** AUC estimated by dividing total cane crushed by mean yield. Does not account for cane diversions.

Figure 2 Comparison of mean (2007/08-2017/18) sugar production and estimated sugar yield by mill supply area



*Tons sugar compiled from 'review of milling season' statistics.

**Tons of sugar per hectare estimated by dividing total sugar production by estimated area harvested.

2.2 Overview of the regulatory structure of the South African sugar industry

The South African sugar industry is distinctive among many agro-industries for its privately administered regulatory structure. This structure has developed in response to the following two key factors.

In the first instance, robust markets for sugarcane are largely limited by its high perishability, the insignificant demand for its un-processed form, and by the large centralised factories required for economic sugar-processing. Although millers may own sugar estates, sugar processing is not feasible for sugarcane growers except in co-operative ownership (such as at USM and UCL), and economic supply is depends on proximity. This places millers in a position of effective monoposony, making regulatory contestation between growers and millers over the terms of exchange a central issue in the struggle of sugarcane growers to persist as an independent class (BTI 1927; Van Biljon 1070; Rorich 1982).

Secondly, sugar is one of the few agro-food commodities remaining subject to significant levels of protection across the world. While international prices were once governed by (frequently flouted) International Sugar Agreements (ISAs), sugar production is generally orientated towards protected domestic markets. International trade is generally constituted out of 'surplus' production and is therefore considered a 'residual' market where prices are highly volatile, and typically at levels below the cost of production (Richardson 2009; Richardson 2015). Unlike many other agricultural commodities where opportunities for export at higher (and foreign-exchange denominated) prices are often coveted, sugar exports are a major industrial liability barring access to other protected markets (ITAC 2009, 2014, 2018). A key purpose of regulation is risk-sharing of export and domestic market premiums between miller processors and the sugarcane growers who supply them (Van Biljon 1970; Rorich 1982, SIA 2000).

Maintenance both of protection and the terms of exchange between growers and millers has always been closely conditioned by the socio-economic role of sugar production –which has changed considerably over the years. These have been driven significantly by supporting large agribusiness; particularly English capital in the early years of the industry, but also Afrikaans capital in the 1960s with the establishment of Tsb and 'Black Economic Empowerment' in the case of the Gledhow mill (Richardson 1982; Rorich 1982; Lincoln 1980; Business Report 2005). Following the early decades of plantation-focused production, which was based on indentured Indian labour, 'beneficiating' sugar through differential models of cane production has also been central. Notable political drivers have included the consolidation of white settlement of Zululand following the Anglo-Boer War; the provision of income opportunities to white war veterans; the creation of income opportunities to remittance-reliant small black farmers and traditional authorities in the former Bantustans; the consolidation of populated 'border' areas in the context of apartheid-era regional armed conflict; and the need to encourage market-based land reform with medium-to-large-scale black commercial farmers and the success of large Restitution projects (Minaar 1992, Rorich 1982, Van Biljon 1970, BTI 1927, Vaughan 1992b; Armitage *et al* 2009, Dubb *et al* 2017).

The South African sugar industry's regulatory framework is constituted by three important components. First, statutory self-governance is empowered by the **Sugar Act (1978)**. This empowers the second critical component, the **Sugar Industry Agreement (2000) (SIA)**, which specifies its representative structure and the details of its exchange mechanisms. Thirdly, the International Trade Administration Commission (ITAC) determines the extent of the **Dollar-Based Reference Price (DBRP)** that governs protection of the domestic market – and which encompasses the member countries of member the **South African Customs Union (SACU)**.

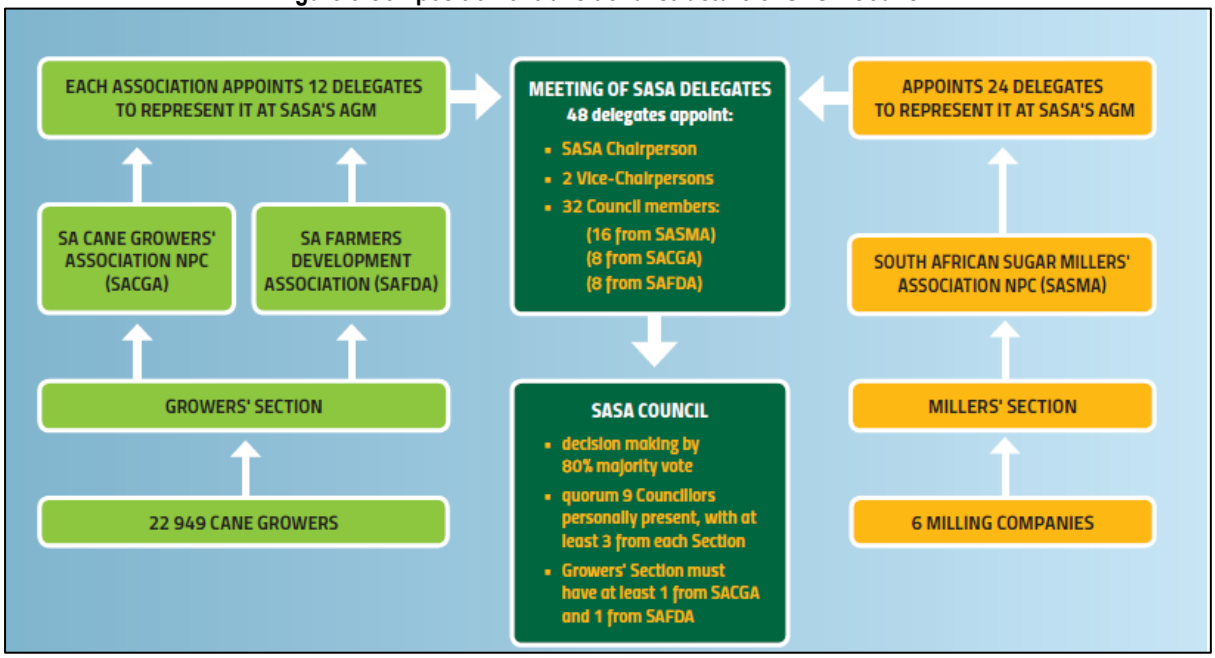
2.2.1 Representative structure

In terms of the Sugar Act and SIA (2000), the industry's statutory powers of self-government reside with the South African Sugar Association (SASA). SASA is free from direct government control, and is comprised of representatives from the core 'primary' (agricultural) and 'secondary' (processing) sectors: sugarcane farming and sugar millers (SASA 2019; Coninngrath Economists 2013). It does not include representatives from other ancillary or up/downstream capitals (e.g. input supply, retail,

finance etc.) or labour. Millers are represented by the South African Millers Association (SASMA), while sugarcane producers are at present represented by two organizations: the South African Canegrowers' Association (SACGA) and the South African Farmers' Development Association (SAFDA) – the latter representing a recently formed breakaway group officially recognized since 2018 under transitional arrangements in place until 2020 (Izigi zabalimi 2018; DTI 2018).

SASA's core bodies include a central Council, an Administrative Board, and an Appeals Tribunal, each of which is comprised of equal numbers of delegates from millers and grower structures, under rotating chairmanship. Under the present transitional structure, grower delegates are equally shared by SACGA and SAFDA representatives, as illustrated in Figure 3, below.

Figure 3 Composition of transitional structure of SASA Council



Source: SASA (2019).

SASA's affairs are administered by six main divisions (excluding Finance, IT and HR). These include:

- Industry Affairs – The support and administration of SASA and its subsidiaries in compliance with the Sugar Act and SIA.
- Sugar Markets and Logistics – Management, administration and tracking of domestic sales and demand, including the sale of sugar exported through SASA's (wholly owned) Durban terminal and the STEM Maputo terminal in which it has a shareholder.
- External Affairs – Strategic, media and policy engagement with external stakeholders.
- Cane Testing Services and AutoLab – Cane testing and analytical services under contract to Mill Group Boards.
- South African Sugarcane Research Institute (SASRI) – Development and improvement of sugarcane varieties, the control and management of diseases, pests and other biosecurity risks, as well extension services.
- Shukela Training Centre (STC) – A wholly owned subsidiary providing accredited training in sugarcane production, research, services and management.

At local level, millers and growers are constituted into Mill Group Boards (MGBs), comprising a minimum of two grower and two miller representatives with equal voting rights. These bodies are responsible for undertaking production estimates, administering delivery schedules in line with the principle of daily rateable delivery, undertaking (or contracting the undertaking) of cane testing, and forming a Local Pest Variety Control committee in liaison with SASRI to authorise seedcane varieties and administer any necessary quarantines or eradications of infested cane.

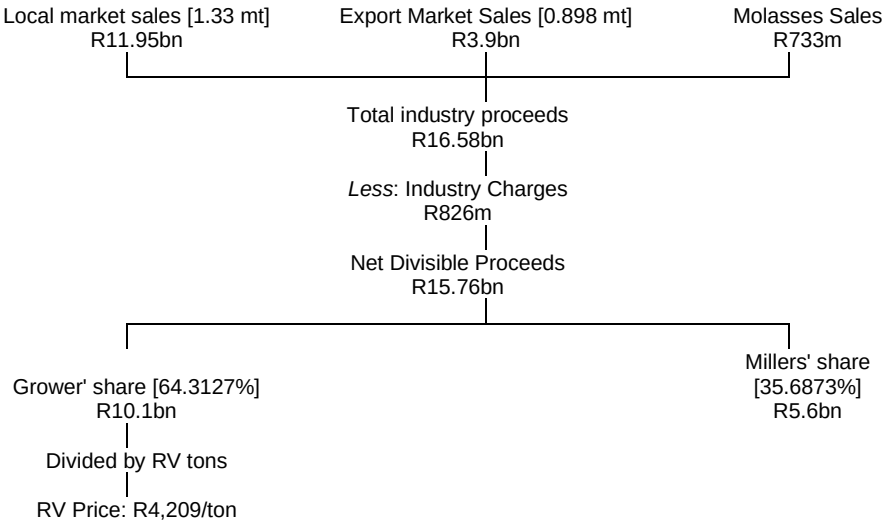
2.2.2 The Division of Proceeds

As noted above, a key feature of the sugar industry's regulatory structure is concerned with establishing the terms of exchange between sugarcane growers and millers (2000).

Here the core mechanism is known as the 'Division of Proceeds'. This is a mechanism for first pooling total industry revenue from domestic and export sales (including molasses but excluding other downstream products) and then deducting 'industry charges' such as the administration of SASA and its services. Net revenues are then divided between miller and grower segments on a pre-determined proportional basis. Growers' current proportion of 64.3675% has seen a gradual rise from 62.7327% in 2000/01 (SIA 2000; SAGCA 2010, Conningrath Economists 2013).

As payments must be made throughout the year, demand is constantly monitored by SASA to arrive at a regulary updated 'notional' price for all brown and refined sugar (in bulk, one tone and 25kg packets) and molasses across domestic and export markets. This 'notional price' forms the basis of ongoing payments.

Figure 4 The Division of Proceeds principle, SIA (2000)



Source: Reproduced from SASA, pers comm.
Note: Actual figures approximate for illustrative purposes.

The pool of revenue accruing to growers is then divided according to the total production of 'Recoverable Value (RV)', a measure that estimates the content of cane that is economically valuable in the production of sugar and molasses, to arrive at an RV price (BFAP 2014, Conningrath Economists 2013). Growers are ultimately paid on the basis of 'Relative Recoverable Value' (RRV), an adjustment intended to counteract seasonal impacts on RV content. Seasonal differences are important because RV values seasonally peak in October/September, and trough in April/May, but mills require throughput over the course of an entire season. This is done by first taking the difference between a grower's specific RV% and the mean RV% of other growers delivering in the same week, and then adding it to the mean RV% achieved by the entire industry for the year. In effect, this means that growers' RV% will reflect the average at their mill area, adjusted by their relative performance to other growers delivering in the same week (Wynne *et al.* 2008). The 'relative' RV system is intimately tied to the system of cane transport and delivery, known as 'daily rateable delivery' (DRD). In order to not prejudice particular segments growers or sections of growers, ticket allocations are distributed for daily mill deliveries proportional to each grower or grower segment's estimated level of production (SIA 2000).

On the millers' side, a further mechanism is the inter-mill redistribution of proceeds, designed principally to ensure that all millers experience equal exposure to the export market. According to this principle, millers are granted quotas in proportion to the industry's sales in different markets. Should a mill, say, sell a higher proportion of its sugar production in the domestic market than the

industry total, the difference in revenues (less a manufacturing charge) is redistributed to mills that sold less. In principle, this means that a mill with competitive advantage in supplying the export market can do so while still receiving revenues from the domestic market. The costs of export are deducted collectively as an 'industry charge' (SIA 2000, DTI 2003, Conningrath Economists 2013).

2.2.3 The Dollar Based Reference Price (DBRP) mechanism

As noted, tariff protection is a key mechanism for ensuring the economic viability of the industry. The domestic tariff is determined by the International Trade Administration Commission (ITAC) and applied as a dollar-based reference price (DBRP) applicable to all countries outside the South African Customs Union (SACU), i.e. South Africa, Botswana, Lesotho, Namibia and eSwatini.

Unlike tariffs applied at a fixed amount or rate, the DBRP is a variable tariff formula devised originally by ITAC's predecessor, the Board of Tariffs and Trade (BTT). The BTT found that owing to the volatile and 'distorted' nature of long-term world prices for sugar, protection was necessary and needed to accommodate rapid fluctuations, including in the exchange rate. The DBRP is essentially intended to establish a threshold price for imported sugar, estimated at the world-price plus a 'distortion factor' and minus the 'natural protection' cost of transport (ITAC 2009). In 2008, the DBRP formula was amended to include an adjustment by the Real Effective Exchange Rate (REER) (ITAC 2018).

The particular rate must remain within the WTO 105% bound-rate, and is established by comparing the DBRP to the Sugar No. 5 price as traded on the London International Financial Futures and Options Exchange. Adjustments to the rate are triggered if the variance in the 20-day moving average daily settlement price exceeds $20 for more than 20 consecutive days. Once detected, SASA informs ITAC of the trigger. ITAC reviews the request and forwards it first to the Minister of Trade and Industry and then onward to the Minister of Finance for further review and ultimately to gazette the adjusted duty. From its original level of $330, the DBRP was adjusted upward to $358 in in 2009, $566 in 2014 and $680 in 2018 (ITAC 2009, 2014, 2018, SASA pers. comm.).

3. Overview of current and recent transformation and assistance programmes

3.1 South African Sugar Association (SASA)

The Supplementary Payment Fund (SPF) and rebates

The most direct form of assistance to Small Scale Growers comes as price support through the Supplementary Payment Fund (SPF), and as VAT and Diesel rebates. The SPF was established in 2005 at an initial fund of R25m per annum, and is funded by the sugar industry at large (effectively at the rate of the DoP) while the rebates are administered by the industry, but amount to a government subsidy. These supports are available to any grower submitting under 200 tons of cane (which includes upwards of 80% of SSGs), but are progressively staggered; providing the largest subsidies to those submitting the smallest amount of cane (Armitage *et al* 2009, ManStrat 2014). From 2008/09 to 2015, the industry spent approximately R186m on the SPF, with an even bigger combined sum of R192m and R31m retrieved through the VAT and diesel rebates, respectively (Hurly *et al*. 2015). In 2018, Dlamini et al estimated that the SPF and rebates contributed approximately R30 for each SSG ton of cane to SSG incomes (Dlamini *et al* 2018).

Grower Development Account

The South African Sugar Association has also put significant funding towards the development and administration of SSGs through the Small Grower Development Trust (SGDT) and the (somewhat overlapping) Grower Development Account (GDA). The SGDT was launched in 1992 to support the training of SSGs and their administrative structures. By 2009 it had supported the training of 20,000 SSGs, but never achieved self-sufficiency, with SSGs contributing about R2m of its R21.6m initial endowment (Bates & Sokhela 2003, SASA 2009, Armitage *et al.* 2009) The Grower Development Account focuses on seedcane initiatives, supply, training, land reform support, extension and institutional development of consolidated grower entities. Since 1998-2010 it has disbursed R42m to SSG and land reform beneficiaries (ManStrat 2014; Hurly *et al* 2015).

The Shukela Training Centre

The Shukela Training Centre is a SASA subsidiary that advances a number of training programmes offered to SSGs, as well as other growers and farm workers. Training of SSGs is generally financed or subsidized by and co-ordinated with other bodies or accounts, such as the SGDT, GDA, and grower associations (ManStrat 2014, Armitage et al. 2009, SAFDA pers. comm.**)**.

The South African Sugar Research Institute (SASRI)

SASRI is the research, seedcane development and extension arm of the sugar industry. It is focused on the development and improvement of sugarcane varieties and the management of pests and diseases and a range of bio-security issues. SASRI also offers extension services to SSGs, information about cane husbandry via fact-sheets and other publications, and training courses (SASA 2019). Since 1996, SASRI has operated a Joint Venture with provincial departments of agriculture in Kwazulu-Natal and Mpumalanga (Eweg 2009), which in 2014 included four extension officers at SASRI and 28 from the departments (ManStrat 2014).

Umthombo Agricultural Finance (UAF)

Umthombo Agricultural Finance is the successor of the Financial Aid Fund (FAF), an early rotating credit scheme widely hailed as underpinning the original expansion of small-scale production sugarcane (SASYB 1974/5; Bates & Sokhela 2003). FAF operated in close coordination with miller 'development companies' and Bantustan development agencies in the prior regulatory regime (Rahman 1997, Vaughan 1992a). Credit financing stood largely at around Rm 20 (at 2010 Rands) between 1994-1999, but peaked briefly to nearly Rm 120 in 1997. After writing off bad grower debts in 2005, UAF focused on administering its savings/retention scheme, a more circumscribed loan-book with credit advanced by the Department of Agriculture's MAFISA programme. In the case of TSB, UAF administers both retention and production loans of Akwandze Agricultural Finance (AAF) (Armitage *et al.* 2009, Manstrat 2014, Hurly *et al* 2015).

UAF's Retention and Savings Scheme works by deducting a set amount of money from SSG's gross revenue to be utilized for capital in the subsequent season. Use of the retention scheme is

mandatory for those taking credit through UAF, but taking credit is not necessary for accessing the retention scheme. In 2014, UAF retained approximately R105/ ton of cane delivered, with growers on irrigation schemes further participating in savings for electricity and irrigation infrastructure maintenance, potentially extending to 25% of gross income. Interest on savings is in the region of 4.5 – 5%, akin to a money-market account (Manstrat 2014).

In 2014, UAF's loan book included around R30m per annum, loaned to 10 co-operatives (a condition of receiving funding) with an average membership of 100 beneficiaries, and R50m on behalf of Akwandze, with interest rates equal to that of MAFISA (8%) (Manstrat 2014).

Transformation Fund

In recent representations to Parliament's Portfolio Committee on Trade and Industry, SASA has indicated that it has made a commitment to spend R1bn above its SPF, UAF, and GDA arms on several transformation initiatives and an improvement in its BEE scorecard. The aim is to raise black sugarcane cultivation in the industry as a whole to 12.8 mt (51%) by 2028, including a target of 3mt (12% of supply) from SSGs (SASA 2018a). Most of the transformation fund's spending is orientated to SSGs. The R142m annual spending is intended to be aimed at:

1. R60m in price support to SSG farmers (above the SPF).
2. R35m in price support to other black farmers that do not qualify as small-scale.
3. R20m to subsidize SSG transportation costs, and for a review of the logistical chain to these farmers.
4. R20m to raise the provision of seedcane for small-scale growers.
5. R7m to subsidise SSGs' membership levies from cane grower organizations.

In 2018, Dlamini *et al* (2018) estimated that interventions 1, 3, and 5 to amount to a per ton subsidy for SSGs of approximately R27.27, R10.24, and R3.59 respectively.

3.2 Milling Companies

Extension support & UAF administration

Millers employ extension officers that typically act in co-ordination with those of SASRI and sugarcane grower organizations. Extension staff tend to offer general growing and business/financial advice, with more technical issues passed on to SASRI or economic units of grower representative organizations (ManStrat 2014). Total numbers of miller extension officers are unknown, although Vellema & Chamberlain (2017) indicate Tongaat-Hulett employed 71 extension officers for their SSG projects.

Miller SSG-oriented projects

Millers have also initiated a number of projects aimed at expanding SSG production, largely through variant group schemes that seek to overcome the limitations of SSGs' economies of scale, and to grow the sugarcane supply base. Some examples include:

- *Vuselela (Tongaat-Hulett)* – Initiated in 2009/10, the Vuselela programme is essentially a SSG land-lease arrangement targeting 3,534 ha, in which SSGs lease their land to co-operatives and receive 10% of gross cane proceeds from production undertaken primarily by contractors (ManStrat 2014, Vellema & Chamberlain 2017). Additional details are provided in Section 5.
- *Simamisa (Tongaat-Hulett)* – Initiated in 2012, the Simamisa programme targets 6,591ha of consolidated SSG canelands. SSGs lease their land to Tongaat-Hulett via co-operatives in return for 10% of gross proceeds, with Simamisa, a contractor company, undertaking all production (Vellema & Chamberlain 2017). Additional details are provided in Section 5.
- *Sizanayo projects (Illovo)* – Sizanayo is a joint venture between Illovo Sugar and the Sezela Cane Growers organization that has sought to rehabilitate 2,000ha of cane and to plant an additional 2000 ha, with the aim of increasing cane supply by 180,000 tons, for approximately 4,000 SSGs (Illovo 2011). Funding was sourced with a R60m loan from

Standard Bank, and SSGs were encouraged to adopt 'mentors' receiving RV% benefits (ManStrat 2014).[7]

- *Sokhulu Co-operative (USM)* – The Sokhulu cooperative was established in 2006 for 600ha of contiguous land for 434 farmers, with funding by the DAEA for infrastructure and initial planting. After 140ha was established, funding from the DAEA was frozen in 2007 due to departmental administrative problems. Conflict within the co-operative saw membership fall to 110. Since then, USM has taken a more direct role in organizing funding and extension (Manstrat 2014).
- *Mansomini Irrigation Scheme (Gledhow)* – The original Mansomini Irrigation Project was initiated in 1984 and supplied the Glendale Mill. It collapsed when the mill closed but steps have recently been taken for its revitalization. Funding from MAFISA (R3.5m) and RADP (R2m) was used for the re-establishment of 168ha for 75 co-op members, including a five hectare vegetable garden. Members receive incomes in proportion to their land commitments. Early yields stood at around 88 t/ha at RV13.5%, with approximately Rm 1 profit distributed as dividends. The recent industry crisis, has however resulted in a cost-price squeeze (ManStrat 2014, Joubert 2012).
- *Akwandze Agricultural Finance and TsGro (TSB)* – Akwandze Agricultural Finance (AAF) was initially established as a 50:50 partnership between TSB and the Liguguletfu Co-operative Ltd, a body representing 889 SSGs in Mpumalanga. Each partner contributed R25m, while a further partnership with Khula Enterprise Finance Initiative raised its capitalisation to R100m. This fund was put towards loans payable from one to six years for repairs and replacement of capital equipment (particularly in irrigation) and replanting. AAF also oversees the UAF retention programme in Mpumalanga. TsGro was launched in 2013 to perform two broad sets of services. First, it assumes responsibility for the delivery of water and the maintenance of bulkwater irrigation infrastructure. Secondly it organizes full contracting of production on SSG farms. Although they are nominally separate, TsGro and AAF share personnel and TsGro may become the only vehicle for highly indebted SSGs. By August 2014, TsGro managed 584.4ha of SSG land, and was intending to increase this to 1,607ha by the end of the season (James & Woodhouse 2015a, Manstrat 2014).

3.3 Government

Extension support

Provincial Departments of Agriculture in Kwazulu-Natal and Mpumalanga have a complement of approximately 28 full-time extension officers focused on servicing SSGs, and operate a Joint Venture with SASRI in the support of SSGs and NFGs (Armitage *et al.* 2009, Eweg 2009, ManStrat 2014).

DRDLR & DAEA fertilizer subsides

Hurly *et al.* (2015) estimate government expended R117.4m on two fertilizer schemes from 2008-2015. It is not clear if this figure includes the R71m in fertilizer disbursed by SAFDA.

Comprehensive Agricultural Support Programme (CASP)

The CASP programme is generally aimed at providing one-off grants for infrastructure, training, and management to previously disadvantaged individuals, largely in the communal areas and land-reform projects. In 2013/14, CASP claimed 8,000 projects nationally with more than 400,000 beneficiaries with R1.6bn in expenditure. ManStrat (2014) estimate around R35m was allocated to SSG projects in Kwazulu-Natal, representing between 20-30% of the provincial CASP budget. Hurly *et al*. (2015) cite instead that approximately R600,000 was expended between 2008 – 2015.

MAFISA (Micro Agriculture Finance Scheme of South Africa)

[7] The Sizanayo project was initiated after several other rehabilitation projects in the Sezela area, largely premised on external funding, high rates of UAF retention (30%), and particular efforts to build SSG and contractor organization had witnessed higher than average yields and lower than average costs being incurred, which amounted to about R174/ton (Armitage et al. 2009). These included the 2005 DAEA-funded Ifafa Mission Project in 2005 (of 300 ha), which recorded per ton costs of R113/ton; the 70%/30% DAEA/SSG-own-funded Khula Project (220 ha) realizing R151.50/ton and the Gjima Project, 68% funded by the EU which realized R150/ton (Landman et al 2009, Gillham & Hurly 2009). The precise status of these projects is not known. Sezela SSG cane supply in aggregate has fluctuated largely with rainfall since 2009.

DAFF's MAFISA programme is the core source of funding for UAF credit. MAFISA extends loans for the purchase of production inputs and small equipment for previously disadvantaged individuals and groups with incomes of less than R20,000 per month. Typically, loans are under R25,000 and do not require collateral, but higher ones do, up to a maximum of R500,000. Applicants must demonstrate a capacity to amortize the loan at 8% interest, with a repayment period tied to the cycle of the enterprise (ManStrat 2014). According to Hurly *et al.* (2015) approximately R50m of MAFISA loan funding had been extended by 2015.

In sugarcane, the repayment period is typically the lifetime of the sugarcane plant over its ratoon cycle (±8 years). Ability to repay is demonstrated through business plans largely drawn-up by SACGA economists, contingent for SSGs on co-operatization or other group schemes to achieve scale. Umthombo is the typical vehicle for credit (ManStrat 2014).

Small Enterprise Finance Agency (SEFA)

SEFA was established in 2012 with the merger of the South African Micro Apex Fund, Khula Enterprise Finance Ltd and the small business activities of the Industrial Development Corporation (IDC). Its Land Reform Empowerment Facility (LREF) provides funds for on-lending to commercial and other agricultural lenders for BEE and SMME. It is capitalized by the Department of Rural Development and Land Reform and supported by the European Union. AAF is an existing lender of SEFA.

SEFA's LREF provides a maximum R15m mortgage facility for the purchase of land, contingent on an equity-share scheme, to be repaid within 12 years. Production loans for agricultural input purchases are available at a maximum of R500,000 per production cycle, and may require an own-contributions of 10%. Loans for the purchase of working capital/machinery are also available at around ≤ R800 000, per farmer, to be repaid within five years (Manstrat 2014).

3.4 South African Cane Growers Association (SACGA)

As a general organization representing all sugarcane growers, SACGA provides a wide range of economic, research and administrative services in the interests of sugarcane growers as a whole, including at local mill level, and from which SSGs also benefit.

Services that are directed specifically to SSGs include:

- Managing the training, Grower Development Account, and external funds allocated to SSGs.
- Calculating the SARS approved VAT Flat-rate for SSGs.
- Administering SSG cost surveys and monitoring and evaluating various SSG projects.
- A funeral benefit scheme for SSGs affiliated to SA Canegrowers whereby members aged between 18-65 are provided R10,000 funeral cover on their life.
- Providing support and economic analytical services to SACGA affiliated Mill Cane Committees.

Among the economic services provided by SACGA in recent years, particular emphasis was placed on programmes to advance c-o-operatization of SSGs to help achieve economies of scale and credit assistance.From 2007-2011 this included a co-operatization pilot programme, the Phakamisa project (a partnership between Canegrowers, SASA, the National Development Agency and Productivity SA) and the Canegrowers Co-operative Program which provided a range of leadership, training and agronomic support services (Manstrat 2014, Armitage et al 2009, SACGA pers. comm.).

3.5 South African Farmers Development Association (SAFDA)

SAFDA is a recently formed sugarcane grower organization that has sought to put particular emphasis on advancing programmes and policies benefitting SSGs and Land Reform growers. It formed as an organization in 2015, and was inducted within SASA as an official grower representative structure in 2017 with government intervention. It has several core projects under way, including:

- Ratoon management and cane expansion: SAFDA acquired R71m from the DRDLR for the bulk-buying of fertilizer for distribution to black growers. It subsequently acquired a further R133m in KZN and R18m in MP for ratoon management, and aims to garner more funds for cane expansion.
- Training and capacity development: SAFDA invested R8.7m in agronomic and management training through the Shukela Training Centre.
- Value-chain ownership: With a R28m loan from Coca-Cola, SAFDA has acquired a 75% stake in a fertilizer company (R14m), and around 30 haulage trucks (R14m). SAFDA's ambition is to run these operations at cost, and thereby provide highly competitive input and transport services for SSGs and other black growers.
- SAFDA Farm Management Services: This entity recently-launched entity seeks to offer complete co-ordination and production services depending on the requirements of the grower involved, but particularly for those unable to farm owing to age or other barriers.

3.6 Land Reform

In 1996, Tongaat-Hulett and Illovo initiated land transfers on their own (MCP) estates with 152 NFGs holding 12,525ha by 1999 (SASA 2010, SACGA 2008). Up to 2007, transfers by millers (seemingly inclusive of restitution) accounted for 14,829ha, with further transfers of 12,498ha from white LSGs bringing the total amount of land transferred to 40,969ha (SACGA 2008). By 2018/19 land transferred through the redistribution programme had risen to 29,896ha and 46,896 under restitution – a cumulative 76,792ha (SACGA 2019). Based on the total industry estimate of the area under cane in 1994/5 (392,476ha (SASA 2009)), less the estimated area under small-scale production (73,019ha (Bates and Sokhela 2003)), this brings the total amount of land transferred to approximately 24% of the area under cane in 1994/5.

3.6.1 Land Redistribution

The South African sugar industry has long been celebrated for its early and pro-active approach to land redistribution.

This was followed by the establishment of the Inkezo Land Company in 2004, an entity intended to streamline willing-buyer-willing-seller deals by identifying beneficiaries and sellers and partners for post-settlement services and support. Inkezo's core financing services included assembling grants from LRAD and international donors, seeking subsidized interest rates, underwriting exchange rate volatility on foreign loans, and seeking the waiving or reducing of costs of subdivision and survey (Mona 2004, Armitage et al. 2009). Inkezo ultimately dissolved as government policy shifted towards the PLAS and Restitution programme.

By 2013/14, when SASA (2014) reported a total of 28,643ha had been transferred, the industry claimed 367 NFG growers. Notably, the bulk of land reform growers supplied Tongaat-Hulett mills (41.7%) – much higher than Illovo (27.8%), TSB (15.8%) and independent mills (14.7%). Up to 2018/19 SACGA (2019) reported 29,896ha had been transferred, but that NFGs' numbers had fallen to 310.

Table 2 Total Number of Land Reform Growers by mill supply area 2013/14

	2013/14			Total	
Mill Region	**Indian**	**Coloured**	**African**	**N**	**%**
Komati			28	28	7.6%
Malelane			24	24	6.5%
Pongola			6	6	1.6%
Umfolozi			16	16	4.4%
Felixton	3		25	28	7.6%
Amatikulu	5	1	30	36	9.8%
Darnall	26		34	60	16.3%
Gledhow	17		20	37	10.1%
Maidstone	17	1	11	29	7.9%
Eston			16	16	4.4%
UCL			1	1	0.3%
Noodsberg	3		9	12	3.3%
Sezela	5		47	52	14.2%
Umzimkulu	1	1	20	22	6.0%

Total	77	3	287	367	100%

*Reproduced from Ntshangase (2016).

Publicly released data on redistribution from the DRDLR are difficult to square with SASA and SACGA's figures in their annual reports. In one dataset, of R1,773.53m spent between 2009-2017 on redistribution in KwaZulu-Natal, R195.97m (11%) was reported as attributable to 19 sugarcane projects. Of this, R63.84m was spent on 7 projects with state entities listed as the registered owner.

In a second dataset focused on PLAS transfers, some R516.39m was reported as spent on land and capital between 2006-2016 on 85 farms where sugarcane farming was listed as a principal activity by the previous owner, together covering 18,711ha. Of these, farms totalling 1,712ha were reported as no longer under sugarcane after transfer. Again, it is notable that the bulk of recorded land transfers have occurred in districts particularly close to Tongaat-Hulett mills.

Table 3 Expenditure and transfers on the PLAS programme in KwaZulu-Natal on farms previously producing sugarcane, 2007-2016

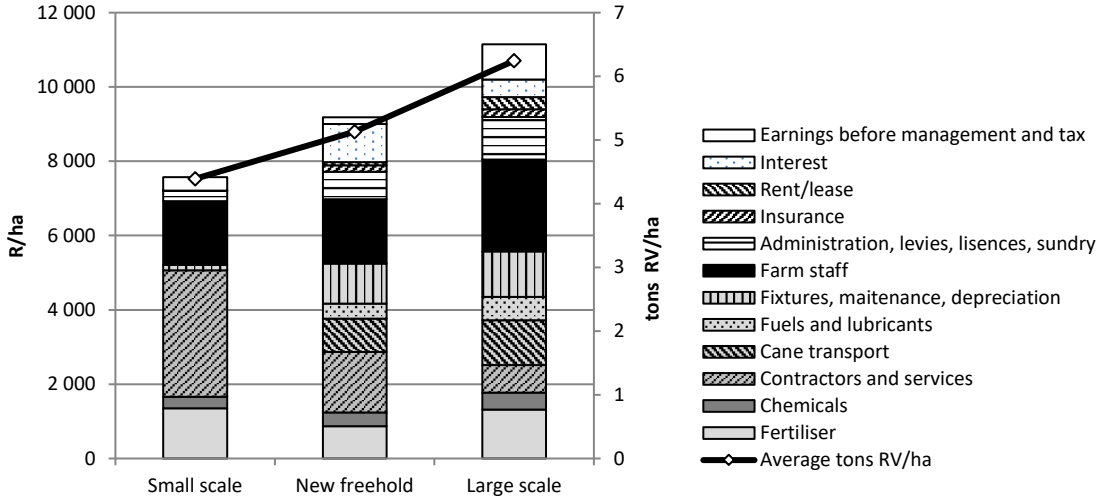
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	
	Farms	4	25	23	2	4	10	4	2	6	4	1	85	100%
	%	5%	29%	27%	2%	5%	12%	5%	2%	7%	5%	1%		100%
	Rm spent	25.93	161.83	148.75	15.04	13.84	61.55	23.39	23.53	7.14	21.02	14.38	516.39	100%
	%	5%	31%	29%	3%	3%	12%	5%	5%	1%	4%	3%		100%
	Ha	985	6,230	5,201	248	633	2,541	545	465	602	949	312	18,711	100%
	%	5%	33%	28%	1%	3%	14%	3%	2%	3%	5%	2%		100%
Total	R/Ha	26,329	25,974	28,601	60,680	21,876	24,220	42,915	50,654	11,866	22,143	46,085	27,599	100%
	Farms		1			2	4			1		1	9	11%
Illembe	Rm spent		6.42			6.61	13.01			2.86		14.38	43.28	8%
(North	Ha		323			162	575			125		312	1,496	8%
Coast)	R/Ha		19,866			40,861	22,626			22,956		46,085	28,921	105%
	Farms		1			1							2	2%
Harry Gwale	Rm spent		13.30			4.03							17.33	3%
(South	Ha		485			344							829	4%
Coast)	R/Ha		27,417			11,714							20,901	112%
	Farms		1			1		1	1				4	5%
Ugu	Rm spent		22.64			3.20		4.50	5.95				36.28	7%
(South	Ha		1,797			127		83	203				2,210	12%
Coast)	R/Ha		12,599			25,216		54,438	29,245				16,419	88%
uMgungundl	Farms						3			5	2		10	12%
ovu	Rm spent						13.58			4.28	6.87		24.74	5%
(Midlands/S	Ha						858			477	505		1,840	10%
outh Coast)	R/Ha						15,836			8,970	13,598		13,441	72%
	Farms	2	16										18	21%
uMkhanyaku	Rm spent	12.01	81.71										93.71	18%
de	Ha	352	1,226										1,579	8%
(Zululand)	R/Ha	34,090	66,629										59,368	317%
	Farms	2	5	23	2	3	3	1		2			41	48%
uThungulu	Rm spent	13.92	25.53	148.75	15.04	34.96	18.89	17.58		14.15			288.82	56%
(North	Ha	633	1,717	5,201	248	1,109	462	261		444			10,074	54%
Coast)	R/Ha	22,007	14,872	28,601	60,680	31,531	40,855	67,316		31,869			28,670	153%
	Farms		1										1	1%
	Rm spent		12.23										12.23	2%
Zululand	Ha		682										682	4%
(Zululand)	R/Ha		17,932										17,932	96%

Source: Compiled from PMG (2017b).

Despite the policy shift towards them, NFGs have struggled in comparison with their large-scale counterparts. Figure 5 illustrates the results of a SACGA cost survey among 240 SSGs, 51 NFGs and 84 LSGs undertaken in 2006/7 and reported in Armitage *et al*. (2009). The most noticeable overall difference between the three groups are in yield of RV/ha: SSGs yielded 4.4 tons, NFGs 5.1 tons, and LSGs 6.2 tons, accounting for the differences in total revenue per hectare. Absolute investments in working capital and contractor services were very similar, at around R5,200, although LSGs provided more of their own transportation and hauling than NFGs, and SSGs relied exclusively on contractors. A broad overview of value-added, including labour, profit, finance and administrative charges, shows LSGs generating 49% as compared to 35% for NFGs and 12% for SSGs. Payments to farm labour were higher on LSG farms and relatively even on SSG and NFG farms. Most evident, however, is that interest charges accounted for 51% of value added on NFG farms as opposed to 16% on LSGs and

less than 1% on SSGs. Assuming the survey's respective average sizes of 3.9ha, 115ha and 220.5ha, net returns for SSG, NFG, and LSG segments would be R1,431; R20,355 and R209,696.

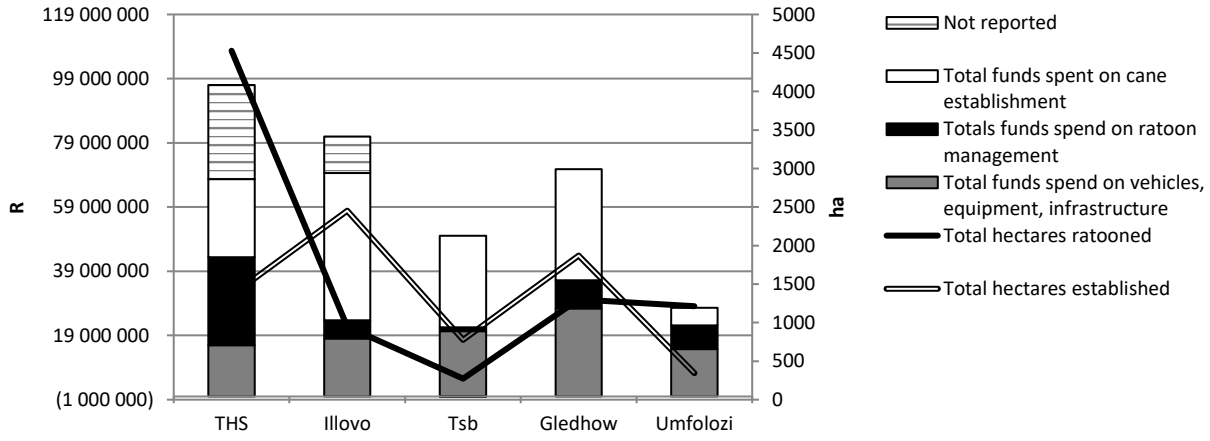
Figure 5 Results of SACGA 2006/7 farm cost survey among SSG, NFG, and LSGs



Source: Armitage *et al.* (2009).

As a result of the difficulties faced by NFGs, SASA responded in 2010 to the public tender process for funding through the Recapitalization and Development Programme (RADP). Millers were accredited as 'mentors' in tripartite agreements between individual NFGs, the DRDLR and millers, with funds channelled through joint bank accounts. Training was conducted through the Shukela Training Centre, extension support was provided by SASRI, and business plans were drafted by SACGA. By 2015, 177 growers at the Illovo, Tongaat-Hulett, Tsb, USM and Gledhow mills had received a total of R326.51m in funding, with R76.14m being spent on infrastructure and equipment, R49.32m on ratoon management on some 6,688ha, and R110.26m spent on establishing new cane plantings on 2,792ha. R40.78m had yet to be spent, while Tsb spent R90,673 over-budget. SASA claimed that 878,874 tons of cane had been delivered by 2015 (SASA 2015). The breakdown by mill area is provided in Figure 6, showing that Tongaat-Hulett claimed the most funding, largely for ratoon management in contrast with Illovo's preference on new cane establishments. Gledhow and Umfolozi likely received greater funding per mill insofar as each represent a single mill.[8]

Figure 6 breakdown of cumulative expenditure through RADP to 2015 by receiving company



Notably, production on NFG farms had been showing signs of decline, with area under cane falling from a peak of 55,965ha - 51,388ha between the 2009/10 -2011/12 season and cane production similarly falling from a high of 2,483,912 tons of cane in 2009/10 to 2,072,114 the following season.

[8] Hurly et al (2015) indicate that approximately R78.8 million of RADP funding was expended on SSGs. It is not clear how this was distributed among the funding indicated in the SASA report.

RADP funding appears to have been important to mitigating decline in the short-term, with production rising to 2,402,307 tons from 56,901ha in the 2012/13 season alone. However, long term impacts are unclear. Overall, NFG production has declined from approximately 15%-9% of all production, and in absolute terms to 1,745,206 tons from 310 growers in 2018/19.

3.6.2 Land Restitution

Land Restitution has been of considerable concern for sections of the industry, especially millers (who worry about maintenance of cane throughput) and LSGs (who are concerned about their properties and the risks to investment.[9]

The progress of the restitution process is in cane growing areas is not altogether clear, in part owing to contradictory time frames provided in public sources, unclarity whether claims encompass sugarcane and non-sugarcane land, the impact of dropped claims, and changes in area under cane in general. SACGA (2010) reported 52% of cane land was under claim, with less than 9.2% of claims having been resolved. By 2013/14, approximately 41,983ha had transferred, with about 130,400ha of gazetted claims unsetlled; in other words 38% of total land under cane, and 44% of land farmed by LSGs (BFAP 2014, SASA 2014).[10] The DRDLR reported then that 29,000ha held by 'willing sellers' awaited final payments, 24,000ha were in final negotiation stages, and only 13% of outstanding claims were contested (albeit not accounting for the difference) (Business Day 2013).

By 2015, SASA had entered into an MoU with the Regional Land Claims Commission to confirm "processes for the sustainable transfer of land; and Joint Annual Plans", and were shortly followed by the transfer of 6,364ha in 2015, reducing total area under unresolved claims to 124,000ha (SACGA 2017). SACGA (2019) reported that 46,896ha had been restituted to date – a 1,451ha difference.[11]

Again, publicly available data on Restitution is difficult to square with the industry's reported transfers. According to the DRDLR and CRLR, between 2009-2017 approximately R598.59m was spent on restitution claims in Kwazulu-Natal on farms totalling 33,846ha where sugarcane production was listed as a key activity after transfer. However R400m (66.8%) of this budget was spent on one claim from Ushukela milling to Royal Shaka Estates (both owned by the Sokhela family) for an area of 1,567ha (4.6%), and 39% of listed land was owing to a different scheme orientated to game farming. The listed unevenness is further complicated by the apparent lack of correspondence with details published about respective cases in Lands Claim Court (LCC) documents, newspaper reports, and municipal land valuations, including cases not listed.[12] Brief summaries of available online references to the trusts are provided as footnotes.

[9] BFAP (2015) reported Eston LSGs initially reduced investments in soil health and ratoon maintenance until realizing this impaired their lands' valuation. In coastal areas some reportedly ceased re-planting, preferring to manage existing ratoons. Some nonetheless re-initiated planting but struggled under the combination of low RV prices (2001-2005) high input costs (2005-2008) and low rainfall.

[10] It is not clear to what degree the dropping of claim on Charl Senekal for 20,000ha in Pongola impacted these figures (Fin24 2010).

[11] It is not clear if the difference relates to findings against the claims of the Elambini community on North Coast farms totalling approximately 1,380ha, which included lands held by Crookes Brothers in Scottsborough (LCC 2018b, Richard 2018).

[12] For instance, the divisive and recently violent Mathulini Claim in Ugu district was not mentioned. Lands awarded in 2012 of around 2,115ha for R80m include a 1,732ha sugarcane farm (Mthethwa 2019).

Table 4 Sugarcane-related restitution projects, KwaZulu-Natal, 2009-2017

District	# farms	Registered beneficiary	R	R%	Reported ha	Reported ha%
Restitution			1,419,647,388	100%	404,666	100%
Sugarcane			598,591,051	42.2%	33,846	8.4%
Illembe (North Coast)			487,233,158	34.3%	12,904	3.2%
	2	Kwacele Nhlangwini Communal Property Trust[13]	59,831,158	4.2%	9,287	2.3%
	1	Makhosikhosi Communal Property Trust[14]	22,651,000	1.6%	2,042	0.5%
	2	Nodunga Communal Property Association[15]	1,376,000	0.1%	7	0.0%
	1	Not registered yet	375,000	0.0%		0.0%
	1	Qwabe Nkanini Communal Property Association	3,000,000	0.2%		0.0%
	1	Royal Shaka Estates Pty LTD[16]	400,000,000	28.2%	1,567	0.4%
Ugu (South Coast)			41,675,320	2.9%	1,289	0.3%
	1	Insika Yamabombo Communal Property Trust[17]	11,797,750	0.8%	539	0.1%
	1	Ndwalane Communal Property Trust[18]	29,877,570	2.1%	750	0.2%
Umgundlovu (Midlands/South Coast)			50,170,473	3.5%	6,433	1.6%
	1	Azibuye Emasisweni Maqamu Trust[19]	17,000,000	1.2%	48	0.0%
	1	Emagcekeni Communal Property Trust	13,241,473	0.9%	868	0.2%
	2	Embo Emfeni Community Trust[20]	13,000,000	0.9%	3,233	0.8%
	2	Embo Table Mountain Property Trust[21]	5,300,000	0.4%	1,880	0.5%
	1	Embo Thimuni Community Trust[22]	1,600,000	0.1%	403	0.1%
	1	State Land - Court Order	29,000	0.0%		0.0%
Zululand (Pongola)			19,512,100	1.4%	13,221	3.3%
	2	Nkunzana Communal Property Trust[23]	19,512,100	1.4%	13,221	3.3%

[13] The KZN DARD MEC Themba Mthembu is quoted as saying "the KwaCele Land Claim was settled in three phases between May 2008 and October 2010. The extent of the land restored to the Claimant community is 7,200 hectares most of which is under cane. The State paid R118 million purchasing land on behalf of the Claimants." (KZN Department of Agriculture & Rural Development 2016). The difference with recorded figures is not clear. At least part of the claim concerned 1,600ha of sugarcane lands held by Crookes Brothers Ltd, which acted as a 49% minority shareholder in joint-venture with a claimant community of around 800 households. The JV expanded to 1.950ha in 2011 on lease from the community and supplied the Gledhow sugar mill (Crookes Brothers 2011). Crookes Brothers ultimately disposed of their interest in KwaCele Farming in 2014 at a net disposal loss of R2 million (Crookes Brothers 2014). By 2016 the trust had around 2000ha under cane (North Coast Courer 2016).

[14] The Makhosikhosi trust was reported as having claimed and received 3,460ha before lodging a further claim of some 12,000ha. A gazetted claim in 2015 for approximately 9,200ha was ultimately denied in 2018 upon the appeal of the Maidstone Proactive Planters Association with 797ha under claim and Tongaat-Hullet with 315ha under claim and gazetted in 2015 (LCC 2018a). Tongaat-Hullet was already involved in joint venture with the Makhosikhosi Trust in establishing 370ha under claim.

[15] The Nondunga Communal Property Association, representing 372 households and approximately 2,256 beneficiaries successfully claimed approximately 2,897ha in 2012, according to Vuk'uzenzele while the Deputy Minister indicated that 685.5ha was purchased at a cost of R7.4m (Mkhize 2015, Mashego-Dlamini 2015). In 2015, the community entered a 10-year lease with Mondi for a rental fee of R507,000. The community also received R17.8m in RADP funding. However, in 2017 the community entered into a lease agreement with Tongaat-Hulett for 378ha under cane (Mkhize 2015, Mduli 2017).

[16] In addition to being one of the most costly claims, it has also been highly contentious and complex. A claim by the Zwelabantu Dube Community Property Association (ZDCPA), representing approximately 1,704 'families' (LCC 2013), was gazetted in 2006. Part of the claim involved the New Guelderland Sugar Estate, a 1,000ha sugar cane estate and conservancy owned by the former chairman of the South African Sugar Association, Rodger Stewart. 134ha was initially sold to BCR for the coastal development for R194m and a 20% shareholding. 100ha was leased back by Stewart, but ultimately cancelled following a violent encounter (City Press 2012, Dardagan 2012). Ultimately, dissatisfaction with the progress of development and benefits saw the deal cancelled, with the CRLR issuing R332m to purchase the balance of BCR's 80% shareholding in the property (Courier 2014, Mercury 2014). A second portion of the claim involved the Addington Farm, then held by the Sokhela family with their purchase of the Gledhow Sugar Mill (Ushukela milling) from Illovo in 2004 (Business Report 2005) with controversial loans from the Land Bank of around R6m-R700m that had yet to be amoritized. The terms of Ushukela's settlement with ZDCPA saw R400m transferred by the state to the land bank in return for ZDCPA gain 20% equity in the farm and sugar mill, with 80% of the farm held by Royal Shaka Estates, owned by Sokhela. Effectively, this allowed the Sokhela family to leverage the claim for amortization of the original purchase (Dardagan 2009). As part of the settlement, ZDCPA would also see preferential selection for milling employment, all proceeds from sugarcane sales plus R10 per ton, and an annual 'lease' fee of R1m (LCC 2013).

[17] According to a provincial MEC speech, in 2013, the Insika Yamabombo Community, representing approximately 150 households successfully claimed 545ha at a cost of R14m and entered into a joint venture with Illovo sugar (Xaba 2015). Valuations have since differed, with Ray Nkonyeni Municipaity valuing community lands of 969ha at R12.57m and Umuziwabantu municipality valuing 1,237ha at R1.93m (Umuziwabantu Municipality 2017, Ray Nkonyeni Municipaity 2017).

[18] Ray Nkonyeni Municipality differentially estimated community land at 906ha at a value of R10.93m in 2017 while Hibiscus Coast municipality valued it at R4.16m in 2015 (Ray Nkonyeni Municipality 2015, Hibiscus Coast Municipality 2015).

[19] Mkhambathini Local Municipality (2014) valuation roll placed community lands at 1,117ha at a value of R21.19m. Claimants remain highly divided (Pieterse 2018, Sithole 2011).

[20] A Lightstone (2016) commercial property report indicated the value of land transactions involving the community stood at R47.6m. A Genix (2018) valuation report indicated the trust holding 4,080ha valued at R111.35m

[21] Msunduzi Local Municipality (2018) listed properties held by this community to stand at 23ha, valued at Rm 1.3m

[22] Genix (2018) Lists this trust as holding 886ha at R7.74m.

[23] The LCC (2011) observes that 12,726ha valued at R182.46m was awarded to the trust, representing 472 households. The claim was complicated when the Usuthu Tribal Authority attempted to lay a subsequent claim which was rejected. The claim was further

Source: PMG (2017a)

Government data on restitution in Mpumalanga is even more incomplete, neither specifying the beneficiary, less often specifying crops being produced on the land under claim, and with discrepancies between different databases about funds spent on specific areas. Within the Nkomazi area, from 2009-2017 approximately R400m was spent on land where 'Sugarcane & Orchards' were specified as being produced by beneficiaries, and a further R427m was spent on lands where beneficiaries indicated expenditure on 'Agriculture and Citrus'.

Woodhouse and James (2015) observed that up to 2010, 61,202ha in the Nkomazi area had been transferred to seven main trusts on behalf of 18,136 beneficiaries at a cost of R2.8bn. All were involved in sugarcane production, although not all land was under cane.

While the differential may considered owing to the differences in the time frame, details of particular schemes also vary. In a separate data set, two CPAs involved in sugarcane-related restitution schemes, the Siphumelele Tenbosch Trust (STT) and the Ingwenyama Simhulu Trust (IST), each received total lands of 10,811ha and 5,505ha respectively. According to Woodhouse & James (2015) up to 2010, STT had received 5,074ha at R270m (and encompassing 6,170 beneficiaries) while IST had received 8,038ha at R351m (including 5,000 beneficiaries). However, Nkomazi Municipality (2018) identified the STT as holding 9,949ha valued at R300.9m, and the IST as holding 2,850ha at R131.24m.

Table 5 Sugarcane-related restitution projects, Mpumalanga, 2009-2017

			R	%
Restitution			827,831.876	100%
Sugarcane & Orchards	3		400,581,136	13%
Ehlanzeni (Nkomazi)	3	Unknown	400,581,136	13%
Agriculture and Citrus	3		427,250,740	14%
Ehlanzeni (Nkomazi)	3	Unknown	427,250,740	14%

Source: PMG (2017a)

News sources suggest that TSB was paid R285m for the combined 8,000ha Komatidraai and Tenbosch sugar cane farms, subsequently managed as a joint venture (Business Report 2007). The particular difference between original farms transferred, and area under cane, however, is difficult to specify. According to Woodhouse and James (2015), in 2014 TSB estimated that restituted land accounted for 21,605ha of 51,054ha of canelands supplying its two mills in Malelane and Komati. Further details of these schemes is provided in Section 5.3.

complicated when another group attempted to subsequently join the group, and reportedly involved in threats and sabotage (Oellermann 2015). While it appears game farming is the main concern of the group, it was also purportedly involved in a fresh vegetable marketing scheme assisted with RADP funding (Phillips 2014).

4. General pressures and controversies facing the sugar industry

This section provides an overview of the primary drivers of the current crisis. Although not definitive, there is little doubt that the scope is substantial and severe. In the context of looming job losses, erstwhile stalled debates about 'diversification' of cane into 'non-sugar' products such as ethanol are being reopened (Kawdwa 2019, Mandela 2019, Mboyisa 2019). Discussions about of 'job preservation' are coming to the fore even as losses in cane production are already becoming evident (Nicholson 2019). At the time of writing, the industry is reportedly in ongoing negotiations with the DTI and DRDLR about the development of a co-ordinated 'Master Plan' for the industry, details of which are not yet available (SASA pers. comm.).

In this paper I argue that, even in the midst of this crisis, there is substantial scope – arguably unparalleled among agricultural commodities – to competitively incentivise the sustainable preservation and expansion of SSG production and sugarcane-related land reform projects. This matters because SSGs represent the most significant channel for 'pro-poor' beneficiation in the sugar industry, but in spite of this earlier crisis-motivated reforms came at their expense.

4.1 The size and share of the domestic (SACU) sugar market

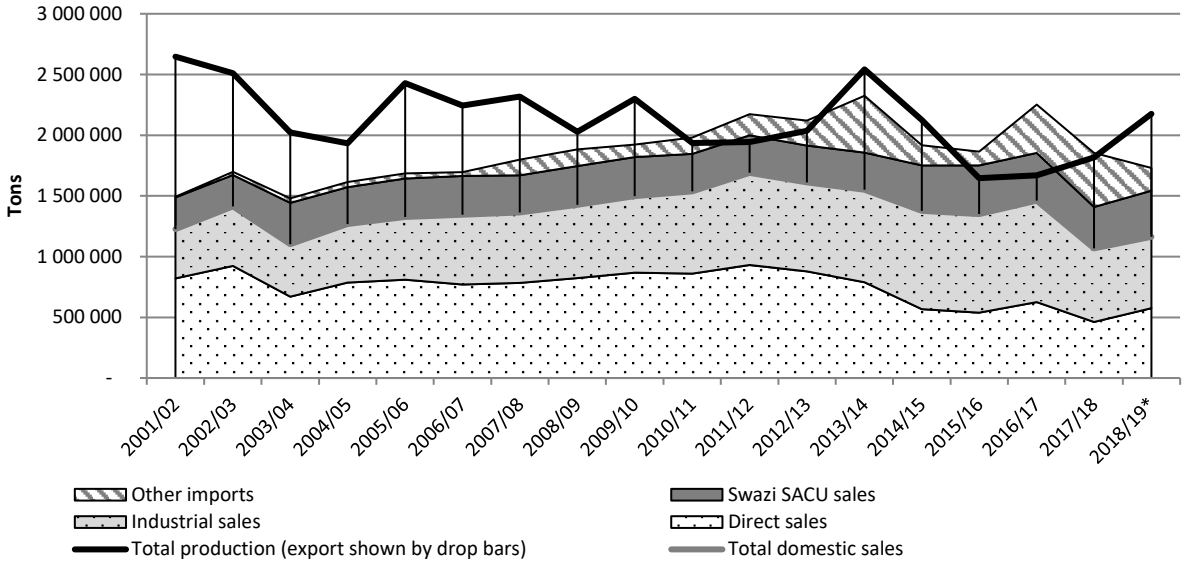
The deepest challenges facing the South African sugar industry concern the size of the tariff-protected domestic market relative to the scale of production.

In a general sense, this challenge is not new. Industrial crises borne of the need to export large quantities of sugar have given rise to struggles over rationalization' since at least the 1980s: the adoption of the SIA (2000) was an outcome of the most recent set of reforms (Van Biljon 1970, Rorich 1982).

Indeed, since the SIA (2000), South African sugar has tended to stay within the boundaries of the SACU market. Firstly, overall sugar production declined and secondly there was substantial growth in sales to industrial consumers. As illustrated in Figure 7, while total SACU sugar consumption 2001/02 stood at near 1.4mt compared to production in that year of around 2.6mt, South African sales to SACU by 2011 accounted for around 1.7mt of around 1.9mt produced. Over the course of this period, rising commodity prices had largely rendered the DBRP moot, and South African milling companies were concentrating investments into regional expansion, largely by acquisition, where they enjoyed irrigated cane production, low wage costs, and opportunities for preferential access to a protected EU market (Dubb *et al* 2017).

However, since 2011, the industry has faced near-constant crisis by the encroachment upon and diminishment of the SACU market, and the consequent displacement of domestically produced sugar into a low-priced world market. Overall, consumption in the SACU market has dropped from approximately 2.3mt to 1.7mt between 2013/14 and 2018/19. Sales from South African producers fell from approximately 1.7mt to 1.2mt between 2011/12 and 2018/19, with sugar displaced onto international export markets consequently rising from approximately 0.2mt to 1.2 mt between 2011/12 and 2019/19. The two most important contributors here are competition from imports and sweeteners.

Figure 7 Comparison of South African sugar sales into SACU market, imports into South Africa, and exports from South Africa, 2001/02 – 2018/19



*South African domestic and industrial sales compiled from SASA (2019, 2009).
**Swazi sales into SACU from 2005/6 – 2016/17 are sourced from Wellington (2018). For the year 2017/18, the 2016/17 volumes were adjusted downward by 13.5% as suggested by the ESA (2018). Sales in 2018/19 were estimated by raising figures provided by TradeMap for Swazi exports to South Africa by the Wellington (2018) estimate of domestic Swazi sugar consumption of 54,000 tons.
***Imports and exports refer to tonnages at Harmonized Standard (HS) category 17.01 "Cane or beet sugar and chemically pure sucrose, in solid form".

4.1.1 Sugar Imports

The incursion of sugar imports into the SACU market has been a central crisis-point. Combined, sugar imports accounted for a conservative estimate of 0.5mt of SACU demand (about 30% overall).[24] Two broad sets of imports are critical, those from eSwatini, which as a SACU member enjoys unfettered trade within the trade bloc, and imports from other countries (mainly Brazil and re-exports from UAE) subject to the DBRP.

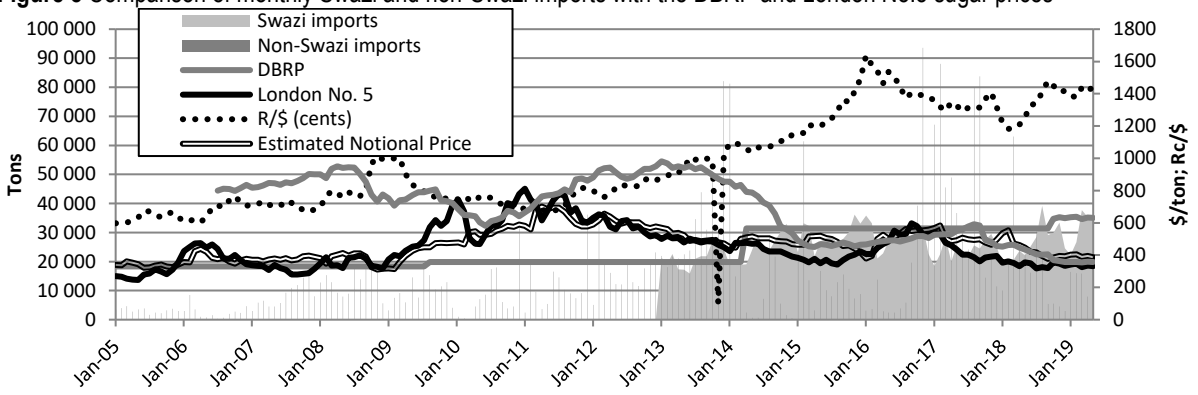
In regards to the latter, from the mid-2000s, imports appear to have been driven foremost by the effective diminishment of the DBRP. Despite the gradual weakening of the Rand, international imports climbed gradually from below 10 – 20,000 tons per month from 2005 to 2009 as world and South African prices fluctuated closely around the DBRP. The climb of world prices above the DBRP thereafter was attended by some diminishment of non-Swazi imports, as well as the rise of South African prices to just below world levels.

However, as world prices peaked in 2011, South Africa appears to have been an increasingly attractive haven for non-Swazi imports. Both world and South African prices remained well above the DBRP, but as world prices fell faster than South African prices, non-Swazi-imports climbed – up to 80,000 tons per month in 2014.

The raising of the DBRP thereafter appears to have been an important and effective deterrent to non-Swazi imports until 2017, when imports in excess of 80,000 tons per month poured into the domestic market. Allegedly owing to an 'administrative error' (De Wet 2018), in 2017 imports received a 0% duty for seven weeks, despite world prices standing below the DBRP, and, for five months until September, received a lower duty than prescribed by the DBRP. The result was particularly severe for the industry given post-2016 drought production recoveries, displacing particularly large volumes of sugar. From 2015/16 to 2016/17, exports increased from approximately 210mt to 748mt.

[24] Comprehensive data on sugar imports is difficult to compile. Sales into SACU by South African producers are provided by SASA, but sales from Swaziland compiled from GAIN and eSwatini Sugar Association (ESA) documents are not complete. Import data from non-SACU countries was sourced from TradeMap, but inconsistently includes Swazi imports and does not include volumes sold within Swaziland. For this reason, other sales from Southern Africa into SACU, particularly Zimbabwe into Botswana, are not clear and excluded as unreliable.

Figure 8 Comparison of monthly Swazi and non-Swazi imports with the DBRP and London No.5 sugar prices



*Swazi and non-Swazi imports refer to the South African market only, as indicated by TradeMap
**London No. 5 price obtained from Investing.com
*** Notional price estimated by dividing SASA (2019) reported RV price by 64% (approximate sugarcane grower's share of the DoP)
*** DBRP figures obtained from ITAC (2009, 2014, 2018)
****EU sugar price obtained from European Commission (2018)

More chronically critical than (even severe) spates of imports from the wider world, however, imports from eSwatini have been a mounting pressure point that is likely to intensify. From the early 2000s, imports of sugar from eSwatini were capped at an agreed quota of approximately 260,000 tons (IUF 2002), but by 2015/16 had reached 400,000 tons, before diminishing under the joint pressure of non-SACU imports (ESA 2018). However, Swazi imports are at high risk of supplanting non-SACU import volumes as a point of sustained pressure on the South African industry (Wellington 2018).

The growth in Swazi imports has many dimensions, but two related factors are of particular importance: the shifting regulation of the EU sugar market and the investment of South Africa's major sugar companies in the region. Briefly, in the post-apartheid period, recently 'unbundled' South African sugar capitals leveraged investor confidence, cash windfalls from the 2002 exchange rate volatility, and government funded-BEE deals to invest in regional sugar milling interests, largely by acquisition. Regional investments were attractive not only due to highly favourable production conditions (with companies enjoying far lower wages and securing access to large, mainly irrigated cane-supplies through a variety of production models in negotiation with governments eager to attract foreign investment), but also enjoyed the prospects of garnering preferential access to the protected EU market under the 'Everything-But Arms' (EBA) initiative for 'Least Developed Countries' (LDCs). In this manner, South Africa's major sugar companies were able to diminish the problem their exposure to the South African 'overproduction' and costs of 'rationalization' (Richardson 2010, Dubb *et al* 2017).

Wider regional investments included securing interests in all of Swaziland's major sugar companies, with Illovo acquiring Ubombo Sugar, Tsb securing a 29.1% interest in the Royal Swaziland Sugar Corporation, and Tongaat-Hulett retaining ownership of some 3,767ha of irrigated cane land. The investments and market opportunities presaged a significant expansion in Swazi sugar production overall, including rising SACU sales. However, ongoing liberalization of the EU sugar regime has witnessed the collapse of European sugar prices to world levels, and eliminated guaranteed quotas for LDCs like Swaziland. African sugar companies increasingly seek to supply their protected domestic markets. In the case of Swaziland, this has been further bolstered by substantial developmental investments by the EU towards adapting to the new commercial environment, which, while having ambiguous impacts on labour, is also promoting the expansion of the industry (Richardson–Ngwenya & Richardson 2014, Chisanga *et al.* 2014, Terry & Ogg 2017, APA 2017, Wellington 2018).

As a SACU member standing outside of South African regulatory mechanisms, and owned in large measure by South Africa's major milling companies, Swazi imports also represent a key point of pressure to 'rationalize' the South African industry in favour of its major corporate players. As Illovo

owns Ubombo sugar outright, however, it appears to be largest beneficiary. Revenues from Swaziland sales into the SACU market effectively 'ring-fence' domestic revenues that would otherwise be subject to the inter-mill redistribution of proceeds (effectively putting particular pressure on independent mills) as well as South African sugarcane growers and 'transformation' initiatives. Moreover, Swaziland's favourable conditions of production provide an opportunity for these companies to undercut South African sugar, keeping prices suppressed below the DBRP (SASA pers. comm.). Finally, although less clear, some reports indicate sales from eSwatini are not projected to be significantly impacted by the 'Sugar Tax', both because Swazi companies do not have a history of contracts with beverage producers in South Africa while also supplying sugar to beverage manufacturers in Swaziland (Wellington 2019a).

4.1.2 The Health Protection Levy ("Sugar Tax")

A related concern is the Health Promotion Levy (HPL), commonly known as the "Sugar Tax", which took effect in April 2018 and stipulated a 2.1 c/gram charge for every gram of sugar per 100ml (above a tax-free threshold of 4g/100ml) (PMG 2017c). While amounting to an approximate 12.3% tax per soft drink, it amounts to an approximate 214% increase on the price of taxable sugar content.[25] At the end of its first year in effect, the tax had generated approximately R2.7bn in state revenue; hence on about 128,500 tons of taxable sugar (Pilane & Green 2019).

Proponents of the HPL stressed the deleterious health impacts of excess sugar consumption, particularly on Non-Communicable Diseases (NCD) and tooth decay, and highlighted sugar sweetened beverages (SSBs) as a key vehicle thereto. They emphasized the large and growing burden on the public health sector represented by these ailments, the efficacy of taxes in curbing consumption in Mexico and on tobacco, and the lack of any net impact on employment in those cases – largely owing to substitution effects. In some cases, the importance of other measures such as awareness campaigns, were also stressed. Opponents to the tax disputed the evidence, suggesting reduced consumption in SSBs did not necessarily reduce overall sugar intake, nor in sufficient quantities to reduce associated negative health impacts, while stressing the short-term potential impacts on employment in the sugar and SSB industries. In particular, SACGA emphasized that as Mexico had access to the US market, that displaced sugar was less economically deleterious – a condition not present in South Africa (PMG 2017d, 2017e, 2017f).

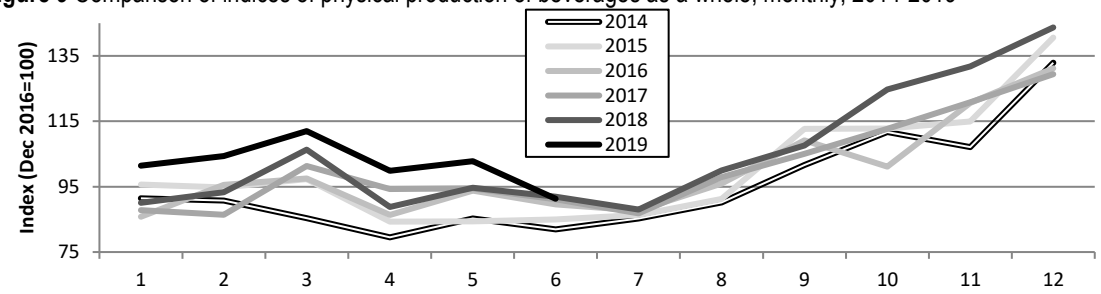
The impact and efficacy of the HPL in regards to health outcomes is beyond the scope and expertise of this report. The economic impacts of the HPL to date are also not entirely clear, and also must consider related impacts on the public health sector and highly contingent questions of how revenue raised from the tax is utilized. Here, a brief review of limited publically available and highly aggregated data only provides some indication of the impacts on the beverages and sugar industries.

In regard to the former, available evidence suggests that the impact of the HPL on production volumes and employment has not been highly significant, and that the tax has been 'passed on' to consumers, at least to some degree, in higher prices. To this degree, the HPL does not seem to have had a strongly negative economic impact.

In regards to volumes, the DTI's indices of physical monthly production volumes in the beverages sector as a whole (i.e. including non SSBs like fruit juices, waters and others) in Figure 9 below shows overall production volumes have continued to rise year on year after the implementation of the HPL. As these figures are at a high level of aggregation, it is impossible to determine to what degree volume growth owes to substitution effects – and hence to what degree the HPL has effectively incentivised consumers to opt for less drinks without sugar (e.g. water), different sugars (e.g. fruit juices) or artificially sweetened beverages.

[25] Assuming a 2 litre Coca-Cola price of R22.50 with a sugar content of 10.6g/100ml and sugar sales at the current DBRP of $680/ton.

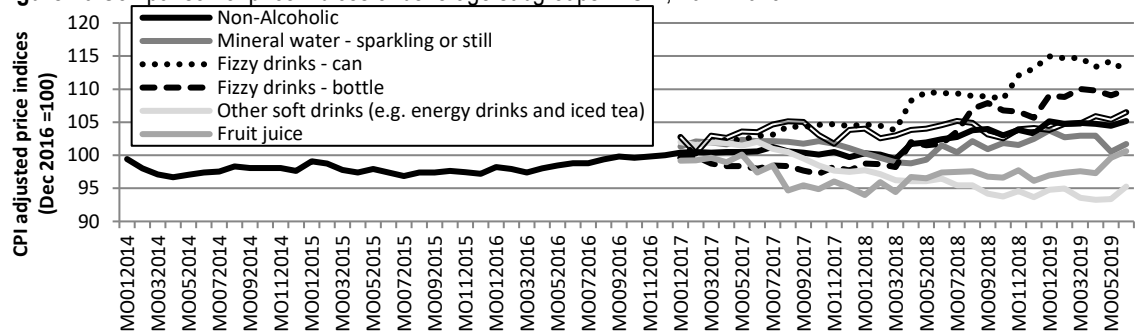
Figure 9 Comparison of indices of physical production of beverages as a whole, monthly, 2014-2019



Source: DTI (2019a)

A somewhat more disaggregated picture on price impacts is provided by DTI indices for items comprising the CPI in Figure 10 – although only available at a disaggregated level from 2017. When deflated by the overall CPI, it is clear that a sharp uptick in real non-alcoholic beverage prices proceeded from April 2018 after the implementation of the tax, resulting in a real increase of 5% by May 2019. Less clear is whether or to what extent the increase in the DBRP in 2018 also contributed to the price rise. The most significant price rises occurred for 'fizzy' drinks in cans or bottles, which saw a real increase of around 10%. This suggests that the tax has at least to some degree been 'passed-on' to consumers, although the extent or influence of other possible factors is not clear. Also notable is that the rise in non-alcoholic beverage prices in general appears to have impacted non-fizzy drinks, particularly fruit juices, which saw reverse in a downward real price trend. Waters have seen some increase, although not sustained, and fruit concentrates do not show a clear trend. Energy drinks and 'other' soft drinks have meanwhile seen an ongoing albeit moderated decline.

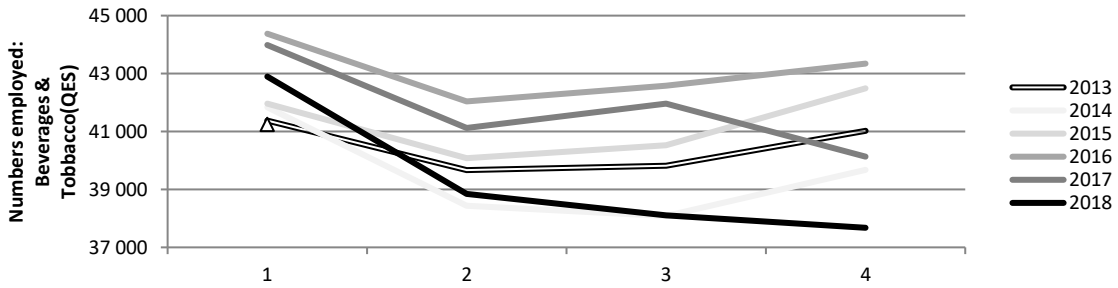
Figure 10 Comparison of price indices of beverage subgroups in CPI, 2014-2019



Source: DTI (2019b)

With largely sustained overall production volumes and price increases, employment might have been anticipated to have remained steady or increase. Quarterly Employment Survey (QES) data suggests that employment in Beverages and Tobacco as a whole, however, has declined by approximately 1,655 between the first quarters of 2018 and 2019. This was preceded by jobs in this category peaking in 2016, and having already witnessed an average drop of 1,282 between 2016 and 2017. If related to the HPL, the shift would have to been in anticipation of the HPL rather than as an immediate consequence. This may also be consequent to differential labour requirements of different drinks, or changes in the labour processes of the same product categories owing to sweeteners.

Figure 11 Number of persons employed in Beverages and Tobacco, Quarterly Employment Survey, 2013-2019Q1



Source: DTI (2019c)

In estimating whether the HPL has reduced overall industrial consumption of sugar in South Africa, the question of the relevant period of review and measure of consumption is key, particularly owing to simultaneous impact of imports, and changes in the DBRP.

The core competing arguments are that:

- The HPL has had a direct and immediate impact on sugar consumption (Wellington 2019b, Arthur 2018, Ensor 2019);
- Declining sugar consumption is a long-term trend not strongly attributed to the HPL (REF);
- Long-term declines in sugar consumption were structured by anticipation of the HPL. It is further argued these declines are both permanent (as manufactures adjust their production processes) and will deepen (as non-beverage manufactures reduce industrial sugar consumption to pre-empt an extension of the tax) (SASA pers. Comm.; SACGA pers. Comm.).

The chief difficulty in evaluating these arguments is that while sales from South African sugar producers to the SACU market distinguish between direct and industrial sales, the same is not true of imports, including those from eSwatini. A related concern is that recent spikes in cheap imports open the possibility of sugar stockpiling that make turning points in aggregate demand fraught. Similarly, the intentions of industrial sugar consumers are not here evaluated.

Publically available data support the above arguments to differential degrees, but overall suggest the HPL has triggered a minimum reduction of 200,000 tons of sugar consumption; itself significantly higher than predicted 150,000 tons (BFAP 2017)

It is perhaps first appropriate to observe that industrial consumption of artificial sweeteners in South Africa is not a universal long-term tendency. Figure 12 illustrates the net-imports (imports less exports) of key sweetener commodities in South Africa listed by TradeMap. Although statistics on the manufacture of sweetners in South Africa are not readily available, in principle sudden growth in sweetener consumption should reflect in growing imports and/or declining exports.

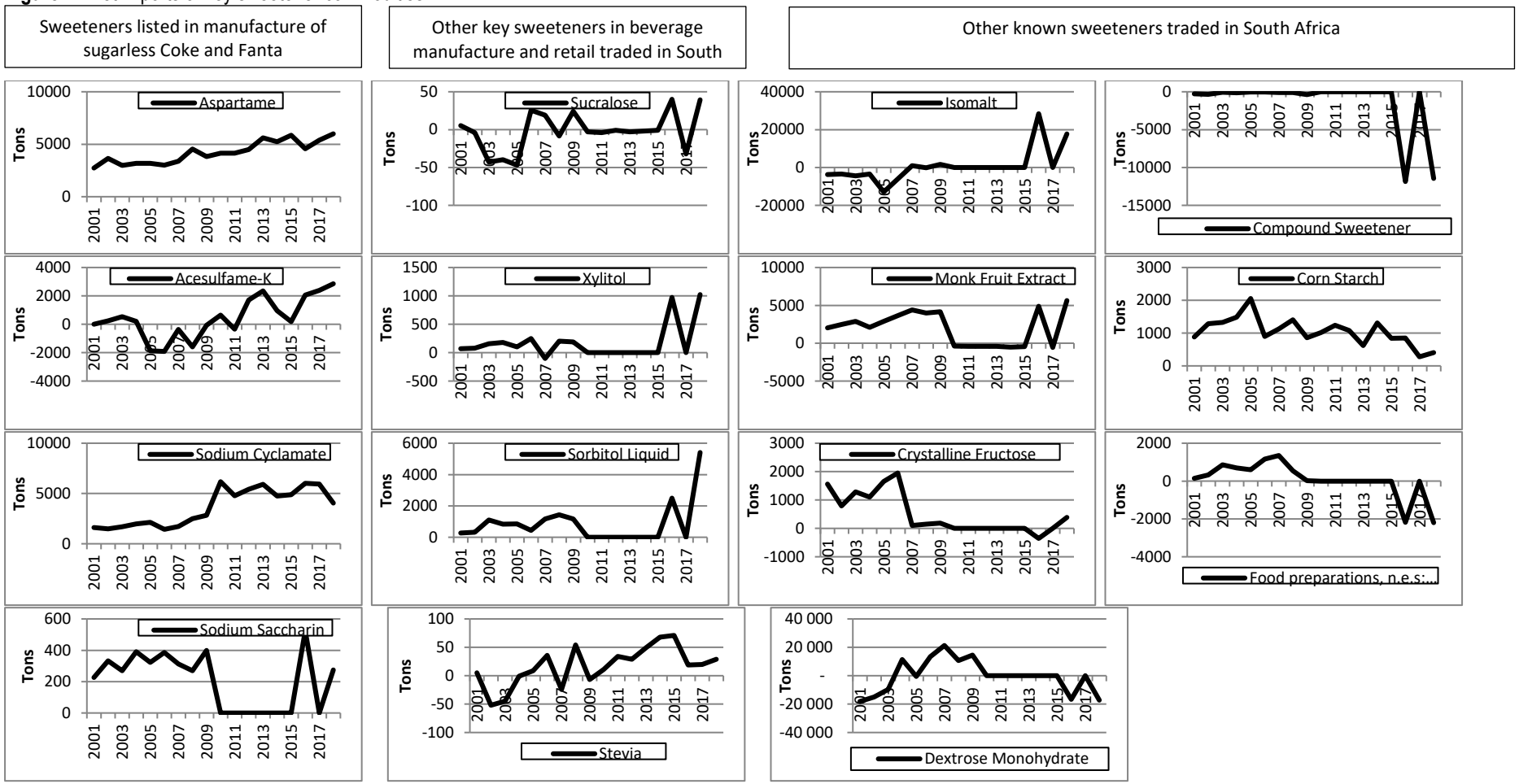
Growth in artificial sweetener imports is indeed a long term tendency for sweeteners common in the manufacture of sugar-free Coke and Fanta, particularly aspartame, acesulfame-k and sodium cylclamate. Sodium Sacchrin, however, saw net imports drop to zero following the peak in world sugar prices in 2010 and during import crises, and peaking again after 2018. This suggests import of these sweeteners has grown following the HPL.

A similar tendency is also evident for other sweeteners commonly used in beverages, other manufactures and retail sales more broadly, particularly sucralose, xylitol, and sorbitol liquid. The exception here is stevia, which is also a commonly sold sweetener at retail level. Net stevia imports saw considerable growth as retail prices rose and the 'notional' price declined with world futures, with the inverse tendency predominating in 2016. This, *prima facie*, would appear linked to TSB standing as a key producer of stevia.

Other sweeteners not known to be particularly common in beverage manufacture are more differentiated, with monk fruit and isomalt showing significant growth in net imports after 2018, but with others showing no clear trend or decline.[26] Overall, this suggests that while the utilization of artificial sweeteners is a long-term trend, it was significantly interrupted by the incursion of cheap imports, and accelerated by the imposition of the HPL.

[26] The particular sweetener commodities and their closest HS codes selected were based on the list provided at https://www.foodchem.cn, with trade data sourced from TradeMap.

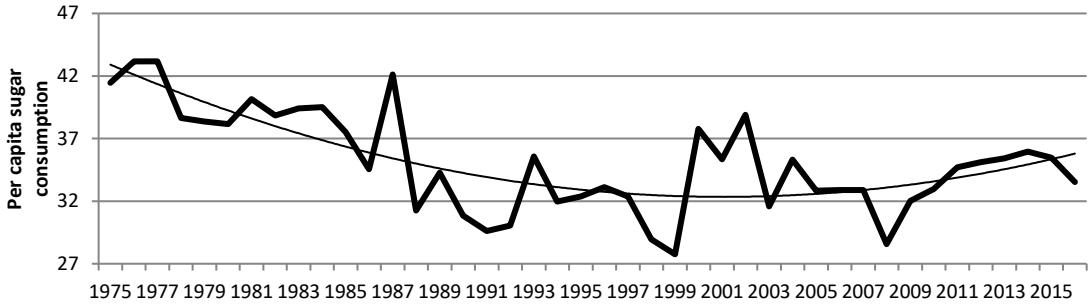
Figure 12 Net imports of key sweetener commodities



Source: TradeMap

In regards to the decline in sugar consumption being a long-term trend, available data suggests this to be partially true. Data from the DAFF Agricultural Abstract suggest per capita sugar consumption to have declined considerably from the 1970s, but to have trended upward from 2000, notably as industrial consumption increased. However, as estimates typically divide production and imports by total population, the data is subject to sharp swings.

Figure 13. Per capita sugar consumption, 1975-2016

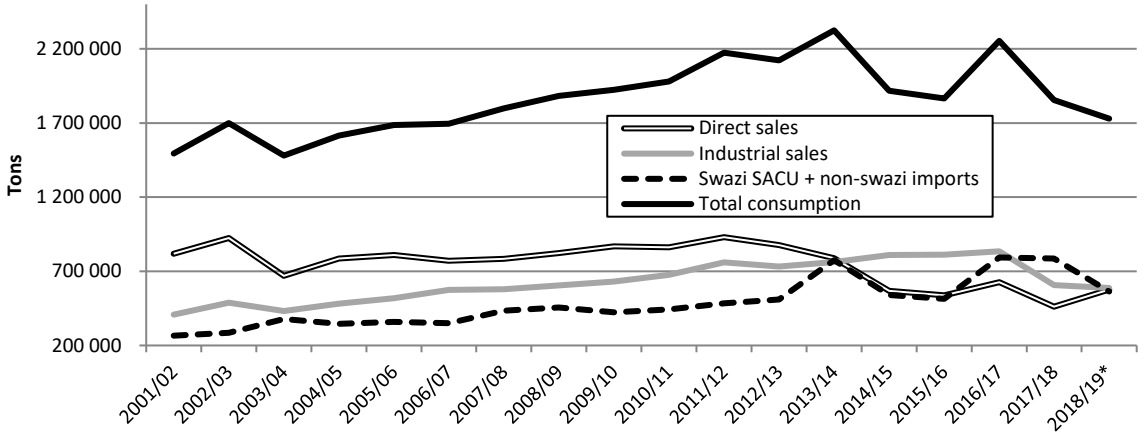


Source: DAFF 2019

SASA sales data together import data from TradeMap since 2001, however, instead suggest that recent falls in consumption were initially driven by declines in direct sugar sales – in part owing to a raised DBRP deterring import. While estimated aggregate sugar consumption peaked in 2013/14 amid raised prospects of the HPL, the peak was driven overall by a large growth in non-Swazi imports – raising the possibility that sugar imports were opportunistic and prospective, rather than reflecting a 'true' level of annual consumption. This is supported by the fall of direct sugar sales by the South African sugar industry as total imports increased to 2013/14. As such the 'true' peak SACU consumption appears to have been reached in 2011, before the HPL was pursued, and as industrial consumption was continuing its rise. While both imports and direct sales fell thereafter, both appear to have been importantly structured by the rise in the DBRP in 2014, in part precipitating a rising 'notional' price with lagged reflection at the retail level. This is not to suggest that SSB manufacturers ignored the potential impact of a suggested HPL, only that if so these were less significant than rising industrial sales overall and declines in direct sales.

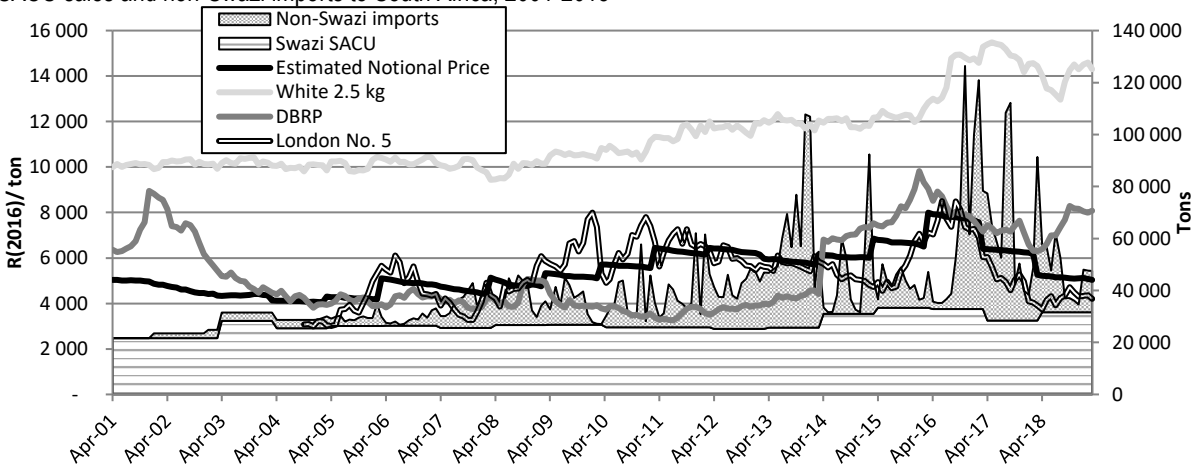
The rise in sugar imports over the course of 2017 appears to have played a key role in maintaining the suppression of the South African industry's direct sales in 2016/17 and industrial sales in 2017/18. Imports rose from by around 300,000 tons between 2015/16-2016/17, remaining inflated for the 2017/18 year. By 2017/18, direct and industrial sales had fallen by an approximate combined 361,000 tons, but notably remained suppressed the following year, even as imports fell by approximately 220,000 tons. While it is difficult to discern precisely to what degree imports came at the expense of direct or industrial sales in 2017, that both markets remained suppressed even as imports declined from their peak suggests the HPL is responsible for the difference in industrial sales, and that the raised DBRP and retail prices have contributed to the suppression of direct sales.

Figure 14 Comparison of direct and industrial sales of sugar by the South African sugar industry with estimated total Swazi production, non-Swazi imports, 2001/02-2018/19



Source: SASA (2019, 2009), TradeMap, Wellington (2018), ESA (2018)

Figure 15 Comparison of real R(2016) white sugar retail, DBRP, London No.5 and estimated notional prices with Swazi SACU sales and non-Swazi imports to South Africa, 2001-2018



Source: SASA (2009, 2019), StatsSA, Investing.com, ITAC (2009, 2014, 2018), SSA (2018), Wellington (2018), TradeMap

4.1.3 The prospects of for product diversification: Biofuels

Under the conditions of an effective contraction in demand for South African sugar sales, the prospects of utilizing sugarcane as a feedstock for the production of other commodities is receiving renewed attention (PMG 2019, PMG 2019d, Mboyisa & Maphumulo 2019). To date, most prospective analyses of the prospects have rested on the cogeneration of electricity in the process of sugar manufacture and the production of ethanol form sugarcane as a fuel, but are considering additional commodities.

Sugar mills already generate electricity in the process of sugar production, largely by harnessing the steam released from factory boilers, but are orientated almost entirely towards mills' own electricity consumption, with little export. Potential to increase electricity producing capacities exist, by either reducing steam demand, installing more efficient boilers and turbines, increasing fuel supply by burning tops and trash, and, more prospectively, 'gassifying' sugarcane residue ('baggasse') in addition to steam-power (Wienese & Purchase 2004).

The inevitable question, then, is if sugar mills are permitted to supply the electricity grid, whether co-generation of electricity would be a feasible and economic opportunity to increase sugar revenues. The highly technical nature of potential generation as well as structure of electricity tariffs makes any generalization of potentials difficult, and largely outside the expertise of the author.

Moreover, recent studies tend to include cogeneration within scenarios for larger 'bio-refineries' (Naidoo *et al.* 2018, Gorgens *et al.* 2015).

Nonetheless, some basic estimates are made below on the basis of assumptions made by Wienese & Purchase (2004) for electricity co-generation. Here, only the scenarios of reduced steam demand and improved steam and power generation are considered, owing to the provisional nature of combined-cycle technology and owing to the use of tops and trash for on-farm soil-fertility. The base assumptions from Wienese & Purchase (2004) are presented in Table 6, below.

Table 6 Estimations of electricity sale potential and annual operation and maintenance costs of different co-generation investments

	Energy (kWh/tc)	Operation and Maintenance Cost (annualized) Rm (2003)
Base requirement of sugar mill	40	
Reduced process steam demand	28.69	3.42
Improved steam and power generation	92.94	8.2
Increased fuel supply with tops and trash	261.83	43.94
Combined Cycle technology	>400.	

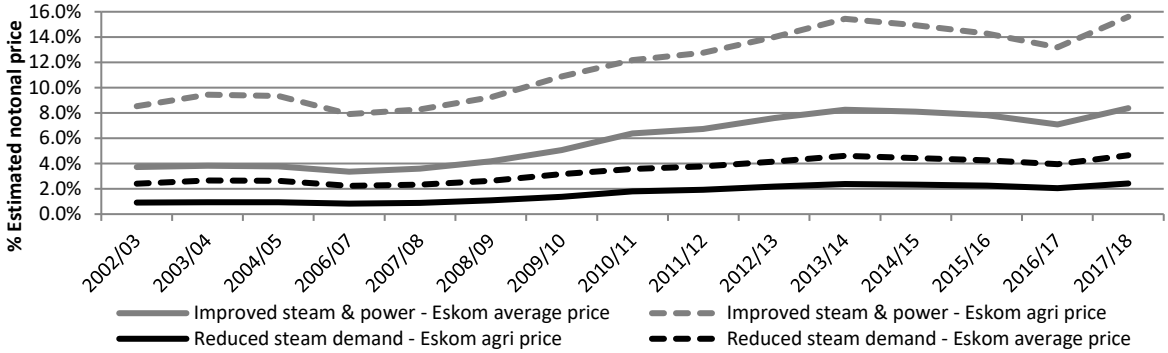
Source: Wienese & Purchase (2004)

* Wienese & Purchase (2004) presume an 'average' sugar mill processing around 1.5mt of cane per year at a rate of 300 t/h, and with a base energy requirement of 40 KWh/tc. The annualised operating and maintenance cost is taken as: "3% of the [fixed] capital cost minus the cost of obsolete equipment. Added to the operating and maintenance cost is the cost of loss of sucrose due to reduced imbibition. The annualisation of the capital cost is based on a life span of 34 years and a discount rate of 10% (annuity rate of 10.41%)"

A crude estimate of the revenue-augmenting potential of co-generation are presented in Figure 16 below. These were arrived at by first inflating Wienese & Purchase (2004) annualized operation and maintenance costs by the CPI, and then dividing them by the 'average' cane crush (assumed 1.5mt) to arrive at a basic cost per ton of cane. These are then deducted from a revenue estimation, made by multiplying Wienese & Purchase (2004) estimate of net electricity produced per ton of cane by Eskom's (2019) annual average selling price and the annual average selling price to agriculture. These are then expressed as a percentage of the estimated 'notional' price for sugar per ton of cane – here estimated by dividing the RV price by 64% and multiplying the quotient by an estimated 12% RV.

Although basic, the exercise suggests that above inflation electricity tariff increases as well as the recent fall in the RV price would render electricity co-generation increasingly attractive, with prospective revenue addition nearly doubling, but highly contingent on the tariff pricing regime selected and level of investment. Simply reducing mill steam consumption would see modest revenue augmenting potential of between 2-4%, depending on whether average or agricultural tariffs are applied. For improvement in steam and power, the potential is far more significant at between 8.4-15.6%. While significant, these are not sufficient to alone the offset revenue losses consequent to fall in domestic market realizations (at around 48%). Moreover, the substantial capital investments required under austere sugar market conditions, including declining cane throughput, uncertainty as to likely tariff regime, and potential for contraction increase the risk of investment (SASA pers. comm.)

Figure 16 Basic estimate of cogeneration potential to augment sugar revenue under different price and technology scenarios, 2002/03-2017/18



Source: Wienese & Purchase (2004), Eskom's (2019)

The spur to ethanol production to absorb exported sugar is not altogether new. Interest in ethanol from sugarcane in South Africa was spurred in the 1970s amidst peak oil prices and later with the onset of sanctions. By the 1990s, planned investments in a pilot plants and distilleries were underway, and a government subsidy agreed to, but ultimately abandoned alongside the stabilization of fuel prices (Lewis 1990, Wienese & Purchase 2004).

Government's renewed interest in biofuel production occurred largely in a context rising oil and commodity prices, but officially centred development above the energy independence or environmental rationales favoured by other countries. The stated ambition was to use biofuels as a means to link the 'first' and 'second' economies by bringing 'underutilized land' into production, primarily in the former homelands, and growing South Africa's field-crop subsectors without creating a price-depressing over-supply (DAFF 2015). However, as bemoaned by SACGA (2019), concrete policy "failed to materialise". Announcements that blending mandates of 2% for ethanol and 5% for biodiesel would be set by 2015 lapsed, the scope of target prices or proposed subsidies remains unclear, and four multi-billion rand projects, including on the Makhatini flats, did not proceed beyond licencing (ACB 2015, Letete, T. & Blottniz 2012, Kohler 2016, Department of Energy 2014, West 2012). Similarly, in other Southern African contexts, a number of biofuel projects have stalled or collapsed. However, whereas previously interest in bio-fuels within the sugar industry was premised foremost on increasing demand for cane-supply in a context of factory utilization, the current impetus is being driven by the imperative to reduce exposure to the world sugar market.

It is beyond the scope and expertise of this report to conduct another thorough assessment of the prospective viability of ethanol or other non-sugar commodities produced from sugarcane. Existing studies have largely pointed to ethanol-for-fuel from sugarcane either being economically unviable (Conningrath Economists 2013), contingent on subsidization (Kohler 2016), or utilize price estimates well above the market averages (Naidoo *et al.* 2018). The prospects of utilizing sugarcane for the development of ethanol and other commodities (such as lactic acid) are generally more optimistic, but require very large multi-billion rand upfront investments in fixed capital (Naidoo *et al.* 2018, Gorgens *et al.* 2015). The spectre of losing employment and income opportunities in sugarcane production presented by the contraction of the domestic market for sugar certainly warrants thorough-going investigation of the viability of all possible commodities that can be produced from sugarcane. Bio-based plastics are currently considered to not have premiums over bio-fuels.

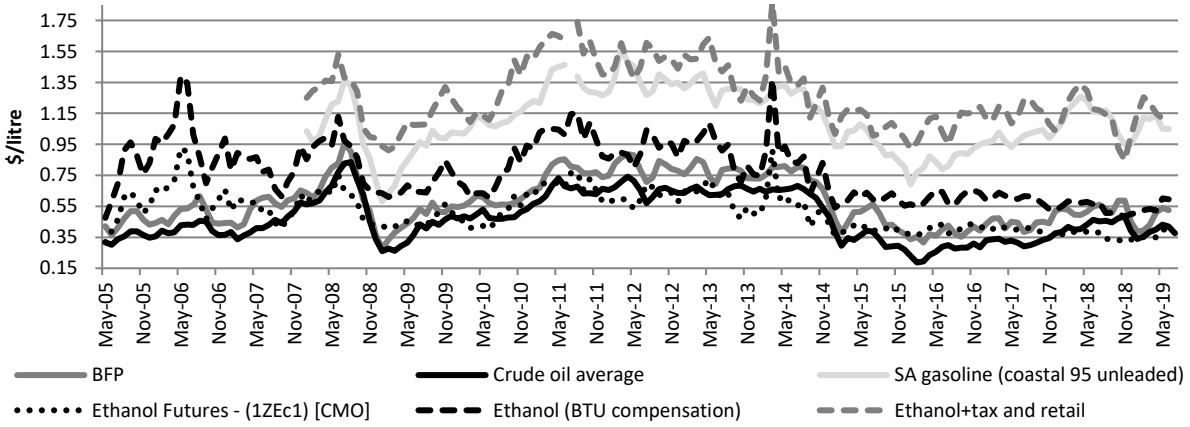
Here, however, it is worthwhile to simply illustrate the foundational barrier to economic viability of ethanol-for-fuel production that would need to be overcome by either (a) extensive subsidization (b) identification of higher value ethanol markets than basic fuel or (c) simultaneous production of more viable commodities. In particular, ethanol does not appear to be either a cheaper alternative to imported fuel, nor provide regular and substantial premiums to world sugar prices.

Figure 17 shows that world ethanol prices (illustrated by American futures contracts), fluctuates closely with (World Bank average) crude oil prices, and, similarly, the South African Basic Fuel Price (BFP). However, as ethanol produces 66.7% of the energy content of regular petrol[27], the effective price of ethanol must be proportionately raised, placing it above that of the BFP – or effectively presume that bioethanol processing to be at least 66.7% more cost-effective than refining oil. Raising this adjusted ethanol price by the difference between the BFP and South African petrol (coastal, 95 unleaded), accounted for almost entirely by taxes and retail margins, consequently finds fuel from ethanol largely uncompetitive, requiring an average difference of $0.39/l to come from price supports or tax-incentives.

Kohler (2016) estimates a bioethanol production price of around $0.68/l for the 2005-2015 period, a cost at or above the BFP, suggesting that increased processing efficiency would be far from sufficient cover for the difference. In their review of economic prospects of sugarcane bio-refineries Naidoo *et al* (2018) estimate from a variety of sources that ethanol production could yield an Internal Rate of Return of 25.33% with a payback period of 16 years. However, it is notable that they estimate an ethanol selling price of R10.5/l, despite average monthly ethanol contracts and BFP prices from May 2005 – Jun 2019 standing at R4.78/l and R5.53/l respectively, and never passing a maximum threshold of R9.82/l and R8.63/l over the same period.

Should, hypothetically, Tongaat-Hulett's highly optimistic scenario of establishing a 725ml production capacity at existing sugar mills (Tongaat Hullett 2013) be extended, this rate of subsidy would translate to roughly R3.96bn a year – enough to provide annual salaries of nearly R500,000 to all mill employees and nearly 20-fold the industry's own transformation commitments. Even a far reduced target of 200ml, half of the ambition for a 2% blend of around 400ml (ACB 2015, Kohler 2016), would by this estimate account for R1.07bn annual loss from the fiscus.

Figure 17 Comparison of prices for crude oil, basic fuel, ethanol and South African gasoline prices, 2005-2019



Source: World Bank, Investing.com, DoE (2019)

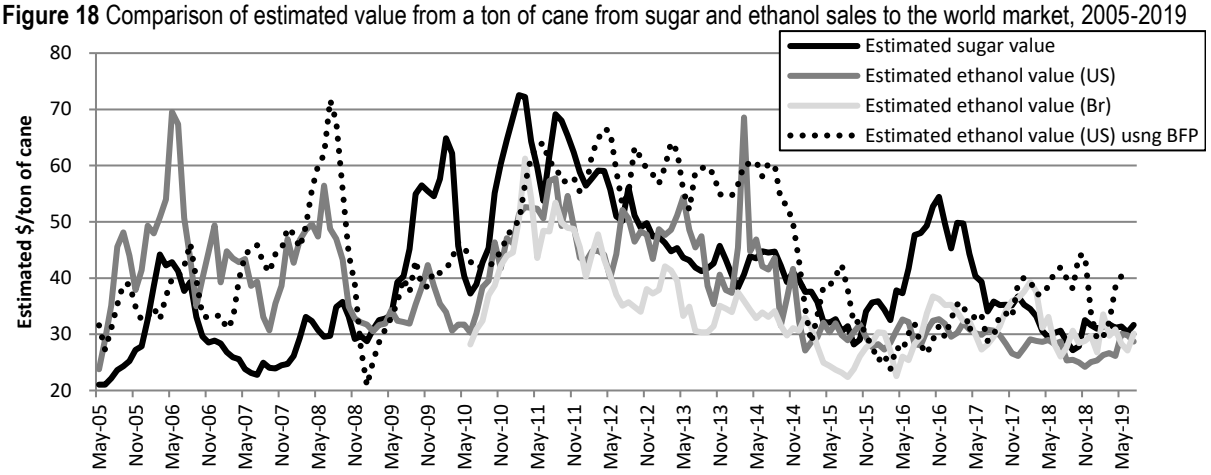
Similarly, it is not clear that ethanol for fuel would lessen the pressure of the sugar industry's exposure to the world market. Figure 18 illustrates the estimated value of sugar and ethanol per ton of cane, at world prices (which are notably lower than London No.5 prices) - assuming 9 tons of cane per ton of sugar and 75 litres of ethanol per ton of cane.[28] As can be seen, by this estimation, revenue from ethanol per ton of cane has tended to fluctuate with that of world sugar (and often below it). The prospects are only somewhat improved by utilizing BFP prices, and are similarly

[27] Ethanol produces 76,100 BTU per gallon as compared to114,100 from regular petrol. BTU are "British Thermal Units", equivalent to the amount of heat energy needed to raise the temperature of a pound of water by one degree, Fahrenheit (Kohler 2016).

[28] SASA (2019) suggests an average range of between 8.35 – 9.12 tons of cane per ton of sugar between 2005/6- 2018/19 seasons. The USDA estimates approximately 19.5 gallons of ethanol per ton of sugarcane (USDA 2006), similar to the 74.5 litres applied by by Yamba *et al.* (2008).

volatile. Unsubsidized, then, ethanol sales unto the world market would closely parallel the revenues garnered from exporting sugar – prices which have depressed sugarcane grower revenues.

Figure 18 Comparison of estimated value from a ton of cane from sugar and ethanol sales to the world market, 2005-2019



Source: World Bank (2019), Investing.com (2019), DoE (2019)

Finally, it is notable that Fundira (2018) observes that South Africa has an underutilized quota for export of ethanol into the EU (11,000 tons exported of a 80,000 ton quota). The extent to which EU ethanol prices sell at a premium above US listed prices, however is not clear. Moreover, the end of EU anti-dumping duties on US ethanol may witness price convergences (Voegele 2019, Pennington 2018).

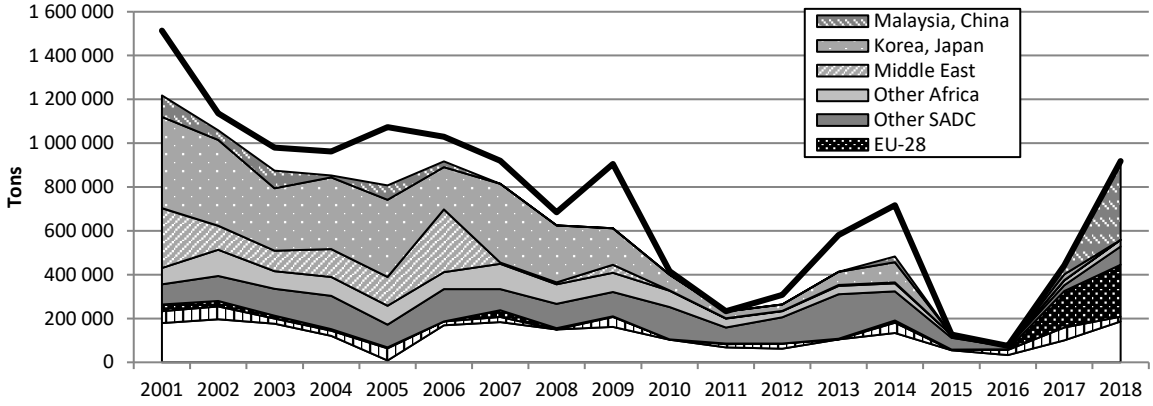
4.1.4 The prospects of an extended free-trade market for sugar

In addition to the diverting sugarcane away from sugar production, a second potential area to absorb sugar surpluses is diverting exports to other protected markets.

Outside of SACU, South Africa currently enjoys a limited measure of preferential access to other protected markets, primarily the United States and Mozambique (approximately 186,000 tons in 2018) (DAFF 2017, TradeMap). Market access to the United States, however, is subject to a quota (30,000 tons according to Conningrath Economists (2013), although TradeMap indicates quantities in excess of 50,000 tons).

In 2018, other exports reached 850,000 tons. While South Africa has also recently been permitted quota access to the EU market, ongoing liberalization of the EU sugar market is negating the price benefits thereto. TradeMap indicates South Africa exported 237,000 tons to the EU in 2018, although Fundira (2018) indicates South Africa's quota to stand at 50,000 tons of refined sugar and 100,000 tons of raw sugar. The balance of recent peak export tonnages have been received largely by China and Malaysia (350,000 tons in 2018) and other SADC members (83,000 tons in 2018).

Figure 19 Composition of South African sugar exports, 2001-2018

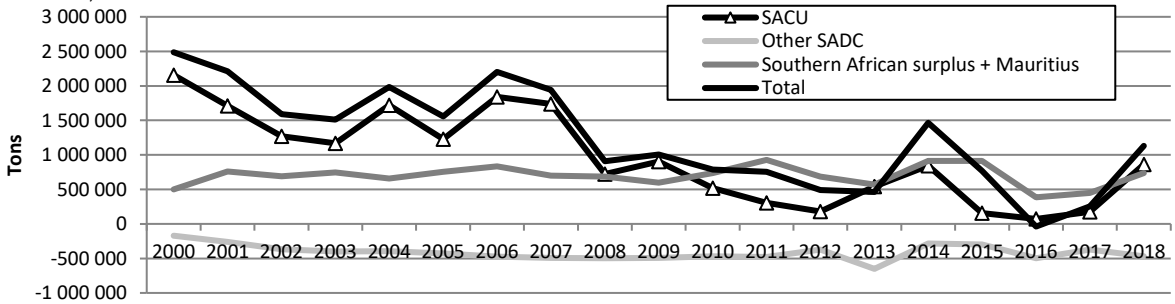


Source: TradeMap

The prospects of growing continental markets has been one area of key concern. Currently, South African sugar only moves freely within SACU, having received special treatment in Annex VII on the SADC Protocol on Trade. This included a provision from 2011 that non-SACU SADC members producing sugar-surpluses would be granted duty-free access for a combined quota of 45,000 tons, with a further 20,000 ton for sugar-producing members, proportionate to their share of non-SACU sugar surpluses (Coningrath Economists 2013, Lincoln 2006).

Although not in motion, a common external tariff in the SADC region could terminally exacerbate the crisis of local demand faced by the SACU market, owing to its inclusion of significant sugar producing countries, as shown in Figure 20. These include Mauritius, as well as countries in which South Africa's major sugar companies have large or exclusive interests, including Malawi, Mozambique, Tanzania Zambia, and Zimbabwe. Together these countries export similar or greater volumes of sugar as South Africa, exceeding the net imports of remaining SADC countries. While previously orientated to the hitherto lucrative EU export market, since its deregulation these countries would similarly be placed in competition with South Africa for market share in a protected common market. As is the current case with eSwatini far more favourable production conditions would almost certainly see South African production displaced by expansions in these countries.

Figure 20 Comparison of net sugar trade of SADC countries, SACU, non-SACU surplus producers, and other SADC members, 2000-2018.



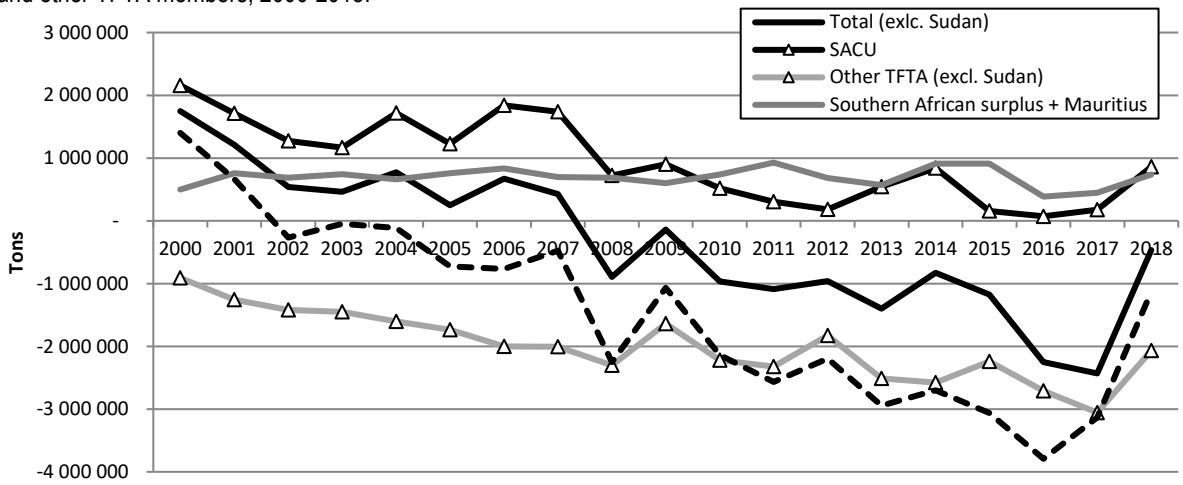
Source: FAO & TradeMap

Another possibility concerns ongoing negotiations for a Tripartite Free Trade Area (TFTA) encompassing the Common Market for Eastern and Southern Africa (COMESA), Southern African Development Community (SADC) and East African Community (EAC). The TFTA has currently been signed by 23 member states, but has only been ratified by 5, South Africa, Kenya, Uganda, Rwanda and Egypt. The stated ambition of the agreement is the phased liberalization of 90% of trade over five years. Discussions surrounding the liberalization of a remaining 10% encompassing 'sensitive' commodities including sugar would only begin thereafter. In the meanwhile, a common African tariff for sugar would be imposed. The state of negotiations, and particular protection mechanisms to be

utilized, are not clear. However, of 27 member countries, the International Sugar Organization (ISO) indicated that from 2010-2018 an approximate annual average of 10.5mt of sugar was consumed, a difference of 1.7mt, from an estimated 8.8mt produced by 18 sugar-producing countries. This, in principle, raises the prospects of insulating member countries from world market sales while also providing space for further growth (Mandela 2019, Coningrath Economists 2013).

Owing to the larger number of net sugar importing countries in the proposed TFTA, a common externally protected market would appear capable of absorbing current surpluses from SACU and other sugar surplus producing countries. From available FAO and TradeMap statistics, however, the extent of the deficit in the first instance is heavily contingent on reporting from troubled Sudan region (and with statistics not available in the TradeMap dataset), and further subject to the import of large quantities of illegal sugar. However, as with Swailand now, a common TFTA could also be injurious to the specifically South African industry, which would bear a heightened prospect of being eventually supplanted by expanded production in regions with greater abundance of cheap labour, state-mediated access to land and water, as has proceeded in recent in years in Southern Africa (Dubb et al 2017, Sulle 2017, Terry & Ogg 2017, Chinsinga 2017, Matenga 2017).

Figure 21 Comparison of net sugar trade of TFTA countries, SACU, non-SACU southern African sugar surplus producers, and other TFTA members, 2000-2018.



Source: FAO (2019) & TradeMap

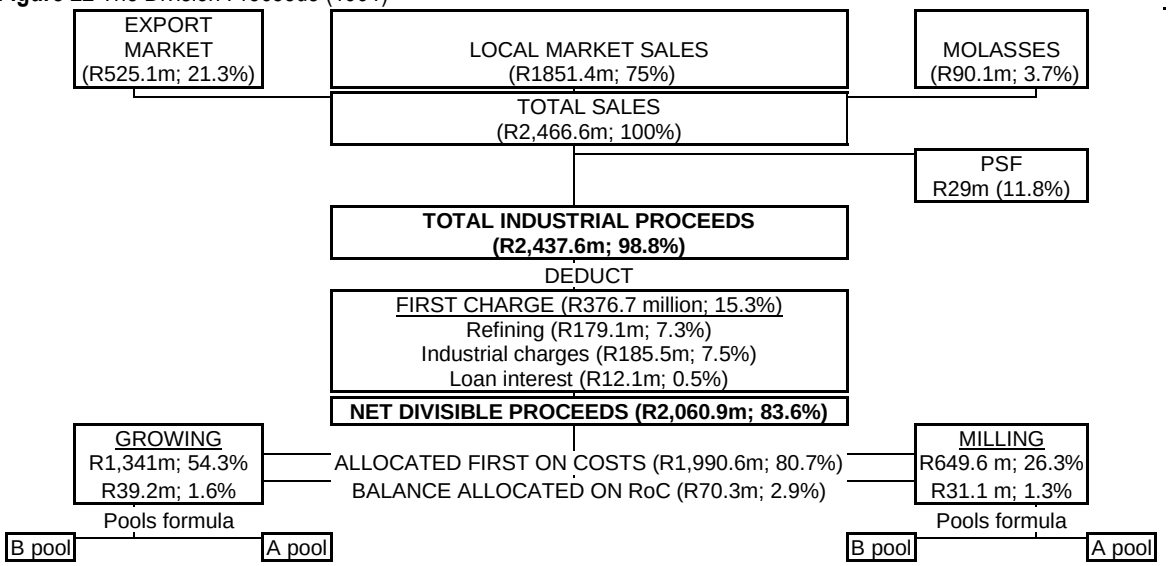
4.2 The distribution of proceeds

A second series of controversies concerns the DoP mechanism since its reform in 2000 under new Sugar Industry Agreement (SIA). In principle, South African sugarcane growers enjoy one of the most favourable pricing mechanisms in Southern Africa. Growers' share is notably larger than in other Southern African contexts, where millers' cane supply emanates largely from a mix from their own plantations ('estates') and small-scale-growers (whether as individuals or from grouped production units) (Dubb 2017), and further includes sharing in molasses revenues and seasonal adjustments. However, the DoP is also not without controversy, and indeed remains a key are of struggle between millers and growers – as well as among growers themselves.

Prior to the SIA (2000), the pricing of the domestic market and DoP were considerably different. Maximum industrial prices were set by national gazette, and the DoP was premised on 'average costs' and then 'return on capital' allocations after industry deductions (including refining costs). The allocation among growers was determined by sucrose, rather than RV content, and among millers by quotas on the domestic market. Other important mechanisms included an elaborate system of transport subsidies, a Price Stabilization Fund (PSF) – intended to be drawn upon during exceptionally poor returns from export sales – and the segmentation of returns in grower and miller sections based on pools: an 'A' Pool priced based on domestic market returns, and a 'B-pool' that

fetched export market returns. The pools system was itself implemented in attempts to 'rationalize' the industry, and in particular incentivise the reduction of production within the boundaries of the domestic market (Van Biljon 1970, Rorich 1983, Rahman 1997, DTI 2003).

Figure 22 The Division Proceeds (1991)



Source: Reproduced from Jordan (1992)

There were multiple drivers of the change to the SIA (2000) and the existing DoP, but two were particularly prominent. In the first instance, growers were concerned that millers were manipulating 'costs' to gain a greater share of proceeds, including the maintenance of 'non-economic' mills, the maintenance of transport subsidies coming at the effective expense of those positioned closer to the mills, and the running of 'development companies' focused on extending SSG production. Secondly, into the post-apartheid period, particular concerns about liberalizing the industry altogether among broader de-regulation initiatives prompted efforts to show that the industry was serious about promoting a more competitive orientation (Rorich 1983, Rahman 1997, DTI 2003).

4.2.1 The 'notional' price

As observed above, the setting of the 'notional' price of sugar across domestic and export markets forms the basis on which the division of proceeds, and hence RV prices are calculated. In principle, moreover, the system of single-channel export and 'flexible market shares' equalizes millers' *pro rata* revenue. This principle rests on the notional price accurately representing millers' actual revenues, with any difference for the account of particular mill, and hence, not for redistribution to 'under sellers', nor effectively entering the DoP.

In 2003/4 the NAMC (2004)[29] indicated that millers' margins had remained relatively constant for the previous 5 years, while Funke (2006) indicated an asymmetric relationship between cane and retail prices. SACGA, however indicated concern of a growing divergence between the notional price and actual retail sales (Stainbank 2011). This concern essentially postulates that the notional price 'ring-fences' returns to sugarcane growers, with growers effectively sharing in the risk of depressed economic conditions but not the benefit of millers' bargaining advantages with downstream consumers.[30]

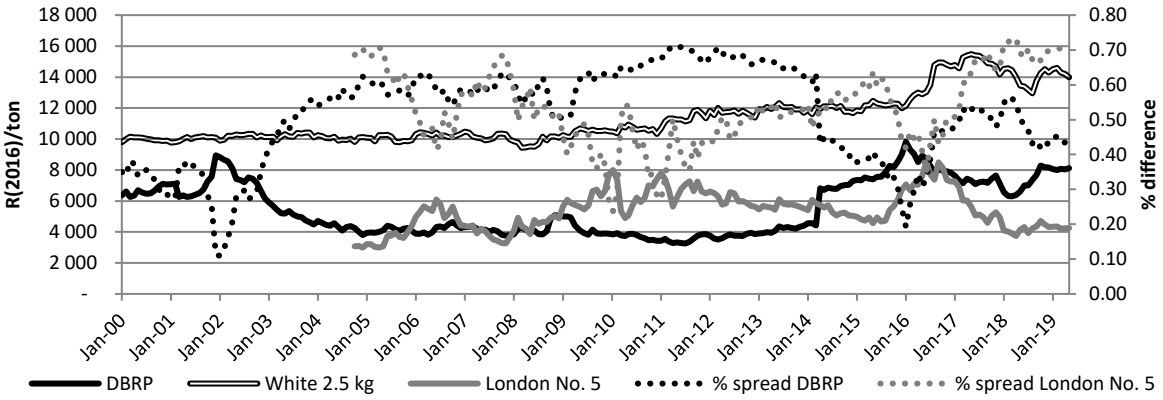
[29] By these figures, the difference between millers' net selling price (inclusive of rebates and discounts) and retail prices from 1998/9 – 2002/3 rose gradually from 28%-32%

[30] Stainbank (2011) reports that SACGA expressed this as possibly owing to millers recouping margins in downstream-value adding activities, while running factories at break-even costs for the calculation of the notional price, and/or manipulating 'handling fees' not included in the notional price.

Millers' sales data is not available, but a comparison of StatsSA's (2019) estimation of the cheapest white retail price (2.5kg) with both the DBRP and the London No 5 price suggest that retail spreads have shifted considerably. Figure 23 shows that the estimated spread with DBRP to have been similar to that suggested by the NAMC (2004), but rose to between 50-60% as the DBRP devalued against the exchange rate while real retail prices remained constant. The rise of London No.5 price above the DBRP from 2009-2014 suggest this to be a more likely barometer of retail price spreads. This suggests that retail spreads may have initially declined to 2011 to around the 30% levels realized in the early 2000s (as world prices, and indeed real retail price, rose), but thereafter the spread again increased to around 50% by 2011, particularly as imports ratcheted up. That the rise of the DBRP was only mirrored in retail prices up to two years afterwards, alongside a spike in world prices, and that the DBRP was rendered largely ineffective in 2017, suggests that retail spread from London No. 5 prices to be more reflective, and which reached highs of 70% by 2018.

It is ambiguous as to whether, thereafter, the retail price spread has remained closer to that reflected in world prices (at around 70%) or the intended floor set by the DBRP (around 40%). On the one hand, world imports have declined, and real retail prices appear to reflect the REER adjusted DBRP to some degree. On the other, on-going and increasing imports from Swaziland likely play a role in undercutting – particularly with both South African and Swazi sugar manufactures facing world prices for their 'surplus' production.

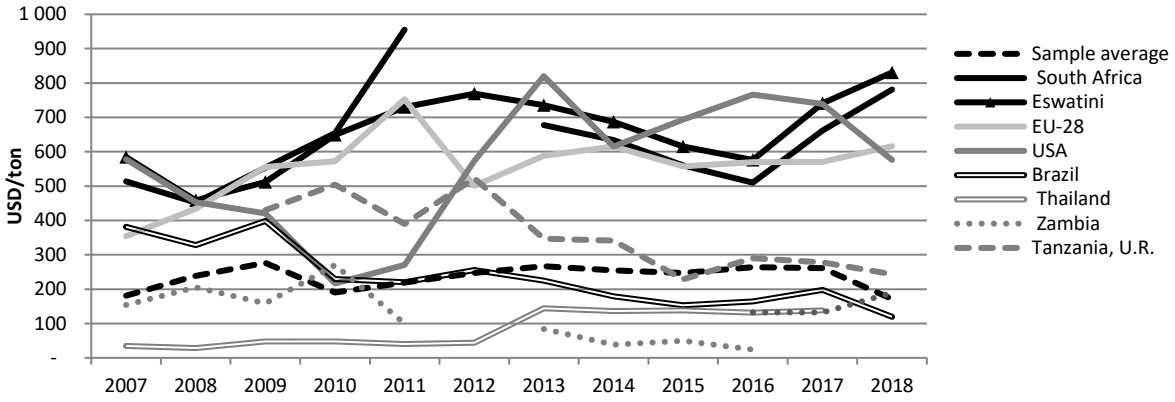
Figure 23 Comparison of retail prices with DBRP and London No.5 prices, 2000-2019



Source: ITAC (2009, 2014, 2018), Investing.com, StatsSA (2019), SAGIS (2019) , authors own calculations

Moreover, analysis by the International Sugar Organization (ISO) suggests that South Africa's wholesale-retail price spread is among the largest in the world, at (or even above) the levels of 'developed' sugar producing countries such as the United States and EU-28, and far above the levels of other major producers such as Brazil and Thailand, let alone regional producers such as Zambia, Zimbabwe, and Malawi. The only exception here is Swaziland, where comparison of Swazi wholesale prices with 'South Africa' retail prices suggests the spread to have been slightly higher; again suggesting eSwatini sugar operation to be undercutting their South African counterparts

Figure 24 Comparison of retail-wholesale price spreads between South Africa and other select countries, 20017-2018



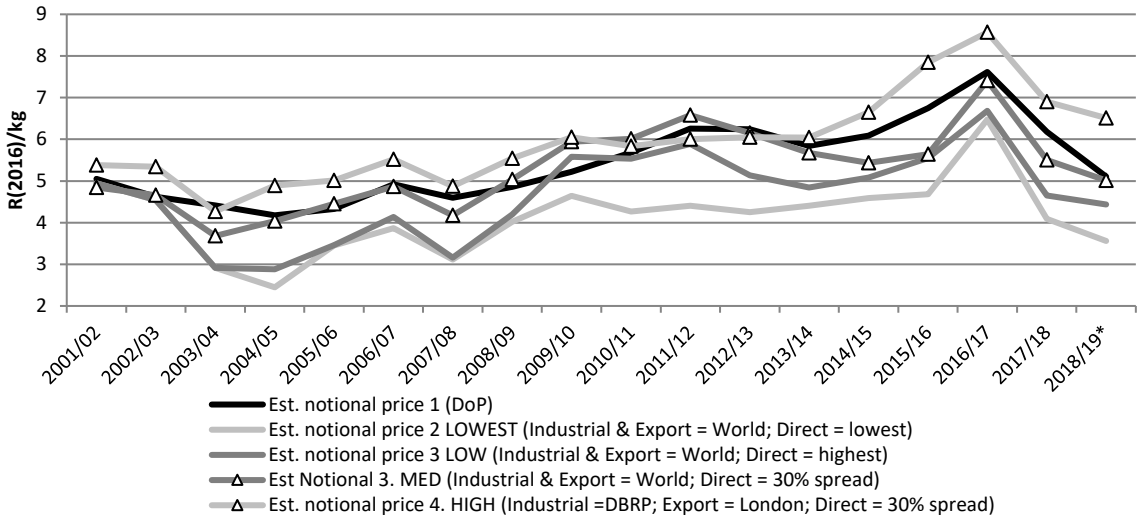
Source: ISO (2019), authors own calculations

In the absence of available data on actual sales in different markets (industrial; direct, export, brown, white, VHP, molasses) and the notional price, evaluating potential differences is difficult. Nonetheless, Figure25 below illustrates the potential extent of the problem utilizing available data, and given the current crisis of local demand. Five estimates of the notional price are provided:

- In the first instance, the closest estimate of the actual notional price is based on dividing stated annual RV prices by the DoP. This provides a baseline of the existing price, which as illustrated, has fallen to a near 20 year low in *real* terms. This provides one of the starkest illustrations of the level of economic crisis faced by the industry.
- In the 'LOWEST' estimate, industrial and export sales fetch the lowest international world prices provided by the World Bank, and direct sales are assumed to carry the highest estimated retail spreads from between the DBRP and London No 5 price. This basically assumes a scenario of total liberalization, extreme retail bargaining power, no molasses revenue, and no preferential trade access. Industrial charges were estimated at a constant R(2018/19) 250,000,000 This scenario would presage total destruction of the sugar industry, with mill-prices below prevailing sugarcane prices RV.
- The 'HIGH' estimate also excludes molasses sales, but here presumes that exported sugar fetches higher London No. 5 refined prices, that industrial sugar is priced consistently at the DBRP, and that retailers accept a constant 30% spread. This essentially presumes lower retail bargaining power locally and internationally, as well as a completely effective DBRP, but again no revenue from molasses or preferential trade access. The 'HIGH' estimate is interesting because it maintains the current division between export and domestic consumption, but only assumes highly effective prevailing policy tariff policy, 'normal' world market international trading, and the maintenance of retail margins at 2000s levels. As such, it should represent an achievable standard that would raise prevailing divisible proceeds by 30% (around R3.3bn in total, R2.1bn to growers and R1.2 bn to millers by the DoP).
- The 'LOW' estimate is the same as the 'LOWEST' except it takes the lowest retail spread from between the DBRP and London No 5 price. This essentially presumes that industrial and export consumers still retain high bargaining power, while retailers are moderated somewhat. It still assumes no revenue from molasses or preferential trade access. Essentially, this estimate illustrates that regardless of the spread margin assumed above between London No 5 and the DBRP, there would be little change from the LOWEST estimate. The exception is in 2009/10-2011/12 when this estimate largely matches the estimate of the actual notional price, suggesting indeed that retailer's margins likely dropped in this period.
- The 'MED' estimate also assumes that assumes that industrial and export consumers realize the lowest World Bank prices, but that direct retailers accept a constant 30% spread. This essentially assumes high industrial and export bargaining power, but low retail bargaining power. It still assumes no revenue from molasses or preferential trade access. What is notable about this

estimate is that it is the closest to the actual prevailing estimated notional price. In all likelihood, this is owing to a moderation of bargaining power across consumers, rather than in retail alone. However, it also illustrates that regulation of retail spreads alone would bring industry returns to current levels.

Figure 25 Estimations of actual notional price in comparison with different pricing scenarios, 2001/02-2018/19

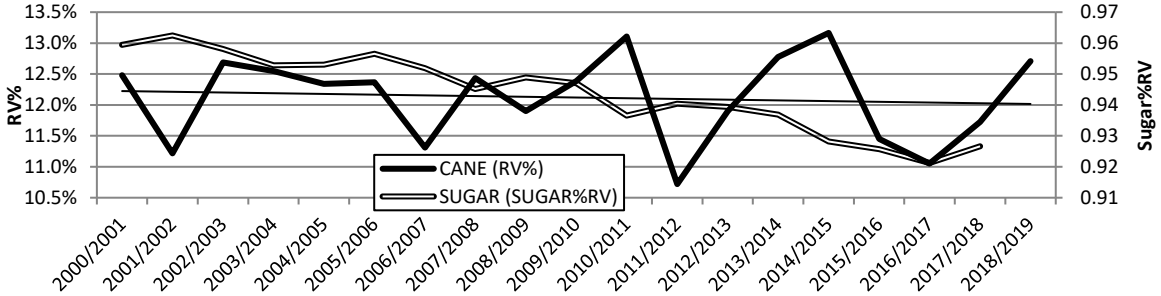


4.2.2 The relative RV system

A related on-going concern has been the function of the Recoverable Value system for cane payment. The core ambition of the RV system was to incentivise high-quality cane production, with growers ostensibly only receiving payment based on the content of cane that can be recovered from processing (and hence realized in sale) rather than on sucrose content, owing to unavoidable sucrose losses in processing.

In recent years, growers have disputed the economic efficacy of the RV system. Growers have argued that while RV content has improved, that millers have not maintained, let alone improved, efficiencies in recovery – particularly at Tongaat-Hulett's Felixton mill. The difficulty of evaluation is accentuated by the fact that RV content and estimations of factory extractive performance are highly correlated with mill capacity utilization (BFAP 2014). Further concerns have been raised about the exclusion of 'downstream' value-adding activities by millers from the DoP/RV system – incentivising millers to focus value recoveries in the processing of non-sugar commodities – as well as the 'additive' structure of the relative RV system (Wynne *et al.* 2009).

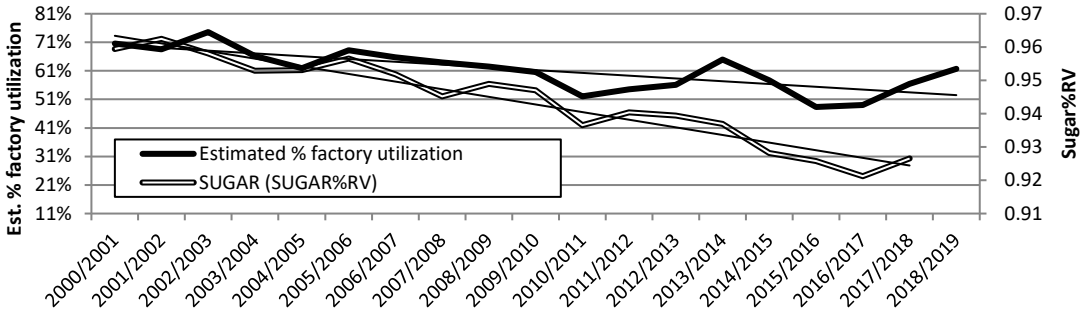
Figure 26 Comparison of industry wide RV% and estimated sugar recovery, 2000/01 – 2018/19



*RV% retrieved from SASA's Review of the Milling Season, various years

**Sugar recoveries were estimated simply by dividing tons of sugar by tons RV, estimated by multiplying tons of cane crushed at by RV%.

Figure 27 Comparison of estimated factory utilization, 2000/01-2018/19



*Sugar recoveries were estimated simply by dividing tons of sugar by tons RV, estimated by multiplying tons of cane crushed at by RV%.
**Factory capacity was estimated by dividing cane crushed by an estimate of total factory cane-crushing capacity. This was estimated by taking first taking the most cane crushed over the 2000-2019 period and dividing the figure by SASTA's estimation of total lost crushing time (to strikes, factory breakdowns, etc.). Secondly, this figure was further divided by taking the proportion of the number of milling days in the season with the most cane crushed to the longest milling season over the period for each mill.

Evaluating claims that RV% has certainly improved is difficult and heavily dependent upon the review period, in part owing to heavy rainfall fluctuations, but also broader economic conditions. RV% figures compiled from SASTA's annual 'Review of the Milling Season' suggest that RV% did towards improvement from 2000-2014, but including subsequent years shows a declining average trend (from approximately 12.5% - 12%). Estimations of factory recoveries (dividing sugar produced by tons RV) suggest, however, that factory recoveries have deteriorated more rapidly and consistently, from approximately 0.96 to 0.92. While estimated cane throughput has fallen disturbingly low, factory performance indicates have fallen in a more secular fashion.

4.2.3 SSG decline, the consolidation of the two-pools system and closure of 'development companies'

The cost-based DoP and two-pool pricing system were both considerable factors underpinning the original growth of small-scale production, and their removal significantly underpinned their subsequent rapid decline.

While some initiatives to encourage small-scale sugarcane production prevailed in the 1950s at the initiative of the NAD, the accelerated expansion of sugarcane into South Africa's bantustans was generally attributed to the Financial Aid Fund (FAF) rotating credit scheme, which essentially offered small-scale credit to establish cane and deducting costs after its delivery. FAF operated in partnership with KwaZulu and KaNgwane departments of agriculture and Bantustan development corporations, and ultimately 'development companies' established by millers themselves. The initiative largely came at the impetus of massive spikes in world prices in the 1970s prompting questions of how to expand sugarcane production in general, as well as to evade losses in cane lands from apartheid government's attempt to 'consolidate' and expand the bantustans. The initiatives also influenced efforts to consolidate milling capacity, such as Tongaat-Huletts establishment of 'Felixton II' from its existing Felixton and Empangeni mills, and which is still among the most significant mills for small-scale supply today (Dubb 2016, James & Woodhouse 2017, Rahman 1997, SASYB 1974/5, Bates & Sokhela 2003, Vaughan 1992b).

Especially following the collapse of world prices in the 1980s, 'development' companies enabled millers' to finance expanded SSG supply as virtual extensions of their 'own' sugarcane supply, at the expense of large-scale white growers and with subsidy from Bantustan development agencies. While millers' development companies were not identical, they frequently organized, or directly performed, nearly the entirety of production. While SSGs' utilization of these services were deducted from their deliveries, the 'costs' of the companies themselves were claimed by millers, and hence at the expense of sugarcane grower prices. The implementation of the 'two-pool' system of cane payments accentuated the benefit, particularly in a context of generalized world-price pressure, as SSG production was categorically given 'A-pool' status. Consequently, not only were SSGs not exposed two depressed international sugar prices, but growing SSG supply allowed millers

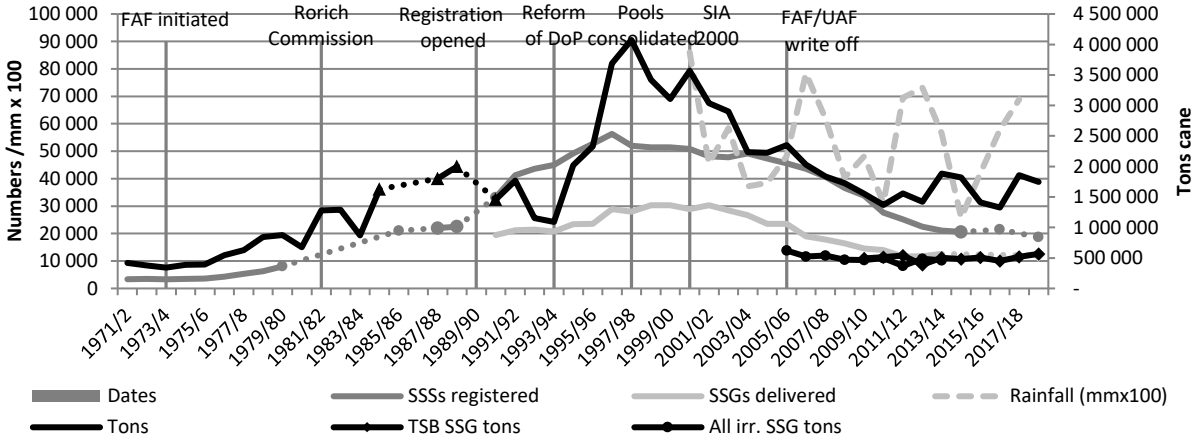
could raise their own share of the domestic market (Dubb 2016, Rahman 1997, SASYB 1974/5, Bates & Sokhela 2003, Vaughan 1992b, Jordan 1992).

A second related underpinning of the growth in SSG production was the expanded addition of irrigated SSGs in Mpumalanga. Irrigated small-scale production had been extended to KaNgwane homeland in 1983, and expanded substantially in the mid-1990s with the Nkomazi Irrigation Expansion Scheme (NIES) constructed with the DBSA funded Driekoppies Dam alongside the opening of TSB's second Komatipoort mill (James & Woodhouse 2017). According to Hurly et al (2015), this development alone inflated SSG cane production by about 4-500,000 tons.

SSG growth was further accelerated with the official 'de-regulation' of SSG registration in 1989. This heralded a rapid increase in official numbers of SSGs, and significant although less extreme growth in cane production (Bates & Sokhela 2003, Rahman 1997). Up to 1997/8, UAF finance grew from two million rands per annum in the early 1990s to over R55m (Hurly et al. 2015).

The subsequent removal of the 'cost' element of the DoP in 1994 and the consolidation of the pool system in 1998 precipitated the secular decline of small-scale production. Perhaps the first obvious signal was the sharp decline in finance advanced to small growers, with FAF/UAF ultimately closing its loan book and writing off millions in debt. Key elements included not only exposure to lower world prices alongside their large-scale counter parts, but deteriorating logistical coordination as the 'development' companies were supplanted by local contractors, typically larger SSGs themselves. Nonetheless, contractors played a significant role in rapidly expanding SSG production, especially through lease-planting arrangements, particularly while still supported by A-pool prices.[31] Wider support structures and interventions to assist SSG production remained significant, but substantially scaled down, particularly as transformation initiatives shifted focus to supporting market-based land reform and New Freehold Growers more likely to sustain commercial-scale sugarcane enterprises. While SSG registration and production was largely 'triggered' by falls in rainfall, the removal of the structural features of their growth have largely precluded any generalized recovery thereafter (Dubb 2016, Munro 1996, Rahman 1997, Vaughan 1992a).

Figure 28 SSG numbers and cane deliveries 1971/2-2017/18

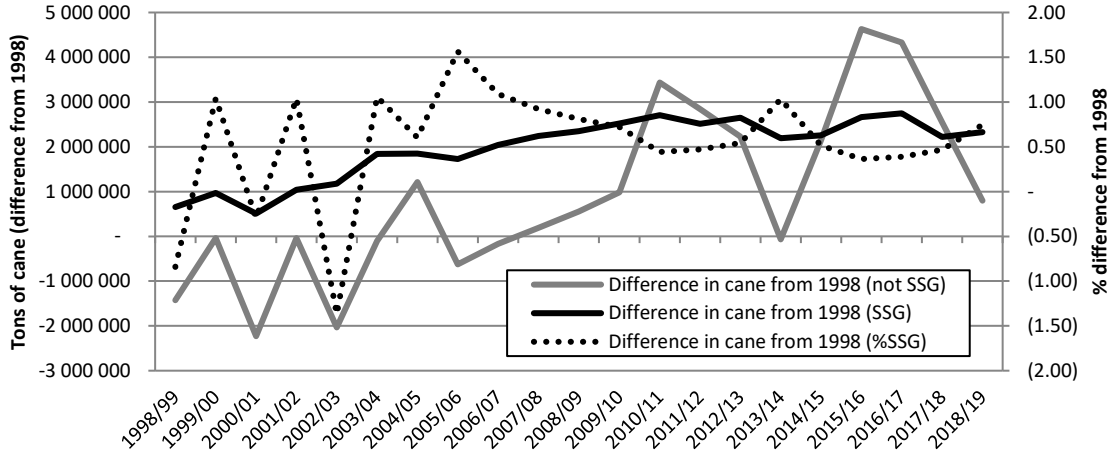


Source: Bates and Sokhela (2003), Lewis (1990), Rorich (1982), Review of the Milling season, SASYB (1984/5), Van Biljon (1970), and Vaughan (1991, 1992b), Vaughan & McIntosh (1993), SACGA (2019), SASA (2019).
*The dotted lines show the trend between missing data.
**The classification of small growers as 'SSGs' emerged only in the 1990s. Previously, racially based classification systems prevailed, irrespective of scale, including 'White', 'Mangete' ('Coloured'), 'Indian' and 'Black'. Only figures relating to 'Black' farmers are provided here, due to unknown levels of scale differentiation of 'Indian' and 'Mangete' farmers.

[31] In these arrangements, contractors would typically bear the costs of establishing cane for a registered grower but only take the returns from the first year of cutting, thereby providing themselves with a future client, and the lessor income through subsequent ratoon cuttings.

While devastating to small-growers, it is notable that the contraction also came to the effective benefit of sugarcane growers more broadly, and mills with lesser cane-supplies in particular, as small-scale growers' rapid decline lessened the pressure of 'surplus' sugar exports at a greater rate than other grower segments. At its 1998 peak, SSG production reached some 4mt but by 2009/10 had fallen to around 1.5mt, with upward fluctuations to 1.8mt in good rainfall years. In the same period, total cane production had fallen from about 23mt to 18.7mt. Indeed, despite the perennial problem of 'overproduction', the decline in small-scale production was initially paired with *increases* in cane production from other growers. However, even under the circumstances of wider declines in cane production, to date SSGs have still accounted for over 50% of the decline of all total cane production from 1998.

Figure 29 Comparison of decline in difference in cane production from 1997/8 levels between SSGs and all other sugarcane growers, 1998/9-2018/19



Source: SACGA (2014, pers. comm.), SACGA (2019).
Author's own calculations

4.3 Declining cane production

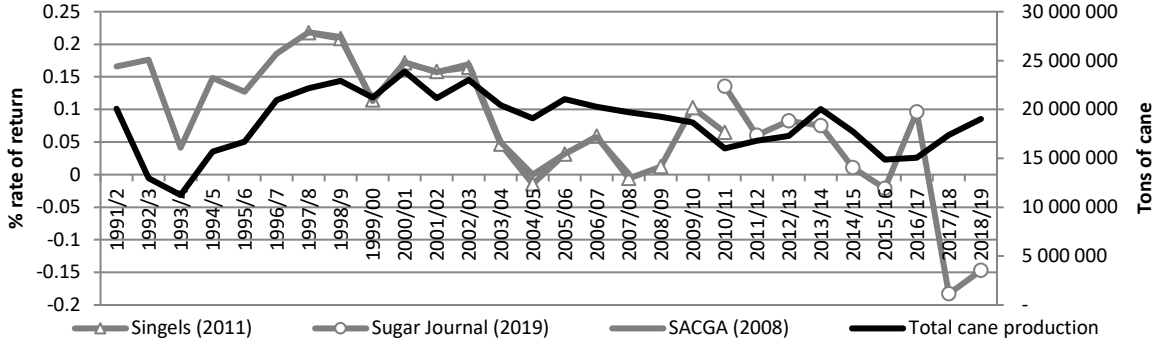
It is important to keep in mind that while SSGs have experienced the most disproportionately intense decline, that declining cane production has been a general problem facing the industry as well. This section gives a very broad review of some of its general underpinnings and expressions. The first sub-section illustrates the close association between decline and a generalized 'cost-price squeeze'. The second and third sub-sections provide an indication of some of the differences in the decline's expression across region and grower types. The last subsection provides an indication of the level of concentration in cane-supply these pressures are inducing/re-enforcing.

4.3.1 The general cost price squeeze

The most significant general change in cane supply has been its overall decline. Figure 30 shows that cane production fell from approximately 21.7mt in the 2000/01 season to a low of 14.8mt in 2015/16, albeit witnessing a significant rebound to 19mt in 2018/19.

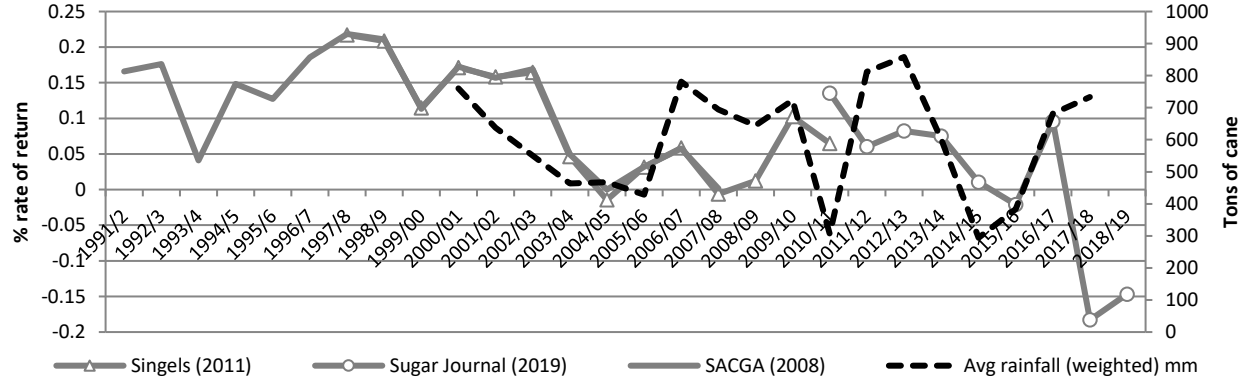
Perhaps the most parsimonious driver of the generalized fall in cane production is profitability. As shown in Figure 30 and 31, rates of return have largely led movements in overall cane production, and indeed shown a secular decline, albeit with significant fluctuations with swings in rainfall.

Figure 30 Comparison of average rates of return per hectare with total cane production, 1991/2-2018/19



Source: Singels *et al.* (2011), Nicholson (2019), SACGA (2008), SASA (2009, 2019)
*Rates of return calculated as the percentage difference between estimates of gross income and total production costs per hectare

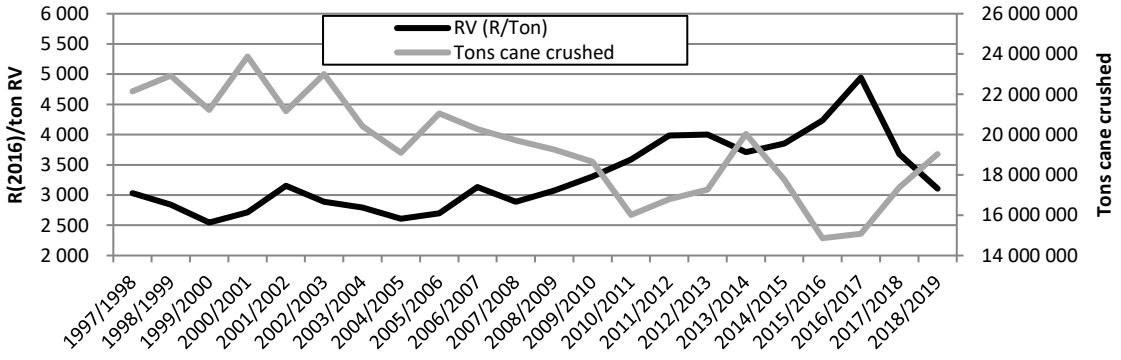
Figure 31 Comparison of average rates of return per hectare with average rainfall, 1991/2-2018/19



Source: Singels *et al.* (2011), Nicholson (2019), SACGA (2008), SASA (2009, 2019), Review of the milling season, various years
*Average rainfall calculated using mill rainfall figures provided by Review of the Milling season, weighted by annual cane crushed.

The decline in cane production as a whole is significantly related to a deepening 'cost-price' squeeze. As discussed above, growers' RV prices are intimately related to the level of 'surplus' sugar diverted to the export market. As a general tendency, the reduction in cane production has resulted in rising real RV prices (with stronger upswings in drought years), and increases in cane production have supressed real RV prices. The ultimate sensitivity of these movements is highly contingent on the amount exported (and hence the differential in prices received). From 2011/12-2013/14, for example, when domestic demand had risen to account for the vast bulk of production, a rise in cane production by 3.2mt resulted in a RV price fall of around R(2016) 200. In 2016/17 – 2018/19, however, a rise in cane production by about 4mt saw a devastating real price fall of around R(2016) 1,800.

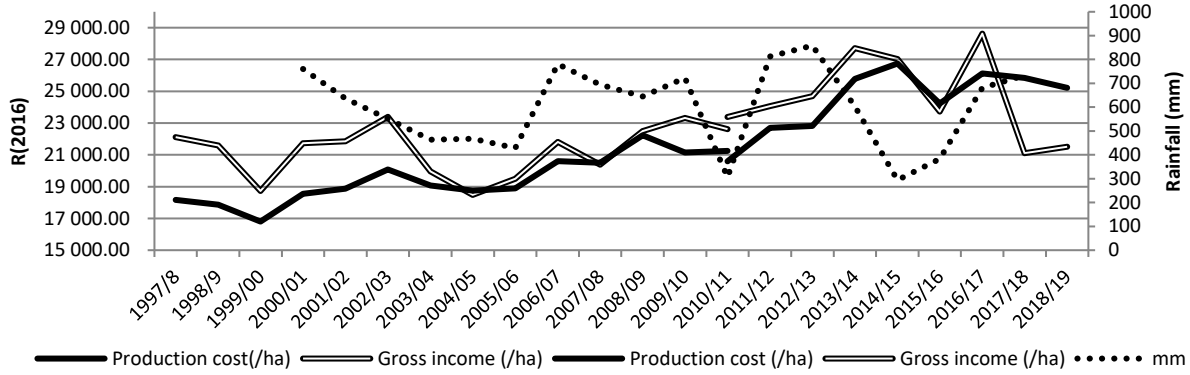
Figure 32 Comparison of total cane crushed to real RV price, 1997/8 – 2018/19



Source: SASA (2009, 2019)

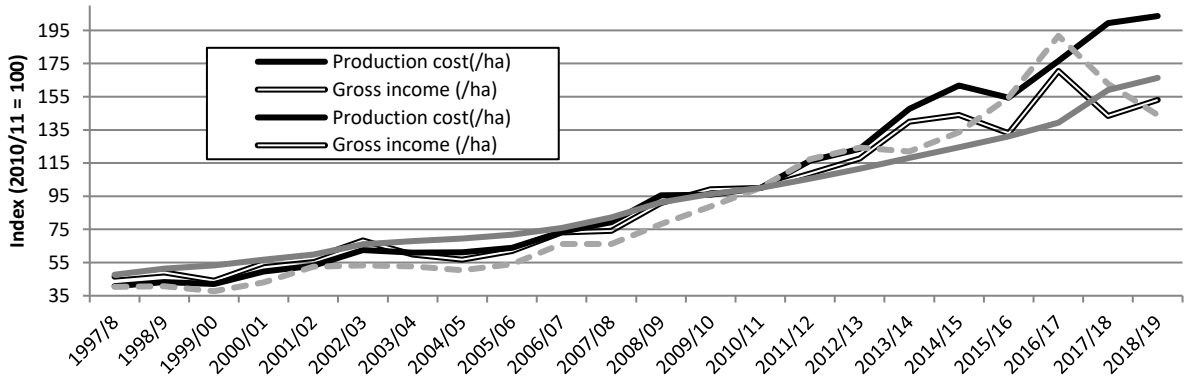
The import of the depressed RV price is clearer when compared to costs. Figure 33 shows estimates of LSGs' real average production costs per hectare compared to real gross income per hectare, importantly moderated by rainfall (and hence yield). Figure 34 compares these figures to the RV price in index form, particularly to 2010 when domestic production had largely fallen within the boundaries of the domestic market. As is evident, RV price growth was largely superseded by growth in production costs until this period. Particular stress was experienced from 2002/03 as the devaluation of the rand greatly eroded the DBRP alongside falling rainfall more broadly. While RV prices finally matched production cost increases by around 2011, the combination of import competition, low rainfall, and contracting domestic demand supressed the RV price and gross income below costs until the end of 2017, but was immediately followed by the severe suppression of income heralded by the recent crisis of 'surplus' production.

Figure 33 Comparison of real (2016) per hectare production costs, gross income per hectare and rainfall, 1997/8 – 2018/19



Source: Singels *et al.* (2011), Nicholson (2019)

Figure 34 Comparison of indices (100=2010/11) of per hectare production costs, gross income per hectare and the RV price 1997/8 – 2018/19



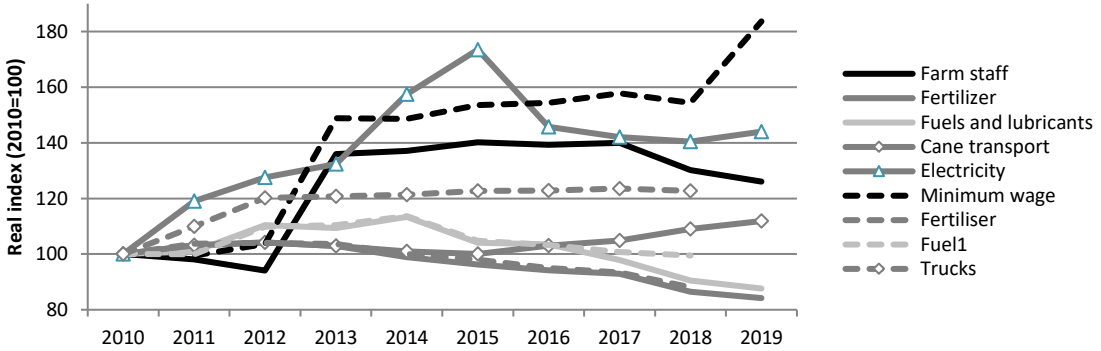
Source: Singels *et al.* (2011), Nicholson (2019),

It is useful to examine the differential shifts in LSG costs themselves. Below, cost indices for key items provided in Nicholson (2019) from LSG cost surveys are compared with similar elements in the DAFF's Agricultural Abstract (2019) and minimum wage figures provided by BFAP (2018), and deflated by the CPI. It is first notable that fertiliser costs provided in both NDA and LSG cost survey trend downward, suggesting that LSGs have continued to utilize the same level of investment in fertilizer, but enjoyed lowered prices. A similar tendency is evident in fuel and lubricants, although with the LSG survey dipping below the NDA survey from 2016, suggesting some reduction in fuel consumption.

Irrigation electricity costs have seen one of the greatest increases, rising by a real 44% by 2019. Secondly critical is that of labour costs, which have risen by a real 26%. Here, however, it is notable that these levels are significantly below the inflation provided by the minimum wage, by a real 84%.

That real labour cost increases attended a rise in real minimum wage from 2012-2013 suggests minimum wage rates to have been the key driver of labour costs in that period. A growing gap between real minimum wage growth and real labour costs could have several dimensions that are not easily discernible, such as non-compliance, retrenchment, a shift towards lesser higher paid agricultural labour or the failure to commensurately increase higher paid agricultural labour. Nonetheless, the steep growth in the gap from 2017 would appear to corroborate reports from the LSG survey that up to 53% of respondents had retrenched workers owing to pressure on profitability.

Figure 35 Comparison of real indices of major cost components in sugarcane production with DAFF price indices, 2010-2019 (2010=100)

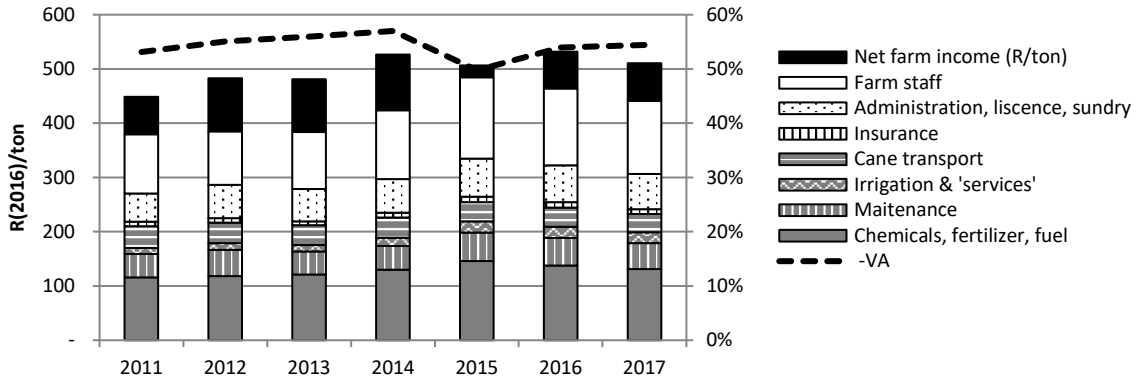


Source: Nicholson (2019), DAFF (2019), BFAP (2018), author's calculations

The relative exposure of LSGs to these costs is intimately related to whether they are rainfed or irrigated. Expressed in per-ton terms, Figure 36 and Figure 37 show the results of LSG cost surveys undertaken by SACGA, expressed in per ton terms (and hence sensitive to achieved yields). Unfortunately, they do not reflect the current crisis conditions, but are useful to review nonetheless.

On rainfed farms, it is clear that the most significant costs are recurrent expenditure in inputs (fuel, fertilizer, chemicals), at around 30-32% of costs, and on labour, at around 29-31%%. 55% of the value is value-added, taken in an expansive definition to include labour, net farm income, insurance and administration costs. These estimates suggest net farm-income to have vacillated strongly between 4-20% of total cane value, and 9-37% of an 'expansive' definition of value added.

Figure 36 Comparison of key value components of rainfed large-scale sugarcane production, 2011-2017

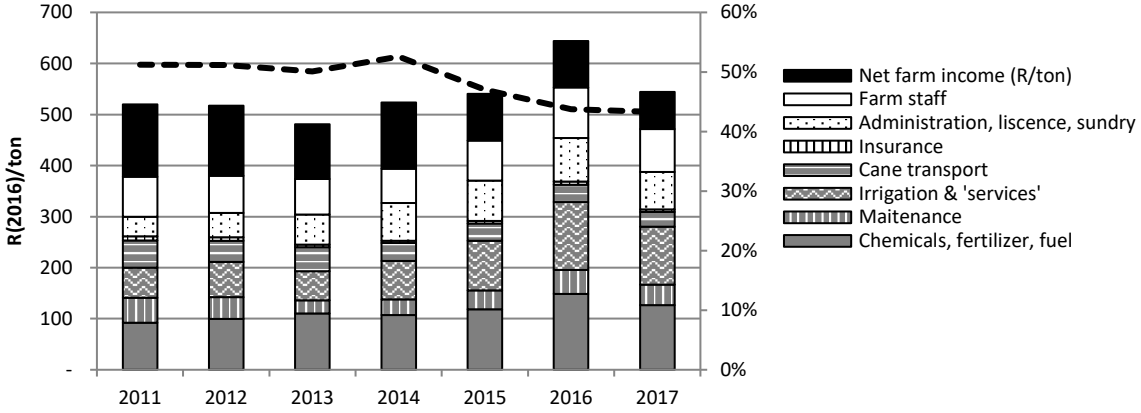


Source: Singels *et al.* (2014-18)

On irrigated farms, as might be expected, the pattern is substantially different. Here value added has declined from approximately 50%-43%, with the most substantial costs rising from approximately 16-24% of costs, and lesser but significant proportions accounted for by fertilizer, fuels and chemicals (24%-29%) and labour (18-21%). Rising irrigation costs (other than falling RV prices) have

been the prime culprit of a fall of net farm income (more than halving) from 27%-13%, and slightly more gradual fall in expansive value-adding from 53%-31%.

Figure 37 Comparison of key value components of irrigated large-scale sugarcane production, 2011-2017



Source: Singels *et al.* (2014-18)

4.3.2 Regional variations in declining cane supply

The general decline in cane supply has also been uneven, witnessing significant regional variation.

The Northern Irrigated region has been the most stable, supplying ±5mt outside of a drastic fall in 2016/17. Decline in the midlands area has also been relatively muted, but witnessing significant variation. Production there has hovered around 3.5mt, punctuated by occasional falls of 0.5-1mt; mainly at Illovo's Eston and Noodsberg mills.

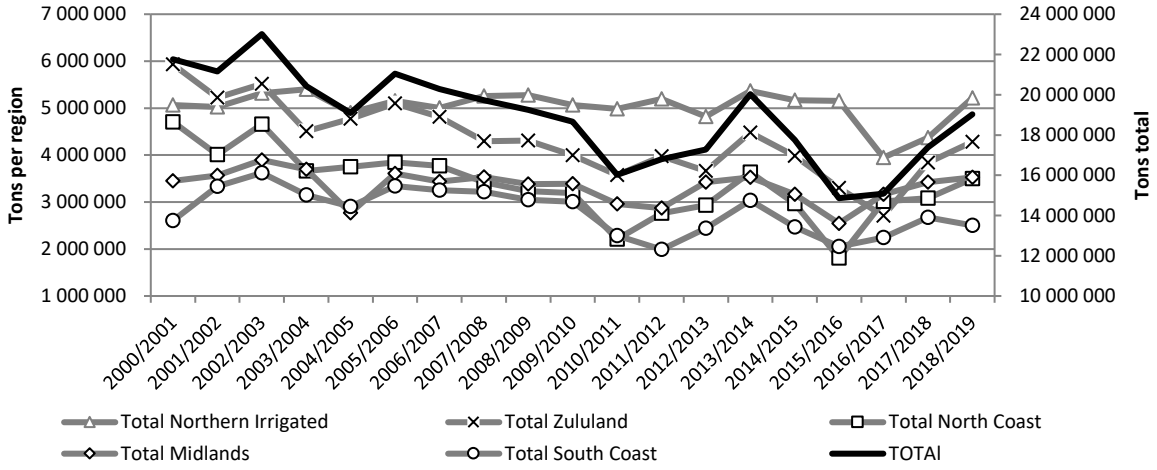
More significant declines have been experienced in the coastal regions and in Zululand, predominately in Tongaat-Hulett supply areas, albeit moderated by the relative stability of independent mills.

In the North Coast, supply fell from between 4 - 4.5mt in the early 2000s to 3.1mt in 2009/10, followed by wide fluctuations between ±2 - 3.5mt thereafter. This was mostly attributable to the decline in the Maidstone mill from above 2mt to around 1mt, albeit exacerbated by the temporary closure of the Darnall mill's in the 2015/16) season. Nonetheless, the Gledhow mill has seen some growth in recent years from 1 - 1.3mt.

Less severely but still significantly, decline in the South Coast is attributable to instability of Illovo's Umzimkulu mill which closed altogether in the 2011/12 and 2015/16 seasons and declined from 1.5 - 0.5mt over the 2000/01-2018/19 period. The Sezela mill, by contrast, has continued to hover at around 2mt.

Arguably, the most significant decline has been experienced in Zululand, from around 6 - 4mt, including by closure of the Entumeni mill (around 0.4mt) in 2004/05 (following its purchase by Tongaat-Hulett), and witnessing a stark drop in 2016/17 season to 2.7mt. The Felixton mill has struggled to remain above 1.5mt after a high of 2.5mt in 2000/01, while the Amatikulu mill has struggled to remain above 1mt, with a drop by 0.38mt in 2016/17 largely responsible for the general fall. Meanwhile, the independent Umfolozi mill has continued to hover around 1mt.

Figure 38 Gross tonnage of cane crushed by major mill supply region, 2000/01-2018/19

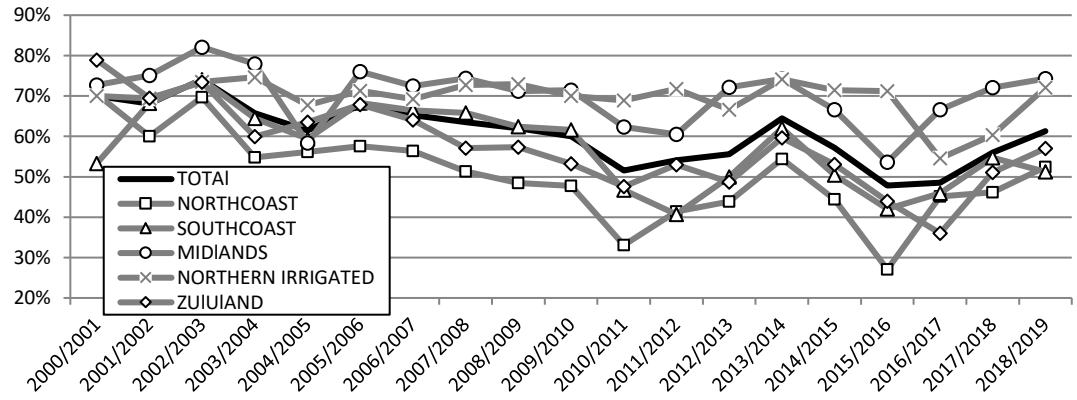


Source: SASA (2009, 2019)

The decline in cane production has resulted in a severe drop in throughput for sugar millers. Figures 39 and 40 show that throughput (as a proportion of estimated maximum capacity) has declined from around 70% to between 50-60%.[32] Northern Irrigated and Midlands mills have experienced the least severe drops, remaining at around 70% outside of years of substantial falls in rainfall. Remaining North Coast, South Coast and Zululand mills, meanwhile, have all witnessed a more severe falls, fluctuating largely within a declining band of 30-60%.

In regards to ownership, TSB's mills correspond directly with the Northern Irrigated region, and hence have remained the most stable, while Independent mills have seen less of a secular decline despite wide vacillations of between 55-70% capacity. A similar tendency is evident at Illovo's mills, however this represents a substantial fall from previous range of performance from around 60-78%. Tongaat-Hullet's mills have clearly performed the worst, falling from highs of 76% in 2000/01 to 51% in 2018/19, and a nadir of 30% in 2015/16.

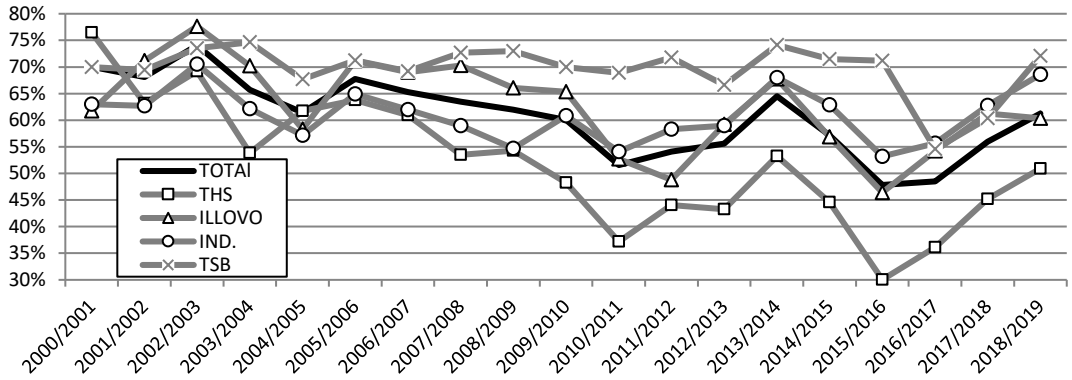
Figure 39 Cane crushed as a proportion of estimated crushing capacity by mill supply region, 2000/01-2018/19



Source: Review of milling season, SASA (2009. 2019)

[32] Maximum milling capacity was estimated by first taking the maximum quantity of cane crushed over the 2000/01-2018/19 period and dividing this quantity by the estimate % time efficiency in the same year. The quotient was then further divided by the % of the length of the milling of the milling season in the same year against the longest recorded milling season over the period.

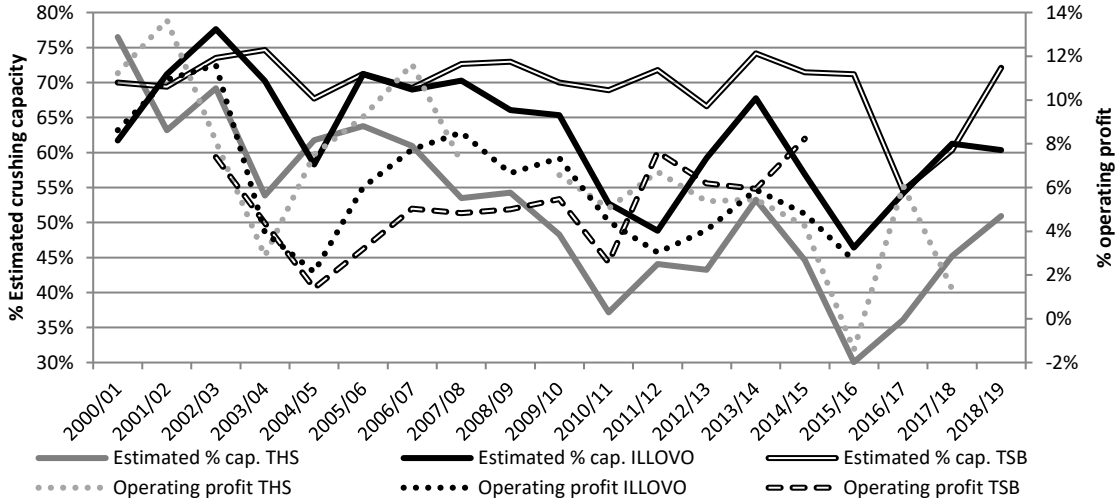
Figure 40 Cane crushed as a proportion of estimated crushing capacity by major sugar producer, 2000/01-2018/19



Source: 'Review of milling season' various years, SASA (2009. 2019)

The impact on throughput alone appears to be a key explanatory variable to miller's profitability from their South African operations. Figure 41 illustrates the significant association between miller profitability (measured as operating profits as a percentage of revenue), with estimated capacity utilization. Consistent data is not publically available, largely owing to recent changes in the segmental reporting of Illovo and Tsb, which disguise operating profits from South African sugar production. The association is closest with Illovo's mills, with Tongaat-Hulett mills seeing some association in direction of change, but with far more intense shifts in profitability in different periods. The direct association is weakest with Tsb over the period, largely owing to relative consistency in throughput over the period that operating profits are available.

Figure 41 Cane crushed as a proportion of estimated crushing capacity and operating profit as a share of revenue by major sugar producer, 2000/01-2018/19

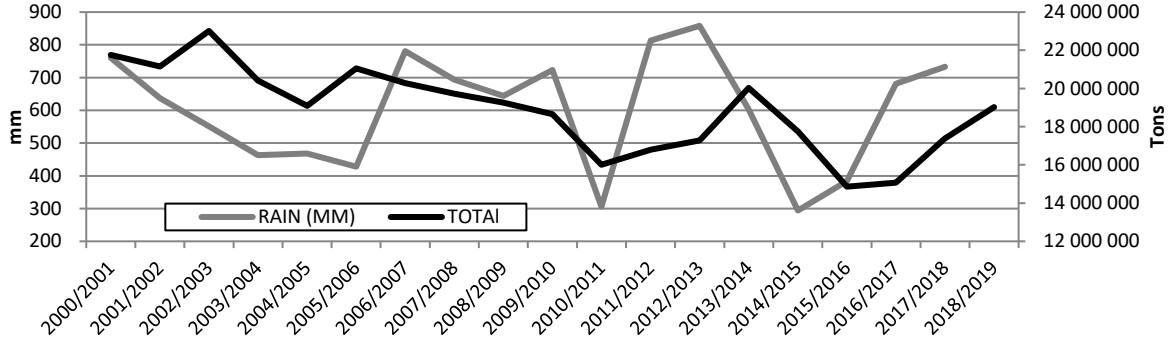


Source: Review of milling season, various years. Illovo Sugar Limited (2002, 2004, 2006, 2008, 2010, 2011, 2013, 2014, 2015, 2016), Remgro Limited (2004,2005, 2007, 2009, 2011, 2013, 2015), Tongaat-Hulett (2002, 2003, 2005, 2007, 2010, 2012, 2014, 2016, 2017, 2018)

Variation in mean rainfall is perhaps the most parsimonious explanation for changes in sugarcane production year-on-year, but does not, in itself, explain secular decline in some regions. The Northern irrigated region has sustained the least variation in production, but a sharp fall in production in 2016/17 was preceded by several years of low rainfall.

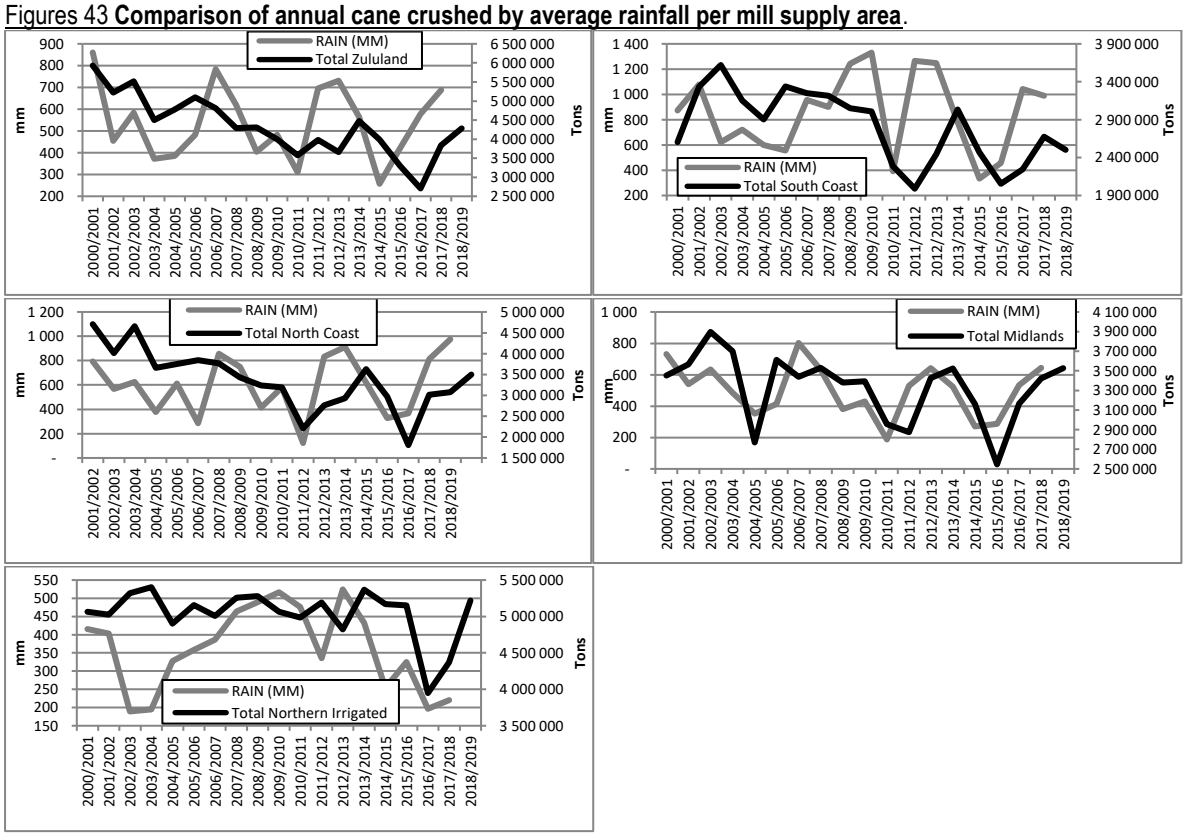
Production in the Midlands region has fluctuated perhaps most strongly with rainfall, and witnessed one of the least secular declines in production over the past 20 years. In Zululand, North Coast and South Coast, changes in rainfall have not seen a decline that clearly explains secular declines in production.

Figure 42 Comparison of total annual cane production with annual rainfall, 2000/01-2018/19



Source: SASA (2009, 2019), Review of the milling season
*Rainfall from particular mills weighted by total cane production

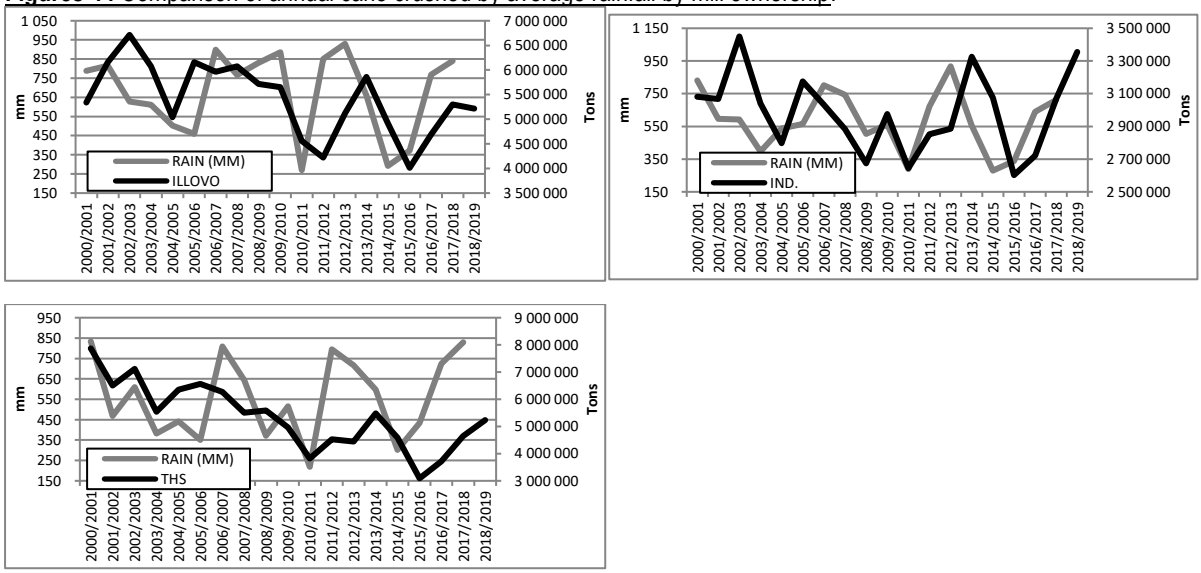
Figures 43 **Comparison of annual cane crushed by average rainfall per mill supply area**.



Source: Review of the milling season
*Rainfall in particular from particular mills weighted by total cane production

Although mill ownership tightly corresponds to mill-supply areas, it is notable that secular declines in production have been less pronounced at independent mills, where changes in cane production more closely mirror changes in mean annual rainfall. Among the corporate rain-fed mill areas, Illovo's (currently owned) mills have certainly seen a secular decline in cane crushed, but fluctuate closely with mean rainfall. Tongaat-Hulett's mills have seen by far the strongest secular decline, particularly after 2004/05.

Figures 44 Comparison of annual cane crushed by average rainfall by mill ownership.

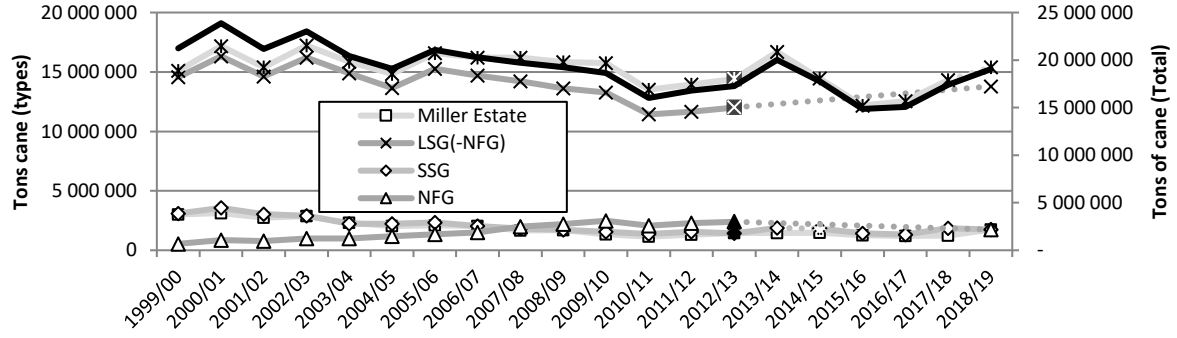


Source: Review of the milling season
*Rainfall in particular from particular mills weighted by total cane production

4.3.3 The shifting composition of sugarcane production forms

While SSGs have faced the singular greatest pressure of sugarcane types, declining production has been a general feature for other cane production types as well. Other than SSGs, the most significant early declines came from millers' own estates, but largely as transfers to NFGs, albeit with other LSGs witnessing a steeper decline from 2004/05. From 2010/11, however, total LSG cane production has seen a substantial rise, even as NFG production plateaued and saw some decline. Somewhat ironically, by 2018/19 non-NFG LSGs accounted for a *higher* proportion of cane production (72.33%) than in 1999/000 (68.6%) and 81.5% if NFGs are included.

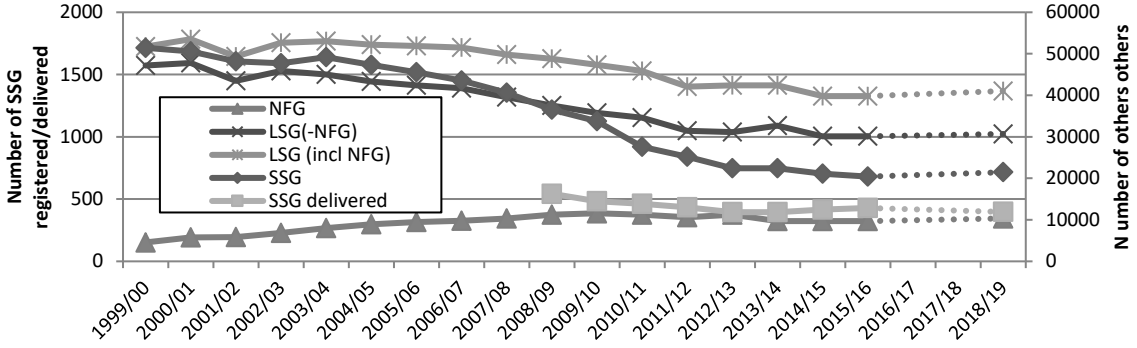
Figure 45 Cane deliveries by farm type, 1999/00 – 2018/19



Source: SACGA database 1999/00-2013/14; followed by SACGA database 2018/19, which does not distinguish NFG
*Dotted lines indicate trend over missing data points.

Yet, while accounting for a higher proportion of supply, numbers of farms have seen a substantial fall. Non-NFG LSG farm numbers fell from just below 1,600 in 1999/00 to just above 1,000 by 2015/16. While NFG numbers grew to about 386 by 2009/10, their numbers also contracted to about 323 in 2015/16. Nicholson & King (2016), moreover indicate a mounting yield gap between NFGs and other LSGs, with the latter achieving ±50 t/h between 2005-2014, and the former falling from ±40-25. Together, and notwithstanding land transfers from mill estates, LSG farms in general have witnessed a general decline from around 1,784-1,368 between 2000/01 and 2018/19.

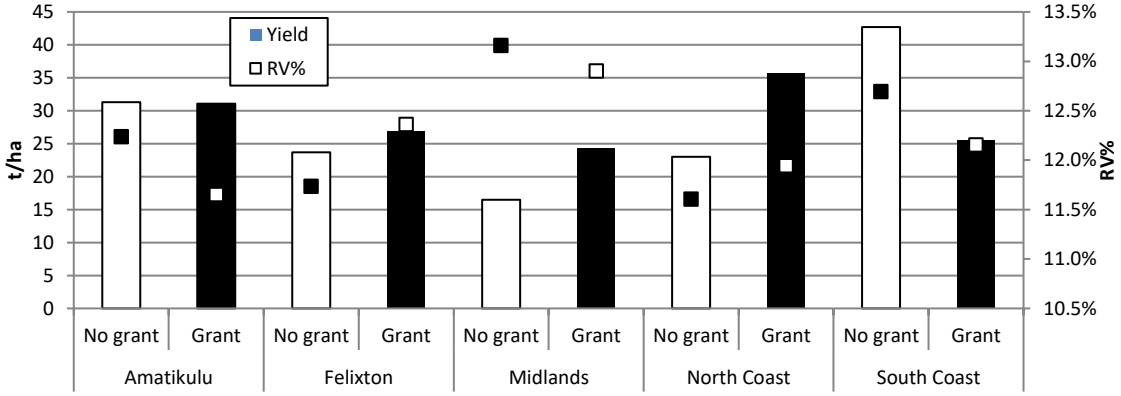
Figure 46 Numbers of registered sugarcane growers by farm type, 1999/00 – 2018/19



Source: SACGA database 1999/00-2013/14; supplemented with figures reported in SASA (2017, 2019)
*Dotted lines indicate trend over missing data points.

Nicholson & King (2016) show that NFGs indicated their greatest liabilities pertained to lack of infrastructure (24%) and funding (26%), as well as input costs (39%), but most pertinently inabilities to contend with drought and climatic changes (55%); with notably few indicating land size (9%) or labour (11%) as key problem areas. Success factors were highlighted mainly owing to funding (59%) and to training, in agronomic (36%), industry workings (25%), and finance/business (24%) as well as good extension relations (21%). Rainfed NFG supply has been significantly differentiated by region, but notably receipt of grant funding is unevenly associated with performance. Nicholson & King (2016) further show that grant funding had little impact on 5-year average yield and RV% among NFGs in the Amatikulu and Felixton supply areas, a positive association in the Midlands and North Coast, and an inverse association in the South Coast.

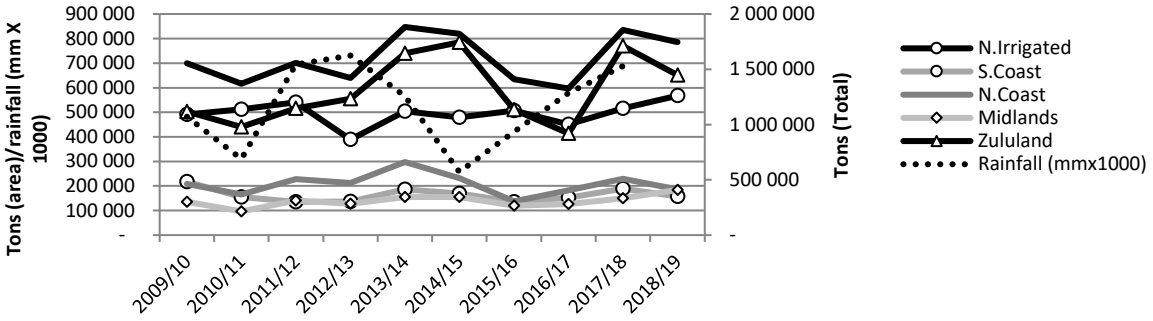
Figure 47 Association of NFG 5-year mean yields and RV% achievement with grant funding by region



Source: Nicholson & King (2016)

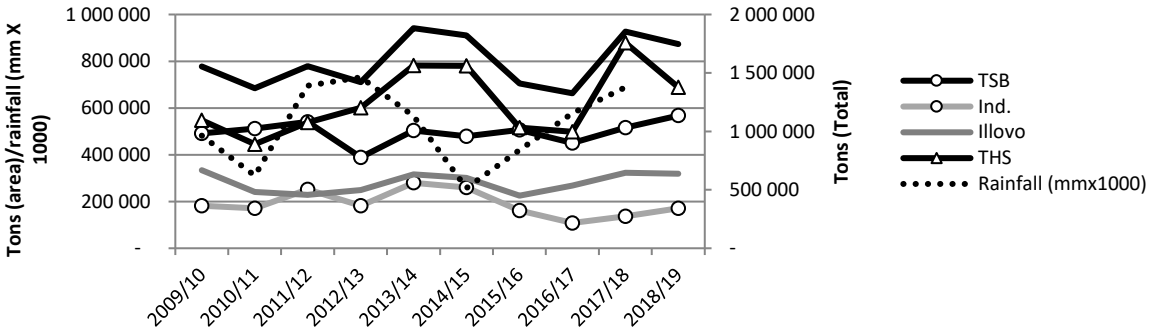
The SSG production has also shifted since their generalized decline. Smaller levels of SSG production in the Midlands and South Coast have remained relatively stable, and fluctuated heavily with changes in rainfall in Zululand (where most SSGs are located). Nonetheless, SSG production has also seen secular decline in the North Coast, and a more secular rise in the Northern Irrigated regions. Expressed in terms of milling company, the greatest variation has occurred at THS mills, while the most significant declines have been experienced at 'independent' mills, most significantly, USM.

Figure 48 Comparison of SSG production by mill supply region, 2009/10-2018/19



Source: SACGA (2019)

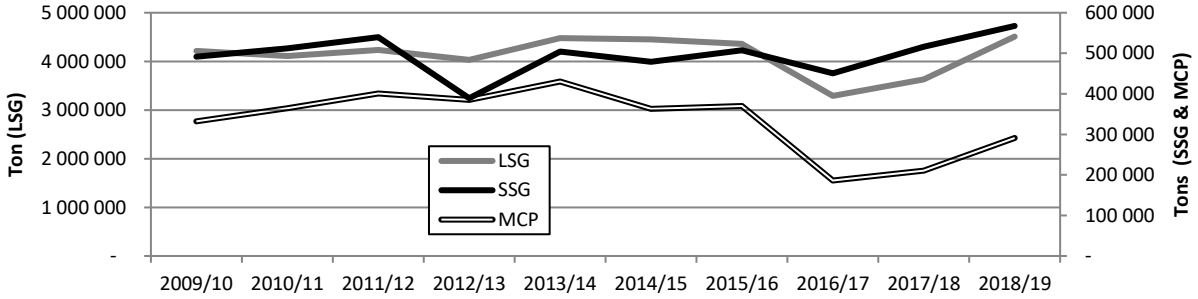
Figure 49 Comparison of SSG production by mill company, 2009/10-2018/19



Source: SACGA (2019)

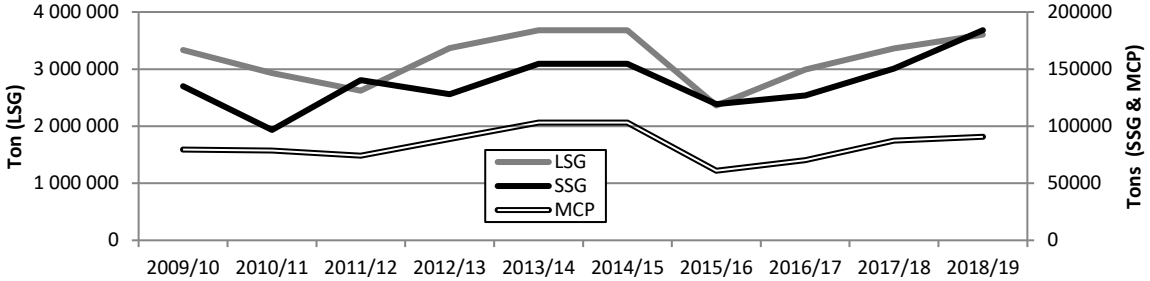
SSG production increases in Northern Irrigated areas appear to be due foremost to Restitution, particularly on miller-owned estates. Figure 50 shows that rising SSG production accompanied general fall in MCP production. However, as Restitution can also occur on LSG land, and given the general unavailability of synthesized data, here more precise figures are not possible. The tendency is less clear in the Midlands, although as will be seen in the subsequent section, much of Midlands' SSG cane supply comes from grower codes with especially high levels of production – suggesting at a minimum that 'SSGs' are incorporated into group schemes, if not necessarily under restitution.

Figure 50 Comparison of SSG, LSG, MCP production in the Northern Irrigated region, 2009/10 – 2018/19



Source: SACGA (2019)

Figure 51 Comparison of SSG, LSG, MCP production in the Midlands region, 2009/10 – 2018/19



Source: SACGA (2019)

In general, numbers of registered SSGs fell by 2,222 (11%) between 2013/14 and 2018/19 and cane production fell by 239,801 tons (12%). Notably, 58% of decline in SSG numbers and 37% of the fall in SSG cane production was attributable to the Umfolozi mill alone. Strong declines were also witnessed in the North Coast, where SSG numbers nearly halved (from 1,539 - 780) and production fell by 37% (111,292 tons). The Midlands, where SSG production has been relatively limited nonetheless saw some small increase in both registered SSGs (1,817-2,383) and production (154,659 – 184,077 tons).

It is difficult to impute the importance of these shifts alone, given that SSG production codes include 'group' schemes, such as in restitution or co-operatives, while other will refer to individual growers. In the next section, a review of relative concentration in cane production between LSG and SSG types suggests that production in the North Coast and Midlands areas come from composite producers. Nonetheless, as an aggregate trend, the suggestion is that if group schemes may bear some explanation for declines in grower numbers, they have not stemmed the decline in SSG production as a whole, although it is not clear whether or to what extent decline would have been more severe in the absence of such measures.

Table 7 Comparison of changes in numbers of registered SSGs and production by mill area – 2013/14 – 2018/19

		Registered SSGs				Tons SSG cane			
		2013/14	2018/19	Diff.	Diff %	2013/14	2018/19	Diff.	Diff %
	ML	258	204	- 54	-21%	103,285	101,479	- 1,806	-2%
	KM	706	564	- 142	-20%	439,521	409,456	- 30,065	-7%
	PG	169	137	- 32	-19%	64,828	56,513	- 8,315	-13%
N. Irrigated	Sub-total	1,133	905	- 228	-20%	607,634	567,448	- 40,186	-7%
	AK	4,888	4,319	- 569	-12%	232,360	271,566	39,206	17%
	FX	5,100	4,960	- 140	-3%	332,091	281,915	- 50,176	-15%
	UF	4,387	3,099	- 1,288	-29%	176,225	98,038	- 78,187	-44%
Zululand	Sub-total	14,375	12,378	- 1,997	-14%	740,676	651,519	- 89,157	-12%
	MS	704	346	- 358	-51%	115,479	56,159	- 59,320	-51%
	DL	206	183	- 23	-11%	102,275	79,045	- 23,230	-23%
	GH	629	251	- 378	-60%	79,826	51,084	- 28,742	-36%
N. Coast	Sub-total	1,539	780	- 759	-49%	297,580	186,288	- 111,292	-37%
	UCL	3	15	12	400%	23,922	21,755	- 2,167	-9%
	ES	1,249	931	- 318	-25%	58,467	48,220	- 10,247	-18%
	NB	565	1,437	872	154%	72,270	114,102	41,832	58%
Midlands	Sub-total	1,817	2,383	566	31%	154,659	184,077	29,418	19%
	SZ	1,839	1,893	54	3%	141,500	111,695	- 29,805	-21%
	UK	203	345	142	70%	44,178	45,399	1,221	3%
S. Coast	Sub-total	2,042	2,238	196	10%	185,678	157,094	- 28,584	-15%
Total		20,906	18,684	- 2,222	-11%	1,986,227	1,746,426	- 239,801	-12%

Source: Ntshangase (2016), SACGA (2019)

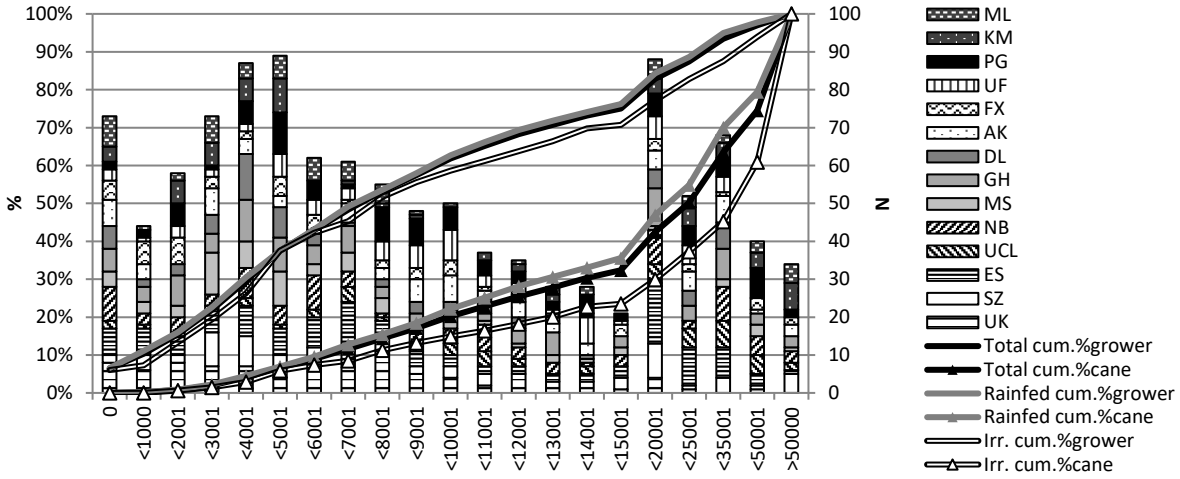
4.3.4 Signals of high concentration in sugarcane supply

In both the LSG (including NFG) and SSG categories, production is highly unevenly distributed.

For LSGs as a whole, in 2018/19 the bottom 75% (n=849) of LSGs produced only 32% of LSG cane (4.8 mt), with the top 3% (n=34) farms producing 25% of all LSG cane (3.8 mt). In the Northern irrigated areas (accounting for approximately 27% of LSG cane or 4 mt) the distribution is even more skewed,

with 77% (n=179) of LSGs producing 30% of LSG cane (0.93 mt), and the top 6% (n=14) producing 39% (1.5 mt).

Figure 52 Distribution of LSG numbers by scale of cane production, juxtaposed to cumulative percentage of numbers in numbers and cane supply, 2018/19



Source: SACGA (2019), authors' own calculations

Despite their near categorization as 'small-scale', growers in the SSG segment are significantly differentiated. This is in part indicated by the sheer inequality in scale of deliveries. Table 8 below shows that in total, approximately 36% (n=6,681) of registered SSGs did not submit cane at all, and of those that did (n=12,071), 86% (n=10,368) submitted 200 tons or less, representing only 30% (0.5mt) of total SSG cane deliveries (1.7mt). The top 3% of SSGs (n=314) submitted over 1,000 tons each, reaching nearly 0.6mt of cane, and alone representing 34% of all SSG deliveries.

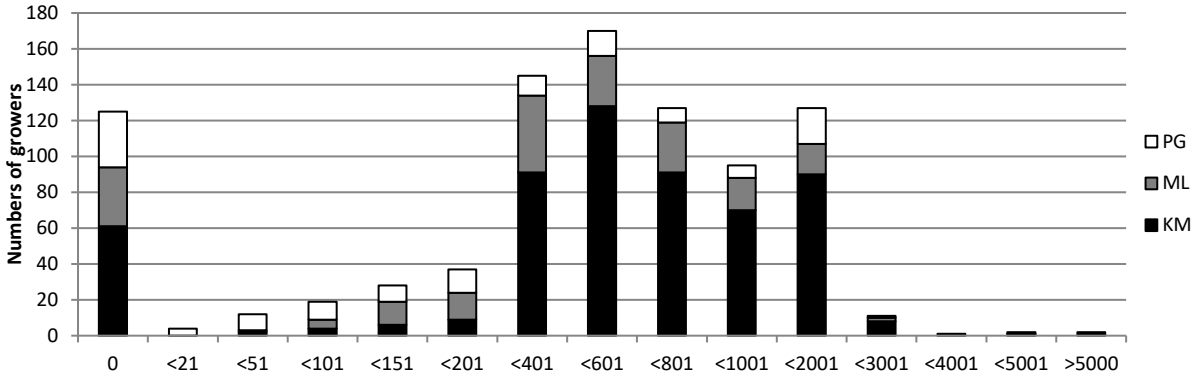
Table 8 Distribution of SSG numbers and production by cane deliveries and water-supply, 2018/19

	0	1-200	201-1000	1001+	Total delivered
SSG rainfed numbers	6556	10,268	798	157	11,223
%	37%	91%	7%	1%	100%
SSG rainfed tons	0	501,667	327,624	346,040	1,175,331
%		43%	28%	29%	100%
SSG irrigated numbers	125	100	537	157	794
%	14%	13%	68%	20%	100%
SSG irrigated tons	0	12,098	303,980	247,551	563,630
%		2%	54%	44%	100%
SSG Total numbers	6681	10,368	1,335	314	12,017
%	36%	86%	11%	3%	100%
SSG Total tons	0	513,765	631,605	593,591	1,738,961
%		30%	36%	34%	100%

Source: SACGA (2019), authors' own calculations

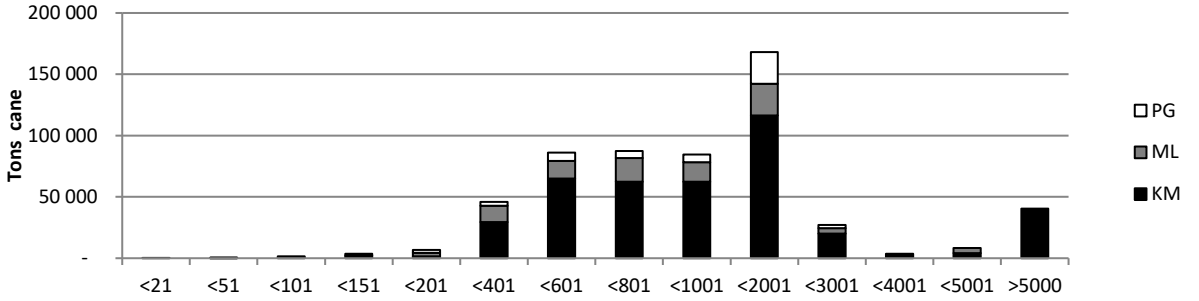
SSG uneveness is significantly disguised by the more substantial production of fewer numbers of irrigated SSGs, mainly in the Komati mill area. These growers accounted for 0.56 mt of cane, concentrated overwhelmingly in the 200-1000 ton delivery range (68%; n=537), albeit with significant numbers in the higher +1,000 ton range (20%, n=157), accounting for 54% and 44% of production, respectively. Irrigated growers also claimed a much lower non-delivery rate of 14%.

Figure 53 Distribution of irrigated SSG numbers by scale of production and mill area, 2018/19



Source: SACGA (2019), authors' own calculations

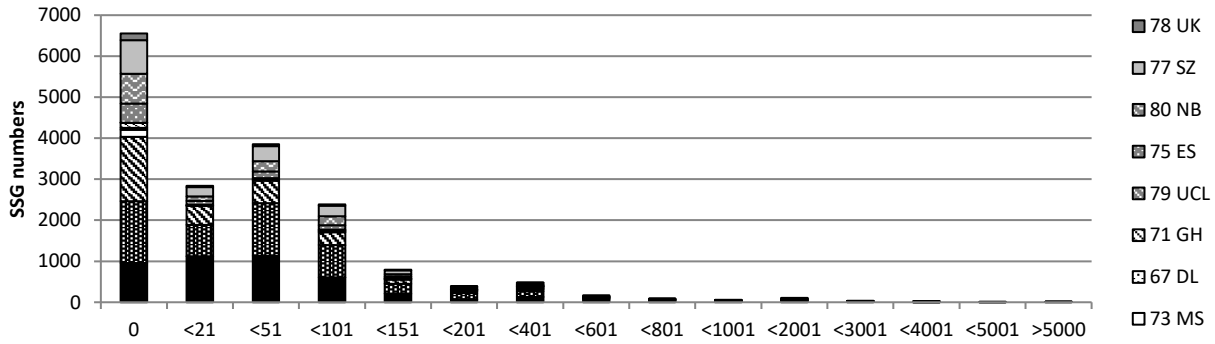
Figure 54 Distribution of irrigated SSG cane production by scale of production and mill area, 2018/19



Source: SACGA (2019), authors' own calculations

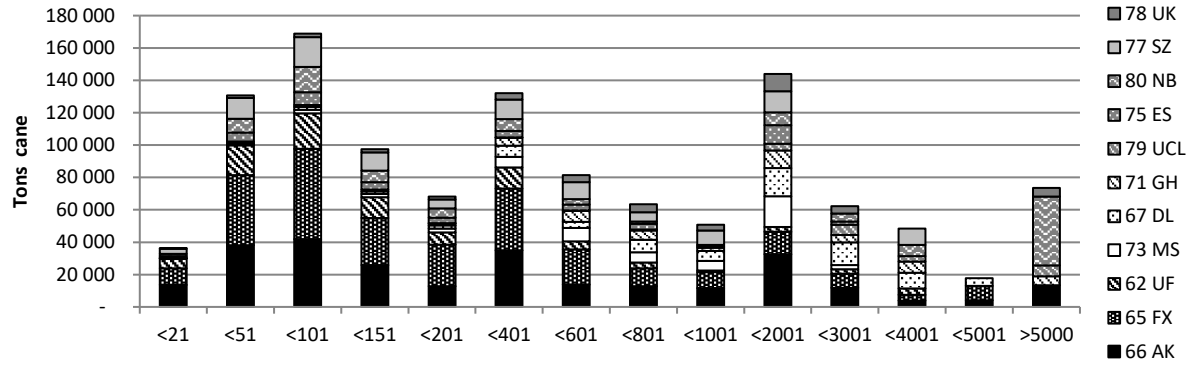
Rainfed growers, by contrast, account for 95% (n=17,779) of registered growers and 98% (n=6,556) of non-delivering growers, but only 68% (1.1 mt) of production. 91% (n=10,268) of delivering growers are in the 1-200 ton range, accounting for 43% (0.5 mt) of cane in their segment; and with the top 1% (n=157) accounting for 29% (0.34mt). The 'less than 200 tons' category is of significance given that this is the threshold of deliveries for receipt of the SPF, although larger 'group' schemes may also receive SPF by virtue of the numbers of their beneficiaries (i.e. producing less than 200 ton per member). Nonetheless, it is notable that the bulk of SSGs delivering 'below 200 tons' in rainfall areas delivered less than 100 tons in 2018, and were concentrated overwhelmingly in the Zululand Amatikulu, Felixton, and Umfolozi supply areas; albeit with some significant numbers supplying Sezela and Noodsberg mills (albeit with production from the latter focussed heavily on growers delivering upwards of 5,000 tons). Growers outside of these areas, such as in the North Coast and Midlands were comprised of growers delivering far greater quantities of cane, at LSG levels.

Figure 55 Distribution of rainfed SSG numbers by scale of production and mill area, 2018/19



Source: SACGA (2019), authors' own calculations

Figure 56 Distribution of rainfed SSG cane production by scale of production and mill area, 2018/19



Source: SACGA (2019), authors' own calculations

On its face, the concentration of 'small' growers in delivery segments that technically qualify as 'large' appears odd, but is significantly impacted by 'group' schemes with multiple beneficiaries utilizing one grower code. The character of these growers is not easy to induct, but apparent group schemes were identified based on the presence of an obvious indicator in their registered name, and divided between apparent collective organizations (e.g. co-operative, community property association, community trust etc.) and private/corporate ones (e.g. CC, Pty Ltd, Family trust etc.). These are likely not comprehensive, owing to this partial and subjective identification process. Nonetheless, of obvious codes identified, an approximate 187 group schemes accounted for 0.25 mt of production, 0.20 mt of which were in the 1000+ segment (largely shared between 'collective' and 'corporate' bodies), and which would account for approximately 33.7% of deliveries in this strata for registered SSG segment as a whole. Those in rainfed areas (n=53) accounted for 0.13 mt, and approximately 39% of deliveries in the 1000+ strata, but 70% of these (94,590 tons) were notably delivered by corporate bodies. In the irrigated areas, where group bodies accounted for 27% (0.066 mt) in the 1000+ strata, the reverse applied, with collective bodies accounting for 81% (0.054 mt) of group deliveries.

Table 9 Estimated numbers and scale of production of 'group' schemes in SSG production category

		0	1-200	201-1000	1001+	Total delivered
	N	68	33	64	53	183
Dryland Total	Tons	-	3,142	37,446	134,271	174,860
	N	35	18	47	39	104
Dryland (CC etc.)	Tons	-	1,991	27,024	94,590	123,605
	N	33	15	17	14	79
Dryland (Co-op etc.)	Tons	-	1,151	10,422	39,682	51,255
	N	6	2	19	16	37
Irrigated Total	Tons	-	283	11,498	65,872	77,654
	N	3	1	12	8	21
Irrigated (CC etc.)	Tons	-	180	8,393	12,352	20,926
	N	3	1	7	8	16
Irrigated (Co-op etc.)	Tons	-	103	3,105	53,520	56,728
	N	74	35	83	69	187
Total	Tons	-	3,425	48,944	200,144	252,513
	N	38	19	59	47	125
Total (CC etc.)	Tons	-	2,171	35,417	106,942	144,530
	N	36	16	24	22	62
Total (Co-op etc.)	Tons	-	1,254	13,527	93,202	107,983

Source: SACGA (2019), authors' own calculations

5. Character and constraints of SSG production: summary and review of illustrative case-studies

As observed above, SSG production is a highly differentiated sector. Growers classified as "SSGs" are done so according to their annual production, or their approximate share of annual production in the case of multi-member 'group' schemes. At a minimum, SSG production must be distinguished between the rainfed and irrigated regions, as irrigation both enables higher levels of production, and hence generally incomes, but also introduces additional imperatives to group management of irrigation infrastructure (and the costs thereto) and different labour profiles.

Moreover, as has been a central concern of this review, SSGs have undergone significant shifts in the terms and mechanisms of their incorporation into the sugar industry over the past 40 years, when SSG production began in earnest. As observed, these were intimately related to crises and pressures on the sugar industry as a whole. The rapid growth in SSG production was intimately tied to SSGs' attraction of price premiums to millers and the political imperatives of stabilizing the Bantustans. Millers invested heavily in 'development companies' funded under the cost-based DoP by the industry at large, and utilized the FAF mechanism to undertake the bulk of SSG production themselves. Bantustan development agencies committed large amounts funds to develop roads and offer credit to FAF and for the establishment of local black contractors (SASYB 1974/5, Vaughan 1992, Rahman 1997, Dubb 2016).

The removal of these mechanisms was an important harbinger of SSGs' general decline (in numbers and production), but offered the potential to focus on developing SSGs as 'independent' growers. The re-orientation of support towards seedcane and fertilizer schemes, grower training, a more limited but important price-support mechanism, and the extension of government financed credit schemes to co-operatives (Armitage *et al*. 2009, Hurly *et al*. 2015), however, has not seen SSG production rise in any sustained way from 2010 levels. Moreover, while once the leading example of the sugar industry's potential for transformation, of itself and as compared to other agro-food commodities, increasing focus had been orientated towards meeting the ambitions of land reform, first through the establishment of black large-scale growers and more recently in maintaining cane production on restitution schemes. Ironically, this has meant that land reform policy has in some respects pulled resources and attention away from some of the industry's poorest members, and most significant victims of colonialism/apartheid. From its peak 1997/98, SSG production injected flows of approximately R1.5bn into South Africa's communal areas, a figure that has nearly halved to around R0.81bn in 2017/18.

Before examining case studies of SSGs in different areas eras, it is useful to make some remarks on their general features. Firstly, SSGs tend to come from large multigenerational households, with registered SSGs themselves typically being older, having achieved little formal education and disproportionately female. According to Hurly *et al.* (2015) SACGA's own surveys suggest that approximately 43% of SSGs are older than 60, 48% had no or only primary education, and 60% were female. A general SSG survey by Eweg *et al.* (2009) indicated that 72% (n=941) of SSGs claimed no or only primary education and that despite efforts at ensuring equitable demographic representation, that 60% of growers were female and that over 80% were older than 40, and 36% older than 60. Woodhouse & James (2017) indicated that irrigated SSGs nonetheless have a generally higher propensity to be male, and have greater levels of education.

Secondly, SSGs tend to cultivate under conditions of customary tenure in both rainfed and irrigated areas. The innovation of FAF as a rotating credit scheme was in part orientated to overcoming the 'barrier' posed by customary tenure to utilizing land as collateral for credit. However, the widespread default of SSGs over their history suggests that tens of thousands of homesteads would have been acutely vulnerable to becoming landless had their land been utilized as collateral. Furthermore, the notion that customary tenure has widely inhibited land markets must, at a

minimum, be moderated by the observed (Dubb 2015; Woodhouse & James 2017) presence of active 'vernacular' (Chimhowu & Woodhouse 2006) markets for land in SSG areas. Often legitimized by local traditional authorities, and typically with relatively successful irrigated and 'contractor' SSGs as purchasers, these active land markets suggest that to the extent that customary tenure has inhibited concentration, this is due more to inhibiting debt-related dispossession than issues of security over title.

Thirdly, however, low returns to small-scale sugarcane means that, in rainfed areas, SSGs rarely garner incomes from sugarcane production sufficient to support a rural homesteads above poverty-line levels (Dubb 2016; Cobbett 1984; Mbowa and Nieuwoudt 1998). Income from sugarcane nonetheless plays an important differential role in SSGs' reproduction, by supporting monthly expenditure and/or providing a significant lump-sum for larger purchases, such as building/improving residences, and investing in education/training of family members. Nonetheless, SSGs' rely heavily on non-farm income for their survival, with historical reliance on migrant remittances (Cobbett 1984) largely supplanted by social grants, and with employment acting as a dominant driver of differences in relative wealth, excepting local 'contractors' (Dubb 2016). In irrigated areas, cane income is more important given the higher returns garnered, but below what community members estimate is sufficient to maintain households at their given standard of living (Woodhouse & James 2017).

A rough guide to SSGs' current returns is provided by using cost figures in Dlamini *et al.* (2018). The impact of supressed RV prices is particularly harsh. Given assumptions of an RV price of R3,121 a RV% of 11.2% and an optimistic 47 ton/ha yield, rainfed SSGs would make a loss on a new planting, with proposed subsidization measures acting largely to ameliorate its extent. Shifting the RV price assumption to the slightly higher (ultimate annual) RV price for 2018/19 only limits the loss further, and with a positive balance assuming only a ratoon submission (i.e. no fertilizer or planting costs). However, reducing yield scenarios to historical levels (Armitage *et al.* 2009) presents a much more severe picture of losses, even with subsidization. A less severe picture emerges for irrigated producers, where, under assumptions of a lower level of yield of 60 t/ha, subsidization sees losses made in planting but not on ratoon cuttings.

Table 10 Comparison of weighted operating costs and revenue of rainfed and irrigated SSGs in 2018

		Rainfed		Irrigated	
		R/ton	% Gross	R/ton	% Gross
Assumed RV%		11.20%		13.01%	
Assumed yield		47		71	
Assumed RV price (R/ton)		3121		3145	
Gross income		420.62	100%	480.23	100%
	Revenue from cane	349.52	83%	409.13	85%
	Subsidy	71.10	17%	71.10	15%
	Other Income (SPF, Rebates, etc)	30.00	7%	30.00	6%
	Transformation Intervention 1	27.27	6%	27.27	6%
	Transformation Intervention 3	10.24	2%	10.24	2%
	Transformation Intervention 5	3.59	1%	3.59	1%
	Operating costs	491.66	117%	521.91	109%
	Harvesting (incl. contractors)	44.88	11%	32.77	7%
	Haulage and transport	122.54	29%	163.70	34%
	Fertiliser	82.47	20%	69.39	14%
	Chemicals	40.92	10%	54.17	11%
	Planting	88.31	21%	134.52	28%
	Levies		0%	5.75	1%
	Sundry expenses	112.54	27%	61.61	13%
	Profit/Loss	- 71.05	-17%	- 41.68	-9%
*	Loss without subsidy (% revenue)	- 142.14	-41%	- 112.78	-28%
*	Profit/Loss assuming R3,702 RV price	- 5.98	-1%	30.77	6%
*	Profit/Loss without planting & fertilizer at R3,702 RV price	164.80	39%	234.68	49%
*	Profit/Loss assuming 24 t/ha; 60t/ha at R3,702 RV price	- 477.15	-98%	-64.91	-12%
*	Profit/Loss assuming 24 t/ha; 60 t/ha & no planting & fertilizer at R3,702 RV price	- 142.71	-17%	176.38	22%

Source: Dlamini et al (2018)

*Author's calculations

The inability of SSGs to 'specialize' in sugarcane production for survival introduces a host of tensions, most of which are tied to the dilemma of whether to consume or invest.

One is the issue of sugarcane's displacement of other potential forms of landed production. Tensions with other cropping activities in rainfed areas, particularly for direct consumption, appears to have been importantly moderated by the extension of social grants; with non-cane cropping concentrated among poorer growers in particular. With few available markets for other crops, sugarcane remains the most accessible means of cropping for income. In irrigated areas, a wider range of substitutions may in principle be feasible. The most robust tension in rainfed, and to some extent irrigation, areas concerns cattle production. On the one hand, sugarcane production can displace land erstwhile utilized to extend grazing, but on the other can also provide a means to purchase cattle cattle (Dubb 2016, Cobbet 1984, Munro 1996, Woodhouse & James 2017, Vellema & Chamberlain 2017).

A second tension is in the mobilization of labour. In principle, SSGs are expected to both have the greatest control and comparative advantage in labour, both in regards to more intensive husbandry (and associated premiums thereto), lower-overheads in monitoring, and acceptance of lower profit-rates by combination of wage and profit 'funds'. However, low returns to sugarcane at SSGs' typical scale, particularly in rainfed areas, raises large difficulties for growers in attracting and managing labour. Within the homestead, growers' older-age inhibit personal labour commitments, but sparse returns also limit the capacities to attract and/or discipline household labour into cane production – indeed input and labour purchases are often contingent on commitments by employed household members. That returns from sugarcane are often orientated to providing training/education to free family members from agricultural labour is a further ironic dynamic. Consequently, hiring wage labour is more frequent than not for most activities, but SSGs also are unable to afford much beyond bare wage payments. Non-homestead labour is hence more likely to be provided either in reciprocal arrangements by SSGs themselves, hire of particularly vulnerable community members (such as youth without grants, employment, or substantial family support) or relatively vulnerable foreign nationals (Woodhouse & James 2017, Dubb 2016, Hurly *et al*. 2015).

A closely related issue concerns how working capital is organized for SSGs as a whole. SSGs' scale is typically far too low to afford 'lumpy' productivity improving equipment such as tractors for short-haul and planting, trucks for long-haul, and in the case of northern irrigated growers, irrigation equipment. SSGs typically depend on local tractor-owning 'contractors' providing hauling, planting, harvest and transport services with their own hired labour, and are usually paid upon deduction from client-SSGs' submission to the mill. Up until the 1990s, millers typically organized contractors and SSG production in general, and management costs were largely borne by the wider industry. This resulted in scale and co-ordination efficiencies that were not achieved by more 'independent' SSGs, but left registered SSGs themselves with almost no direct control over the production processes as well as the risk of agricultural production. Thereafter, contractors in principle compete for SSG-clients, but have long been known to engage in cartel-like behaviour, often accentuated by their stronger local social power, and provide highly variable services. These are particularly acute in sub-standard planting (and in irrigation infrastructure), the impacts of which cannot be undone until several years and multiple ratoons, as well as in transport, where logistical inefficiencies can result in delays that have severe impacts on cane quality. Some studies indicate that better organization of contractors and grower organizations substantially improve services with better access to information, although in other group schemes contractor efficiency has remained a considerable burden. Contractors themselves, however, face a number of constraints in servicing SSGs – particularly in rainfed areas where contractors often extend second-hand equipment over poor-roads to service disparate growers with un-coordinated planting and harvest periods. While surviving contractors are typically among the wealthiest SSG strata, this in part owes to the fact that the success in contracting operations is highly contingent on cross-subsidization and synergy with

larger sugarcane operations (Woodhouse & James 2017, James & Woodhouse 2017, Dubb 2016, Vaughan 1992, Cobbett 1984, Northard et al. 2004, Northard et al. 2005, Vellema & Chamberlain 2017, Dube & Nicholson 2019).

The issue of contractors is further central to the question of SSGs re-establishing cane. Eweg (2009) observed that close to 50% of SSGs had never re-established their cane plantings, and SACGA (2015) has raised concern about succession, particularly in the absence of credit facilities. Munro (1996) observed that many SSGs had initiated cane production without undertaking debt through plant-lease arrangements with contractors, who would cover the entire cost of establishment in return for the first years revenue – with growers hence garnering income from subsequent ratoons and contractors expanding their client base.

In the context of the SSGs receiving reduced premiums and oversight, the general collapse of FAF/UAF credit provisions, and barriers to efficiencies in the provision of services by contractors, various 'group' schemes have been advanced. In some cases, collective bodies act to facilitate engagements among growers and contractors, promoting trust, information, and competitive services, but have occurred typically in areas where growers are fewer in number and supply larger quantities of cane (Gillham & Hurly 2009, Landman *et al.* 2009, Nicholson & Dube 2019). Broader 'group' schemes have typically emanated from SSGs' inability to garner sufficient capital to invest in cane establishment. SSGs are encouraged to form 'co-operatives' to garner greater economies of scale and provide a less risky basis for the extension of credit, typically sourced from MAFISA or AAF. However, within nominal 'co-operatives', growers tend to commit their land but not be involved directly in production. In practice, they more closely resemble lessors, receiving a *pro-rata* margin (whether fixed or tied to returns from supplied cane) but with actual production processes undertaken entirely by contractors and/or managers. While often indicating preferential employment for members, these tend not to be taken up. Diminishing returns in general have accentuated emergent or latent tensions among growers (of differential capacities, endowments and interests) and with contractors (of differential service provision) and managers (at substantial cost and typically privileging productivity over returns to growers) (Vellema & Chamberlain 2017, Woodhouse & James 2017); sometimes to the point of violence (Motha 2015, 2019).

The subsequent section reviews four in-depth case studies of different forms of SSG production in different periods. Cobbet (1984) provides something of a 'baseline' for rainfed SSG production under the prior regulatory regime in the apartheid era, comparing two communities. Those in miller-co-ordinated schemes tended to generate better returns than those more 'independent' growers, garnering returns competitive with migrant remittances but insufficient to meet estimated subsistence level earnings in general. Dubb (2015) provides an overview of tensions faced by rainfed SSGs under the current regulatory regime in the Umfolozi area, where SSGs were anticipated to emerge as stronger candidates for relatively independent production (Rahman 1997). Next, Woodhouse & James (2017) study of irrigated SSGs is reviewed, wherein income pressures are less severe than under rainfed conditions, but where management and maintenance of irrigation infrastructure emerges as a central tension. Finally, Vellema & Chamberlain (2017) overview of Tongaat-Huett's major lease-management schemes is summarized. Here schemes somewhat resemble those of prior 'development companies', but without the benefits of local market returns and industry financing of logistics and oversight, a greater emphasis has been placed on 'co-operative' leaseholds and contractor arrangements.

5.1 Rainfed SSG production prior to SIA (2000) (Cobbett 1984)

Considering the important changes that have occurred in SSG production, it is worthwhile to review Cobbet's (1984) case study. The study considered two communities, Newspaper and Nqunquma, around 30km apart with average rainfall of close to 1200mm, and each constituted by large rural households at mean size of nine.

Despite their proximity, both communities had substantially different profiles. Nqunquma consisted of around 300ha almost completely surrounded by white sugarcane farms. The community had been involved in sugarcane production prior to FAF, and all but one household was involved in sugarcane cultivation, with an estimated 5% of area under food crops, and 64% of homesteads claiming no cattle. They supplied the Noodsberg mill, generally with little extension services. Haulage, land preparation and transport services were performed by unregulated local contractors who had acquired second-hand machinery, almost all (eight of ten) who had gone out of business under the pressure of SSGs' low returns and an insufficient market. Casual labour was performed almost completely by women at very low wages. Generally, the community was considered to be caught in a cycle of declining returns, dependant entirely on their own cash incomes for reinvestment, and achieving an average yield of only 27.4 in 1980/81.

Newspaper, by contrast, presented a significantly different picture. Bordering Natal, Newspaper encompassed an area of around 7,000ha of which only 5% was undercane and 50% to food crops, albeit with a similar 55% of homesteads without cattle. The community had been recently introduced to cane by the (small, then owned by Lonrho) Glendale Mill.[33] Millers had organized growers into farmers associations, with the KwaZulu government ensuring the construction of roads and depots for transport to the mill, and the KwaZulu Finance Corporation (KFC) extending loans to four black rural businessmen to purchase equipment and establish themselves as contractors; while encouraged by the mill to form a cartel and maintain a fixed pricing structure. Contractor earnings were difficult to determine, but estimated at between R8-18,000 (R(2016) 195-439,000).

The extension of sugarcane at Newspaper was closely tied to FAF, which offered loans of R1,000/ha (around R(2016) 24,400/ha) to establish sugarcane, the bulk of which was orientated towards land preparation and initial inputs, at an interest rate of 3% for the first four years and 5% thereafter. Loans were only extended to men, and carried the additional condition of a minimum half a hectare planted and maintenance of 70% of their land allocation undercane. Finally, and critically, the mill maintained responsibility for 'orderly' production, effectively carrying out most or all of production themselves in conjunction with contractors, upon deductions from growers' harvest. This effectively left only the task of weeding to growers themselves (although this too could be contracted out to the mill). Yields in 1980/81 were nonetheless more impressive, at around 65 t/ha. Casual labour at Newspaper was also performed almost entirely by women at very low wages.

Table 11 FAF loan extended by Glendale Mill, 1980/81

	%	R (1980/81)	R (2016)
	100%	1000	24,390
Land prep	27%	270	6,585
Seedcane	26%	260	6,341
Fertilizer	30%	300	7,317
Weeding	10%	100	2,439
Planting	7%	70	1,707

Estimated net earnings at Newspaper and Nqunquma illustrate sugarcane's relative historical significance as an income source as compared to migrant remittances and against a Household Subsistence Level (HSL) baseline of R3,144 (R(2016) 76,683) p.a. At Nqunquma, area under cane was largely bifurcated between households with less than two hectares and those with over four hectares under cane. For the bottom group, sugarcane contributed only up to 13% of the HSL, although for the larger grouping it contributed a more substantial minimum of 39%. At Newspaper, the bulk of homesteads claimed less than three hectares, although in more even graduations. In this range, the higher yields saw sugarcane contributed to between 11% and 53% of the HSL, although

[33] Since the closure of the Glendale Mill, government has embarked on a large housing initiative. Current residents typically survive on a mix of social grants and limited employment, with employment in the immediate area largely limited to casual sugarcane labour on nearby commercial farms (Dubbeld 2012).

the top 22% of homesteads (excluding a chief with 36ha) homesteads achieved between 75%-97% of their HSL.

Table 12 Comparison of net returns from cane at Newspaper and Nqunquma for different areas under cane, 1980/1

Hectare range	Newspaper (yield 65t/ha) % household	Annual net returns R (1980/81)	R(2016)	Nqunquma (yield 27.4 t/ha) % household	Annual net returns R (1980/81)	R(2016)
1	28%	336	8,195	8%	132	3,220
1-1.9	18%	1,008	24,585	30%	408	9,951
2-2.9	27%	1,680	40,976	6%	684	16,683
3-3.9	13%	2,352	57,366	3%	960	23,415
4-4.9	9%	3,036	74,049	43%	1,236	30,146
5-5.9	0%			5%	1,512	36,878
6	3%			5%		

A key concern was income relative to migrant earnings and food crop production, both of which were core livelihood sources in the apartheid era bantustans, particularly given that social grants had not been extended. As noted, food production was low, particularly at Nqunquma. Although sugarcane earnings were similarly low as compared to the HSL, migrant earnings were even more miserable: 35% of households at Newspaper and 40% of households at Nqunquma garnered earnings that only accounted for some 7% of the HSL, while the top 15% of migrant remittances accounted for only between 23%-29%.

Table 13 Comparison of frequency of different levels of migrant remittances at Newspaper and Nqunquma, 1980/81

Monthly range R(1980/81)	Annualized adj, min R(2016)	Annualized adj, max R(2016)	Newspaper % Households	Nqunquma
10	2,927		14%	7%
10-19	2,927	5,561	21%	33%
20-29	5,854	8,488	18%	18%
30-39	8,780	11,415	22%	27%
40-59	11,707	17,268	10%	15%
60-79	17,561	23,122	15%	0%

5.2 The case of small-scale sugarcane production in Umfolozi supply area (Dubb 2015)

Dubb (2015) investigated rainfed SSGs in the Umfolozi supply area. Umfolozi's SSGs are distinctive for several key reasons. In the first instance, USM is one of the few mills not owned by one of the major three sugar companies. Secondly, following the reform of the DoP, Umfolozi's SSGs were considered more likely to emerge as 'independent' growers owing to the thinner history of 'development company' interventions, decent rainfall conditions, and their 'more rural' character; including larger average land holdings and few employment opportunities (Rahman 1997). However, while SSG production boomed significantly from around 83,000 tons in 1994 to 400,000 tons in 2000, production had fallen off dramatically to 101,000 tons by 2010 at the time of investigation (and stood at 98,000 tons in 2018/19).

The social profile of SSGs tend to reflect that of SSGs at large, coming from large (mean members present most/all nights = 10.39) multi-generational (mean = 2.88) homesteads comprising a mean 6.81 adults and 4.41 children. SSGs themselves tended to be relatively evenly split across men and women (54.8% female) but tended to be relatively old at a mean age of 74 and with most (73.9%) considered household heads. 47% had no education, and around 35% had completed primary school. SSGs tended to be heavily dependent on grant income for survival, with 58% claiming an old age grant, 30% claiming a child support grant, and 7% claiming a foster care or disability grant. Only 10.8% directly claimed any sort of formal job (permanent (1%), temporary (5%) or casual agricultural (4%)).

Although land-sizes were only approximated, SSGs reported holding a median of around 4ha, 2ha of which were under cane, and had submitted a mean 30 tons per year over the preceding five years. As expected, relatively few SSGs had ever received credit (27%) and significant numbers (37%) had claimed to have never accessed the retention savings scheme. Only around 10% had ever received agricultural training of any kind, and only 21% could name the last time they had contact with an extension officer from any organization.

SSG labour regimes tended to be highly heterogeneous. While nearly all relied on local contractors (themselves larger SSGs) for ploughing and short-hauling to local loading zones (from which haulier contractors would transport cane to USM), the combinations of unpaid homestead labour, paid homestead labour, and largely locally sourced paid labour were highly uneven. Nonetheless, among the sample as a whole, exclusively unpaid labour was commonly applied mainly in top-dressing (76%) and, among the 52% that did so, chemical application (70%), and to a lesser degree, clearing (52%). Paid labour was highest in harvest (75%), and to a lesser degree planting (47%), typically performed by local contractors. Weeding saw the greatest mix of labour forms, divided almost evenly between fully paid (34%), fully unpaid (36%), and mixed (30%) labour applications.

SSGs' direct relationship with contractors and hired labour was highly contradictory. On the one hand, SSGs' rely heavily on contractors to perform planting, haulage and harvest in general, both because of their scale is too low to cover the costs of 'bulky' machinery inputs like tractors, and because many SSGs are too old, and their command over household labour too partial, to perform heavy tasks themselves. Moreover, contractors were often the original point of involvement in cane for many SSGs, as contractors were known to offer plant-lease arrangements, covering the entire cost of establishment in return for the first year's revenue – with growers hence garnering income from subsequent ratoons and contractors expanding their client base.

On the other hand, contractors' efficiency was a major barrier to SSG production. Transport delays, which can have a high negative impact on cane quality, were one of the most chronic issues. 89% of SSGs complained of delays from long-distance hauliers and 35% complained of delays from local contractors – which could last up to several weeks. Contractor performance in planting is also highly variable, although only growers more knowledgeable of cane typically expressed concern. Moreover, with contractors' scope of operation geographically limited, cartel-like behaviour was common, particularly among relatives. Similar contradictions pertained in regards to labour, both in regards to homestead labour and hiring of local labour. SSGs relationship to local labour was largely expressed in terms of hired workers being demanding, 'lazy', and dependant on social grants (despite being so themselves) and in terms of family members reticence to engage in difficult labour for little pay (if any). Contractor labour was typically sourced from further afield and included foreign nationals.

Table 13 summarizes the outcomes of a cost survey where some of these issues expressed in a 'cost-price' squeeze. Assuming an average of 12.4% RV and 24.5 tons per hectare, an SSG establishing cane at average costs in 2010 would have either just broke even or suffered an outright loss – even with the support of SPF and diesel rebates. Returns from annual ratoon cuttings would be more significant, at between R3,000-3,500, assuming all labour to have been paid for, but this amounted only roughly to the equivalent of a child support grant (then R290 per month). Presuming fully unpaid family labour and a full cutting of median 2 hectares under cane, total net returns would rise to R12,176 – less than the income of an old age grant (then R1,260). While even optimistically too sparse an income upon which to support a homestead, income from cane was still often expressed as important to livelihood improvements, particularly 'bulk' investments such as housing and education.

Table 14 Summary of average production costs and estimation of net income from small-scale production in Umfolozi, 2010.

			Mean (R/ha)		%Gross	
Gross income	Revenue		7,799		86%	
	SPF & rebate		1,287		14%	
	Total		9,086		100%	
Transport (33% gross)			2,998		33%	
Annual ('ratoon')	Input	Applying top-dressing	691		8%	
		Applying chemicals	417		5%	
		Sub-total	1,108		12%	
	Labour	Clearing	267		3%	
		Applying top-dressing	189		2%	
		Weeding	613		7%	
		Applying chemicals	201		2%	
		Cutting	200	700	2%	8%
		Sub-total	1,470	1,970	16%	22%
	Sub total		2,578	3,078	28%	34%
	Net		3,510	3,010	39%	33%
Establishment (Once per planting cycle)	Input	Preparing fertiliser	626		7%	
		Seedcane	531		6%	
		Sub-total	1,157		13%	
	Labour	Tractor tilling	1,758		19%	
		Planting	359		4%	
		Sub-total	2,117		23%	
	Sub total		3,274		36%	
	Net		236	-264	3%	-3%

In regards to general patterns of relative wealth, cane's role came as an important but secondary to both social grants, which formed the baseline for homestead consumption, and access to non-farm income and employment, which stood as the major differentiator of wealth (as measured by homestead asset ownership). The exception here concerned SSG contractors, who were concentrated in the richest asset-groups and generally had sparse off-farm employment. As shown in Table 14, numbers and quality of non-grant income sources ascend with asset-wealth. Area under cane similarly increases across wealth groups, largely in tandem with total homestead land, with the highest concentration again in the richest category. Yet wealth stratification was also suggested to be very modest among the majority: Jobs and cane were concentrated heavily in the 'top' asset group, and their statistical association with asset-wealth degraded heavily when restricted to groups 1-3.

Table 15 Summary of key characteristics of small-scale growers in the Umfolozi region by asset groups, 2010

					Land (ha)			Estimated		Income sources				
												Persons with		
			Homestead size	% Growers female	Total	Cropped	Under cane	% casual labour in cane**	Cattle	Total	Social grants	Perm. jobs	Temp. job	non-agri. bus. w/out employees
Asset group		n=	Mean	%	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
1 (0-6 assets)		21	9.81	66.67%	3.70	2.53	1.56	34%	3.33	4.90	3.29	0.05	0.21	0.05
2 (7-9 assets)		19	9.79	73.68%	3.65	1.81	1.63	26%	1.79	5.42	3.21	0.26	0.26	0.42
3 (10-11 assets)		17	10.88	52.94%	6.81	3.18	2.85	22%	3.06	6.47	3.41	0.56	0.50	0.19
4 (12-23 assets)		17	15.41	23.53%	10.56	7.79	6.19	55%	10.59	8.47	3.82	1.25	0.25	0.33
		p	.232	.175*	**.312***	.152	.263	-.241	-.059	.335	.145	**.359**	.180	.166
		Sig.	.083	.419	**.020**	.269	.051	.110	.663	.011	.283	**.008**	.193	.230
	Corr.	n	57	57	**55**	55	56	45	57	57	57	**54**	54	54
Groups		F	0.266		**3.521**	1.094	2.493	0.483	0.664	1.849	0.036	**4.594**	1.220	**4.189**
1-3	ANOVA	Sig.	.767		**.037**	.342	.092	.620	.519	.167	.964	**.015**	.304	**.021**
		p	**.433**	**0.380***	**.513**	**.463**	**.497**	**.231**	**.383**	**.486**	.177	**.407**	.072	.238
		Sig.	**.000**	**.014**	**.000**	**.000**	**.000**	**.074**	**.001**	**.000**	.132	**.001**	.563	.054
	Corr.	n	**74**	**74**	**72**	**72**	**72**	**61**	**74**	**74**	74	**66**	66	66
Groups		F	**4.036**		**7.701**	**8.136**	**7.702**	**2.906**	**5.197**	**3.737**	0.221	**6.480**	0.917	2.343
1-4	ANOVA	Sig.	**.010**		**.000**	**.000**	**.000**	**.042**	**.003**	**.015**	.881	**.001**	.438	.082

*Refers to Cramer's V in chi square analysis

**Refers only to non-cutting annually recurrent tasks in cane: weeding, fertilizer & chemical application

Interviews with subsections of growers revealed that sugarcane had come to interact with other homestead livelihoods in complex ways. Five general trajectories were identified.

The first category of growers who were 'stepping-up' production were universally contractors, and distinguished furthermore by their far larger than average area under cane (6-25ha). In three of four cases, additional cane-land was acquired in a 'vernacular' (Chimhowu & Woodhouse 2006) cash exchanges legitimated by the *induna*. All of these SSGs were male, although two were notably younger, unmarried and did not consider them-selves 'heads' of their homestead. That both sugarcane and contracting were necessary compliments in context was evident by the fact that there were no contractors without substantial cane fields and no growers without substantial cane fields who were not also contractors. Several dynamic interactions between cane and contracting were key to their relative expansion. In the first instance, each enterprise provided a cash-flow complement to one another, with sugarcane providing bulk returns for tractor-maintenance at year end, and contracting providing a stream of cash-on-hand to purchase inputs and labour. Secondly, contracting essentially subsidized the costs of working capital too costly and 'bulky' at small-scales, but necessary for scale efficiencies. Thirdly, high diesel costs and rates of depreciation rendered contracting a generally unsustainable enterprise outside of the surpluses from cane.

The second category concerned two growers 'hanging-in', in regard to maintaining production at relatively constant levels. The first, also a contractor, was somewhat hindered by the fact that he was only able to command a portion of his family's sugarcane fields for his own use, and was falling deeper into debt. The second, an elderly woman with 4ha under cane, was able to both effectively rely almost entirely on unpaid homestead labour and keep to a strict regimen of consumption within the boundaries of her old-age grant and reed mat sales. The net proceeds of cane were utilized to send her children to university.

The third category included four growers 'stepping out' and 'stepping down' from sugarcane production. For two of the growers, access to employment was the most pronounced vehicle for exit. Although in principle employment helped stabilize consumption and provide cash-on-hand for labour and input purchases, net returns were too low justify on-going investment without strenuous applications of homestead labour. In another case, a third-wife was devolved circumscribed access to land from her husband (who also cut financial contributions). This grower was compelled to rely heavily on her employed child for sustained cane production, but subsists mainly from her old-age grant. A fourth grower was notable as one of the few in the sample who had utilized FAF, acquired a tractor, and at his peak had reached 15ha without an old age grant or on-going employment. That he since reduced his field to 4ha, was unable to sustain tractor maintenance and felt compelled to grudgingly apply for an old-age grant is testament to the intensity of the shifting terms of exchange SSGs have felt.

The fourth category included growers, uniformly female, who were dropping out or had already dropped out of production. The harshest commonality among these growers was the death or incapacitation of husbands or sons with access to employment, or, in one case, a contractor, and consequent deepening crises of consumption that inhibited sustained re-investment. A second notable tendency among these growers, however, was that initial plantings of cane were largely experimental, sometimes in land-lease agreements with contractors. 'Lump-sum' returns were typically invested in education and training to free family members from agricultural labour. The requirement of greater investment of money and labour is hence, something of an inversion of this original appeal.

The final category concerned two growers who, despite sustaining near total falls in production, were in the process of 'creeping back' into production incrementally. Common to both homesteads was a focus on limiting consumption to other available, mainly grant, incomes sources with annual ratoons either committed directly as seedcane or submitted for proceeds to be directly re-invested. In each case, the object of expansion was to reach full scale, and hence consolidate margins into a lump sum.

5.3 Irrigated SSGs in the Nkomazi area (James & Woodhouse 2017, 2015; Woodhouse & James 2017)

In their study of Northern Irrigated growers, Woodhouse and James (2017) mixed a series of interviews, focus groups and survey of 120 small-scale growers on irrigated plots in the Nkomazi area of KaNgwane former homeland, supplying TSB's Komati and Malelane mills.[34] SSG production in the Nkomazi area was largely established in 1983 (on roughly 2,500ha) and substantially expanded with the Nkomazi Irrigation Expansion Scheme (NIES) (by around 7,000ha) and a further Land Bank funded expansion from 2003-2005 (1,300ha). SSGs were organized into projects of around 150 – 250ha using shared irrigated infrastructure (pipes, pumps and weirs) to deliver water from Lomati or Komati to individual growers on between 2-10ha.

Irrigated SSGs' social profile is somewhat different from those in the rain-fed regions. Slightly greater numbers were men (58%), albeit with the vast majority (72%) over 50 years old. Education was also higher: most had at least some primary (42%) or secondary (39%) education. While few (4.7%) had tertiary education many (70.5%) had received agricultural training and some (7.6%) in business in accountancy. SSG irrigation schemes have also been an important source of direct employment, with 42% of SSGs garnering income from employment within the project, 16% claiming employment from an unrelated job/business and 47% receiving social grants.

In addition to being distinguished by irrigation, Nkomazi SSGs were distinguished as the only segment considered financially viable after the collapse of FAF/UAF.TSB then formed Akwandze Agricultural Finance (AAF) as a 50-50 partnership with a new Liguguletfu Co-operative Limited, representing 889 SSGs in the Mpumalanga region. Each contributed R25m Rand, and garnered further R75m from Khula Enterprise Finance Initiative to provide credit for SSGs. Loans from Khula/AAF fund are directed chiefly to non-annual, higher-cost investments such as replanting, upgrading or replacing irrigation infrastructure and purchasing additional sugarcane plots.

SSGs individually pay for fertiliser, labour, pesticide spraying, and cane cutting, loading and transport, while electricity and water costs in irrigation are paid collectively. Costs are generally paid either through retention savings (e.g. fertiliser, labour, pesticides) or as automatic deductions upon delivery to the mill (e.g. cutting, loading and transport, and electricity and water). SSGs tended to expend far more on labour (R3,200/ha) than contractors (R1,288/ha) for harvest, loading and transport, but tended to hire far more (foreign and female) workers at lower rates. While contractor labour has some effective oversight by Akwanze, who will only release funds for registered contractors, SSGs directly hire permanent labour (mainly Swazi and Mozambican foreign nationals) for irrigation, and mostly female casual labour in weeding and chemical application. Barring 16 growers who performed all other labour themselves, on average SSGs hired one permanent worker per 5.4ha, but with a high range. Wage rates averaged R857 per month, but also had a high range of R300 to R2100, with some indication of positive correlations with overall area per worker (0.505), yield (0.224) and non-farm income (0.140).

However, from 2006 – 2014 SSG production dropped significantly, from approximately 621 - 461,000 tons. Indeed, while SSGs accounted for approximately 20% of land used to grow sugarcane towards TSB's two mills, they delivered only 11.2% of total sugarcane. Chief among the most problematic projects were those funded in the Land Bank period, where unrealistic projected incomes, poor project design, and poor contractual services saw SSGs carry the burden of unsustainable debt levels. This accentuated problems of insufficient re-investment in irrigation infrastructure, which became critical, first when flooding badly damaged pumps in 2000, and secondly then with low rainfall in 2004-2006 and 2011/12.

[34] Sample = 109/888. 40 Malelane and 80 in Komati
Productivity: 'high' (n=34%/N=25.5%) Medium (n=38%/N=29.9%), Low(n=28%/N=40.6)

One problem was that growers tended to use their institutional savings for breakdowns rather than regular maintenance. Secondly, in some instances unscrupulous developers saw some irrigation projects designed and installed poorly, resulting in irrigation infrastructure unable to pump water to the farms. Thirdly, theft of electrical equipment to be sold as scrap has hindered some growers, particularly in recurrent cases where theft occurred immediately after equipment was replaced. Fourthly, collective management of irrigation infrastructure has not proved resilient in the face of these challenges, leading some growers to pursue counter-productive individual strategies, such as increasing sprinklers on their farms. Despite river flow being sufficient, this saw between 30- 40% of growers being unable to irrigate whatsoever. Differentiation among growers within the schemes has itself been a vulnerability, as those failing or unable to contribute to collective irrigation and electricity expenditure put added pressure on the margins of other members, threatening to effect a viscous cycle of decreasing returns, credit unworthiness and collapse.

Rising electricity costs have been another fundamental concern to the largely pump-irrigation systems then employed. Alternative centre-pivot and drip-irrigation have both been utilized but carry their own challenges. While centre pivot is considered the cheapest, it involves a higher degree of shared infrastructure coordination among growers. Drip irrigation offers the potential to reduce overall demand and autonomy by growers, but renders pumps more vulnerable to breakdown, is unsuitable for establishment unless placed underground at high cost (then R16,000/ha), and requires careful maintenance.

Together, these difficulties substantially accentuated tendencies to differentiation. A survey of costs among SSGs in different productivity categories illustrates the general point well. Conventional considerations that achieving a minimum yield of 60t/ha was necessary to break-even informed the lowest grouping, with growers in this segment producing the least value added, lowest absolute labour expenditure, lowest investment of fertilizers, and highest debt burden relative to their net earnings – a substantial portion of which itself emanated from VAT/diesel rebates. Growers in the intermediate range garnered greater net earnings than those in lowest segment, but, despite producing similar levels of value-added as that of the most productive segment, saw higher proportions directed toward labour and debt service.

The cost survey excluded about a quarter of the sampled growers that earned no net revenue after deductions from their cane delivery earnings in 2012, and a large majority were earning less than R30,000 from their sugarcane in 2012. Interviews and focus groups suggested that sugarcane's contribution to livelihoods were historically considered fondly, and contributed substantially to SSGs distinction from other KaNgwane residents in affording motor vehicles, university education for children, and the construction of 'modern' houses (with indoor plumbing, furnished living rooms etc.). Cattle were another area of considerable investment that could also be utilized as 'savings' (despite being vulnerable to drought) although growers were reluctant to share the size of their herds. However, youth were increasingly circumspect of succession owing to the evident higher income risks. Focus groups suggested that a (then) annual minimum of R180,000 was necessary to support for social reproduction. This, at prevailing rates, would require nearly 16ha of fully irrigated sugarcane land producing 80 t/ha.

Figure 57 Proportional comparison of costs and returns from irrigated small-scale sugarcane production in Nkomazi across productivity groups, 2011

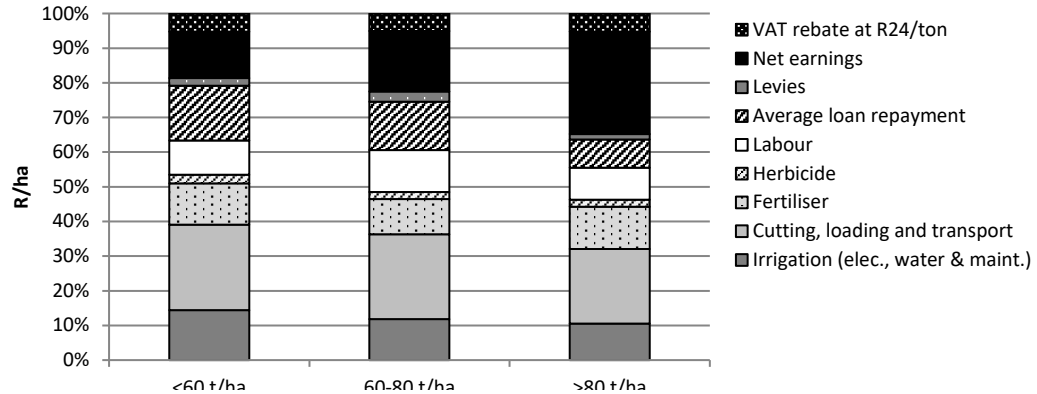


Figure 58 Comparison of costs and returns from irrigated small-scale sugarcane production in Nkomazi, across productivity groups,2011

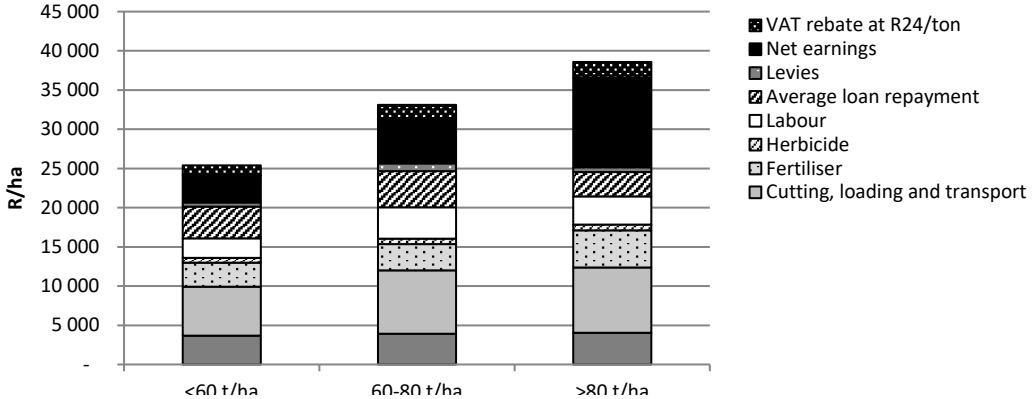


Table 16 Comparison of costs and returns from irrigated SSG production in Nkomazi across productivity groups , 2011

		<60 t/ha	60-80 t/ha	>80 t/ha
	n	48	28	29
Yield	t/ha	55.1	69.9	84.2
change in mean (2010-12 - 2008 -10)	%	-14.3%	-11.6%	8.4%
	RV%	12.8%	13.5%	12.8%
Total gross income	R/ha	24,090	31,416	36,564
Revenue	R/ha	22,768	29,736	34,543
VAT rebate at R24/ton	R/ha	1,320	1,680	2,020
Production costs	R/ha	16,648	21,028	22,033
Cutting, loading and transport	R/ha	6,258	8,083	8,329
Levies	R/ha	548	973	610
Irrigation (elec., water & maint.)	R/ha	3,666	3,926	4,053
Fertiliser	R/ha	3,039	3,354	4,707
Herbicide	R/ha	632	685	751
Labour	R/ha	2,505	4,007	3,583
Gross margin	R/ha	7,442	10,388	14,531
Average loan repayment	R/ha	4,019	4,610	3,124
Net earnings	R/ha	3,423	5,778	11,407
Production costs % of Total gross income	%	73.1%	70.7%	63.8%
Loan % Gross margin	%	54.0%	44.4%	21.5%
Net earnings % Gross income	%	14.2%	18.4%	31.2%
VA+%	%	46%	52%	54%

A second tendency to concentration has been through initiatives to co-operatization. Woodhouse & James (2017) indicate the relative successes and limitations of this tendency with the case of "Langeloop Phase 2", which was originally among the problematic 'Land Bank' projects established on 283ha and involving 39 farmers on around 7ha each. Like many of the 'Land Bank' projects, Langeloop Phase 2 was burdened from the outset with unsustainable debt levels on land not uniformly suited to irrigation, with poorly designed and installed infrastructure, inadequate

contractor services and utilization of cane varieties susceptible to a sugarcane disease known as smut. Positive early performances in production (at around 85 t/ha) were nonetheless undercut by the high debt-levels faced by SSGs. Ultimately, a terminal outbreak of smut spelled disaster for the project, with debt escalating from R16m – R24m well outside of SSG's capacities.

In response, co-operatization and hiring of professional, external management was envisioned as a key precursor for new injections of funding to re-invigorate production. SACGA successfully negotiated the debt burden down to R6.8m, SASA established a nursery to provide smut-resistant varieties, and the Mpumalanga Department of Agriculture Rural Development and Land Administration (DARDLA) committed R3.6m to rehabilitate irrigation infrastructure and in 2011 and two further grants of R2.9m and R3.4m in 2012 for the planting of 58ha and 80ha respectively, and with then plans to expand by another 50ha with a further grant.

Early results were exceptional from a production perspective, with the project yielding award-winning levels of 150 t/ha at 17% RV. However, the effective 'dividend' to co-operative members has been less impressive. The rate of lease was then set at R100/ha per month, amounting to approximately R700 per month or R8,400 per year per seven-hectare holding. At the average rates reviewed above, even a poorly performing 60t/ha farmer would then earn around R24,000 from seven hectares. Employment opportunities were further limited owing to the manager opting to use non-committee labour to evade conflict within the committee, and themselves garnering R42,000 per month in managerial fees – equivalent to R500,000 per annum or 60 annual rental incomes of R8,400 for 7ha. Moreover, governance issues have beset the organization, with shareholders accusing the chairperson of mismanagement and corruption, culminating in the committee being removed from power in August 2014 and the re-hiring of a farm manager who had been fired less than a year earlier.

Similar tensions are evident in James & Woodhouse (2015) inquiry into Joint Ventures between TSB and restitution beneficiaries of the Greater Tenbosch Land Claim. The case is of interest because, although productions on Restitution projects encompass areas in the thousands of hectares, they are often categorized as 'small-scale' owing to the number of beneficiaries.

Although met with opposition from the majority of white farmers, TSB were supportive of it from the start. The claim was gazetted by government in 2001, and settled in 2007, when transfers of land began. It encompassed the claims by tribal authorities in the Tenbosch Land Claim (the Ngomane Hoyi, the Ngomane Siboshwa, the Ngomane Lugedlane and the Mhlaba), additional tribal authority claims (the Mahlalela, the Mawewe and Matsamo) as well as 18 smaller claims made by individuals or families. At the time of writing, James & Woodhouse (2015) observed the processes had witnessed the transfer of 43,000ha (of 61,202ha approved for transfer) to seven trusts comprising 24,636 beneficiaries at a land purchase cost of R2.8bn. This includes land previously and currently under sugarcane, but also other uses, such as citrus farming and game ranching, as well as land identified for eco-tourism. In 2014, TSB estimated that 21,605ha of were under claim by restitution projects, representing about 42% of the 51,054ha growing sugarcane in Nkomazi, and 35% of the 62,202ha approved for transfer.

Three main models for sugarcane farming emerged following restitution. In the first instance, claimants may elect to simply lease their land to TSB, or to other commercial farmers. Secondly, restituted land may be placed under production by trust management, employing farm managers from among beneficiaries, or from outside the claim. Third, trusts may elect to create a Joint Venture, a body 50% owned and represented by the Trust and a 'strategic partner' (such as TSB or Umlimi) under a lease and/or profit sharing agreement, together with preferential employment ('skills development') and service contracting ('enterprise development').

As with Langeloop Phase 2, a similar tension has emerged between the professional management of production and the ultimate flow of benefits to numerous claimants. Certainly, the level of landed production has been highly significant, with yields at IST and SST, for instance, rising from 90t/ha to over 100 t/ha from 2006-2010, and surpassing 110 t/ha by 2012-13. However, as illustrated in Table 16, the profitability of the enterprises and their returns to beneficiaries have been less impressive. Production costs have stood at approximately 80% of revenue, but with gross margins were effectively negated by fixed costs. These include leases to beneficiary trusts themselves, but are met or surpassed by administration and managerial fees. If not for 'fair value' adjustments to cane-roots, the enterprises would have universally suffered losses. Rental incomes as a mass amounted to R28m, which, while significant amount to marginal incomes on a per-beneficiary basis of around R1,600, and would remain small even if all post-tax profits were released as dividends. This, it should be noted, is also consequent to the large number of beneficiaries themselves, with effective area harvested per beneficiary amounting to less than half a hectare.

Other benefits from preferential employment and enterprise development are substantial but not generalizable, typically including only some members of large claimant beneficiary populations. Perhaps the most broad-based, preferential employment, is highly limited on capital intensive operations. TSB's data suggests that approximately 35% of the workforce comprises claimant members, however, even full employment could only absorb approximately 3.8% of beneficiaries. Moreover, with remuneration at market rates (and, hence, not intrinsically commercial sugarcane production in general) such work is in anycase often eschewed by young black South Africans as well as older claimants unfit for agricultural labour. Farm management positions are far more attractive, but across the JVs there existed only 3 general managers, 10 farm managers and 1 junior manager – to say nothing of the tension between managerial fees and dividends noted so far. Similarly, while some relatively well-positioned entrepreneurs have benefitted from contracting opportunities, these few relatively more lucrative opportunities have inspired a tendency toward 'ring-fencing' from among community members.

Table 17 Characteristics of key aspects of major sugarcane Restitution projects in Nkomazi

Tribal Authority	CPA/Trust	Beneficiaries	Ha	R	Lease	Trust man.	JV	JV name
Ngomane Hoyi	Ingwenyama Simhulu Trust (IST)	6,170	5,074	269,884,375		✓	TSB	Libuyile Farming Services
Ngomane Siboshwa	Siphumelele Tenbosch Trust (STT)	5,000	8,038	351,393,750			TSB	Mgubho Farming Services
Matsamo	Matsamo CPA	5,266	875	9,567,690	Comm. Farm.		TSB	Sivunosetfu
Mhlaba	Mhlaba Trust	1,700	557	20,273,195	Comm. Farm.	✓	Umlimi (collapsed)	
Ngomane Lugedlane	Mjejane Trust	n/a**	10,001	177,635,000		✓	Umlimi (collapsed); Keysha investments	
State*			19,367	339,817,061				
Approved For Transfer**			17,290	866,822,015				
Transferred by 2010		18136+	61,202	2,035,393,086				
Matsamo	Matsamo CPA	5,266	11743					
Mahlalela	Bambani Mlambo Trust	2,500	5,240		TSB			
Mawewe	Mawewe CPA	1,500	4,958					
Other	Libuyile Community Trust		21,941				Crookes Brothers	Mthayiza Farming

Table 18 Production characteristics of ITT and STT joint ventures, 2006-2010

		2006	2007	2008	2009	2010
IST	Harvested (ha)	2,305	2,184	2,280	2,783	3,497
IST	Cane (tons)	209,501	224,570	249,658	301,662	384,311
IST	Yield (tons/ha)	90.89	102.83	109.51	108.39	109.89
STT	Harvested (ha)	2,734.60	2,332	2,334	2,411	2,382
STT	Cane (tons)	248,548	239,758	251,773	261,189	248,700
STT	Yield (tons/ha)	90.89	102.83	107.88	108.33	104.41

Table 19 Overview of income, costs and returns of Joint Ventures with TSB, 2012/13

	JV1	JV2	JV3	All JV
Ha harvested	2,918	2,402	2,278	7,598
Tons cane	340,613	277,009	241,865	859,487
Yield (t/ha)	116.74	115.32	106.18	113.12
RV%	12.77%	12.35%	12.73%	12.62%
Cane turnover (Rm)	140	108	97	345
Production costs*	114	88	76	279
Cane gross margin	27	19	20	65
Total fixed costs	36	37	28	100
Administration	14	19	12	45
Management fees	3	3	7	14
Leases	15	10	4	28
Other***	4	4	6	14
Net	-10	-17	-8	-34
None-cane income**	3	1	-	3
“fair value adjustment”	10	13	50	72
Earnings before interest and tax	3	-	44	45
Profit after tax	1	- 3	29	27
Estimated lease income per beneficiary (assume 5,500 beneficiaries)	2,803	1,761	704	1,671
Hypothetical dividend per beneficiary	229	- 470	5,316	1,650

5.4 The Vuselele & Simamisa lease-management arrangements (Vellema & Chamberlain 2017)

Under the conditions of general SSG decline and a lack of private land available to extend cane production for its mills, Tongaat-Hulett undertook two projects in 2009 and 2012 to overcome SSGs' barriers to reinvestment and increased scale of production. In some ways, the operations resemble that of the 'development companies' that predominated during the period of rapid SSG growth in the 1980s-1990s, with Tongaat-Hulett establishing a co-ordinating SSG unit operating at R20m p.a. and a separate unit to administer funds at roughly R2m p.a. Unlike the previous period, these costs are not claimed from industry gross proceeds.

The first project, Operation Vuselele ("revival") was launched in 2009/10 at the initiative of Tongaat-Hulett and the Kwazulu-Natal Department of Economic Development and Tourism (DEDT) with the ambition of rehabilitating 3,700ha of SSG cane land within three years, and in supply of Tongaat-Hulett's Maidstone mill. Although only reaching 2,361ha by the three-year target, by 2016 3,534ha of cane had been planted on lease from 31 co-operatives representing 2,555 members and overseen by 71 extension officers.

Under this model, SSGs were encouraged to form and lease their land to co-operatives which would in turn enter into a 10-year supply arrangement with Tongaat-Hulett. Co-operatives would own the sugarcane roots, financed mainly by the KZN-DEDT (R64m) but with contributions from Tongaat-Hulett (R12m) as well. Contractors appointed by the KZN-DEDT and supervised by Tongaat-Hulett would perform the planting and management of the crop for six months (until the cane developed into a canopy stage where weeding was no longer necessary). Contractors would be subject to a 'trial period' of two weeks to plant two hectares, during which Tongaat-Hulett would have authority to terminate the contract. After the planting and six month management period, co-operatives together with Tongaat-Hulett would select contractors to perform harvesting and transport. Contractors would be bound to recruit locally with preference to co-operative members. Contractor harvest and transport programmes would be drawn up with co-operative management, and again with oversight by Tongaat-Hulett extension personnel. 10% of the gross revenue from cane would be paid directly to co-operative members by Tongaat-Hulett, *pro rata* to their land commitments, and further be eligible for the SPF. A second 10% would be put aside for re-planting, and a pre-determined sum would be placed in retention for input purchases the subsequent year (R130/ton in 2013). Should actual retention expense be lower, the balance is to be redistributed to co-operatives, whether for re-investment or distribution.

The long-term sustainability of Operation Vuselele is not altogether clear, particularly given the general crisis facing the sugar industry at large. The programme, however faced a number of key issues in its development, the two most prominent being relations with contractors and the dissatisfaction of some co-operative members.

In regards to the former, contractors were targeted to be drawn primarily from the local areas, they were typically under-resourced, both in regards to equipment and, in many cases, agricultural training. While short, one-year contract periods incentivised performance for subsequent renewal, they de-incentivised Tongaat-Hulett from investing in building their capacities. Moreover, contractors were found to often perform sub-standard work, moving quickly from area to another, and in some cases appropriating co-operatives' inputs for their own cane or submitting cane on their own production codes.

With regards to the latter, community dissatisfaction revolved largely around proceeds from cane. In the first instance, delays in the planting of cane meant that the 10% of gross revenue attributable to all members was felt to come at the cost of those whose land was planted late, and who could have in principle achieved greater returns themselves. This was particularly true of growers who joined because they were unable to finance replanting, rather than an unwillingness/inability to grow cane themselves. A second issue concerned members who allowed their cattle to graze on co-operative

lands, diminishing proceeds across the entire co-operative while entirely benefitting their own cattle. Many growers also suggested that returns were lower than what they could achieve themselves, although Tongaat-Hulett staff suggested these growers mistakenly compared their own gross revenue, irrespective of re-investment costs.

Nonetheless, the proceeds arrangement itself also raises the question of the nature of these 'co-operatives. All production activities were performed by contractors, and despite a local recruitment policy, few members were either able (largely owing to age) or willing (largely owing to sub-minimum wage levels) to perform labour themselves. In effect, 'co-operatives' acted as semi-land-rental agencies, but with 'rents' tied to the risk of contractor performance and wider economic conditions.

Owing in part to the difficulties faced in engaging with contractors, the Simamisa programme (orientated to supplying the Felixton and Amatikulu mills) was launched following Tongaat-Huletts approach to the Ingonyama Board Trust (IBT) to seek a different model, which in turn approached Simamisa, a sugarcane farming company.

The Simamisa programme differed from Operation Vuselele in several key respects. In the first instance, Simamisa explicitly sought out areas which had not hitherto been placed under cane, and where landholdings were both larger (at around five hectares per homestead) and contiguous. This enables Simamisa to achieve greater economies of scale, but also inhibits membership by potential growers whose land is not contiguous. Utilizing its close linkages with traditional authorities, Simamisa would approach communities in the format of a 'roadshow', explaining and advocating their programme, encouraging members to establish co-operatives and identify land together with traditional authorities.

In the Simamisa model, co-operative members sign their power of attorney to the co-operative, which directly leases their lands to Tongaat-Hulett, in turn and supplying fully owned cane roots. As such, unlike Vuselele, the lease is between Tongaat-Hulett and the co-operative rather than the co-operative and its members. Tongaat-Hulett then engages Simamisa as the sole contractor to undertake all productive activities and engagement with co-operative members. Like Vuselele, however, co-operative members are not directly involved in production unless hired by Simamisa as labourers, and enter the project on the condition of receiving 10% of gross revenues *pro-rata* to their land commitments. Unlike the Vuselele model, however, there is no clear savings plan, raising questions of re-investment after the initial 10-year lease period.

Since 2012, 18 co-operatives have been established with over 6,600 members, on approximately 6,591ha. Although this model has released Tongaat-Hulett from the difficulties of managing contractors, community members have contentious engagements with Simamisa. Lower than expected returns, confusion and lack of clarity around the payment system, and proscription of grazing lands form the major (reported) loci of complaint. One individual claimed in 2015 that they had received as low as R1,000 for their one hectare (Zungu et al. 2016). Reports that the Simamisa scheme was advanced unscrupulously are linked with the assassination of tribal authority figures (Motha 2015). More recently, some angry community members claim to have been tricked into the Simamisa lease by their late *Inkosi*, that his death effectively negates the agreement, and have further threatened to set canelands alight and destroy equipment (Motha 2019).

6. Recommendations

The prospects for supporting SSGs in the communal areas and in restitution projects, both in rainfed and irrigated areas, will undoubtedly be heavily conditioned by the 'Master Plan' currently under negotiation between the sugar industry and government.

It is not known what the full prospects are for ameliorating the severe strain that a combination of imports from Swaziland, iterant 'deep-sea' imports, reduced direct consumption from high domestic retail price-mill price-spreads, and reduced industrial consumption at least accelerated by the HPL may be. These are beyond the scope of the report, but all appear to contain significant liabilities. Ethanol-for fuel alone would require what appear as prohibitive levels of subsidization, but may be more feasible in conjunction with production of other commodities. Expanding a continental protected market may absorb some surplus production, but if demand is not 'ring-fenced' in some other manner, it is likely companies located in other national contexts would be better situated to meeting these gaps. This might even incentivise the dis-investment of corporations operating in South Africa, but with significant if not greater interests in these countries. The crisis facing the sugar-industry is certainly larger than SSGs alone. Any down-scaling could have significant, and in some cases possibly devastating impacts on employment in rural and per-urban towns centres around sugarcane and sugar production.

Nonetheless, this report considers that the sugar industry's involvement of thousands of small-scale producers in the communal areas and restitution projects as one of, if not the, greatest socio-economic liabilities of the industry's current crisis. Should a down-scaling be necessary or inevitable, it is imperative that SSG production not be placed under the same or similar burdens as that of the large-scale sector. The imperative is particularly sharp given that SSGs have in many respects already suffered more than their fair-share to maintaining the durability of the industry since the 2000s (to say nothing of their generally impoverished status). SSG production saw the most rapid decline from the 2000s, doing more to pull domestic production into the domestic market, and hence inflate prices, than any other cane segment. This is despite some signs of expansion in the large-scale sector as a result. The same is even true for millers who had hitherto invested the most in, and relied the most on SSG supply, and have suffered the greatest falls in throughput. This included mill closures (Entumeni), relocations (Glendale) and much larger than average falls in throughput (Felixton/Amatikulu).

The sugar industry has effectively acknowledged this reality through its commitment to the 'Transformation Fund'. The commitment is particularly commendable given the immense strain the industry is under. However, it is the view of this report that the particularities of the sugar industry offer greater opportunities to both incentivise safe-guarding SSG production in any potential down-scaling and encourage its expansion. The recommendations are not entirely novel: indeed they are based heavily on mechanisms that existed to spur SSG production in the first place, notably as a mechanism to contend with general contraction in production.

6.1 Price premiums to SSG cane and SSG sugar

As observed, prior to the SIA (2000), SSG production was heavily incentivised by categorically receiving 'A-pool' prices. This both raised returns to SSGs themselves through a higher cane-price, as well as incentivised mills to expand their SSG production in order to raise their effective share of the domestic market. This occurred in a period of general efforts to curb 'surplus' production headed for international sale. There is little doubt that the introduction of these mechanisms were central to SSGs original growth, and that their removal underpinned the critical decline in SSG numbers, attended by the closure of the much-vaunted FAF credit scheme.

The industry has, certainly, made efforts to ameliorate this with other price-support mechanisms. The SPF and VAT/diesel rebates have been important measures, and gained in relative importance

with the gradual fall in exported production (albeit in large part consequence to SSGs' initial decline). However, the displacement of production into the international market has eroded these measures severely, even with 'Transformation Fund' supplements.

Using available figures, an estimate of the extent of the difference, for the prices received by SSGs is provided in Table 20 below. Estimated gross revenue per ton of cane (assuming 11.2% RV) is only R400/ton. The SPF and diesel subsidy contributes around an extra 8%, and an extra 21% if all industry subsidy initiatives are added (even seed-cane schemes, which would not factor into the price). Yet, a domestic market price, without any further subsidy, would contribute an extra 62%; even excluding VAT & diesel rebates that come at little direct cost (in administration) to the industry itself.

The scope for raising SSG price support may even be greater: by providing SSGs with domestic direct retail prices in particular. It is difficult to estimate what the retail premiums on direct sugar are, and to what extent these are effectively occluded from the 'notional price'. Should differences pertain, it appears unlikely that any competition among millers (through rebates, discounts etc.) reflect in benefit to consumers (as retail prices are conditioned utmost by the dollar-based-reference-price tariff), or to growers (as these would be effectively 'ring-fenced' by the notional price). The worst-case scenario, is one where domestic prices are raised through tariff protection but captured by retailers (especially via competition with the Swazi industry) and resulting in diminished local demand.

There appears little economic reason, then, to allow prices to be effectively inflated by tariff protection on the basis of the sugar industry's national socio-economic contribution without also controlling margins for retailers. This is particularly true given the combined rise of the DBRP with the incursion of Swazi imports. Introducing controls on retail prices within South Africa might also have the added benefit of reducing the competitive advantage of Swazi imports (as payments to millers would find less differential from consumer prices). Controlling retail margins and categorically providing SSG production with higher retail level prices would further act to both raise returns to SSGs and provide millers with a competitive incentive to raise SSG production. Estimating a ringfence of domestic retail sales (estimated by assuming a fixed mill-retail spread of 25% on average retail prices) shows an even more substantial doubling of the standard price.

Table 20 Comparison of estimated differential in SSG pricing between non-subsidization, current subsidization measures and domestic market pricing scenarios

	Total Market (no subsidy)	Total market (SPF & rebate only)	Total market (all current subsidy)	Dom. market (no subsidy)	Direct market (no subsidy)
Notional price sugar R/ton	5,553.13	5,553.13	5,553.13	8,970.00	11,406.71
RV R/ton	3,573.41	3,573.41	3,574.41	5,773.76	7,342.22
R/ton of cane (RV% 11.2)	400.22	400.22	400.33	646.66	822.33
Subsidies		30	82.36		
SPF & rebate		30	30		
Price			27.27		
Transport			10.24		
Levies			3.59		
Seedcane			11.26		
Gross revenue	**393.08**	**423.08**	**475.55**	**635.11**	**822.33**
R/ton difference	-	30.00	82.47	242.03	429.25
% Difference	100%	108%	121%	162%	209%

Finally, the national contribution of the sugar industry via SSGs is often considered in regards to policy, but has failed to be reflected in marketing. This, no doubt, is owing to sugar being a largely undifferentiated commodity. However, the scope for branding sugar products as 'SSG' (proportional to millers' supply from SSGs) should also be considered as a potential avenue for further augmenting SSG incomes by enlisting consumers' willingness to pay premiums to specifically support poor producers. Such strategies have been utilized to some extent by 'FairTrade' and other ethical marketing labelling campaigns. According to FairTrade (2013), their premium in 2011 stood at $60

per ton of sugar, and it is not clear if this margin has been impacted by the recent fall in EU sugar prices. Nonetheless, presuming it to be static, this would translate to approximately R92 per ton of cane – exceeding all current support measures at around R82 per ton. This would further provide an incentive for millers to support SSG production, and privilege mills with strong SSG supply bases.

It has been observed that a benefit of the SPF and transformation subsidy is that they are non-conditional, that is, they apply irrespective of marketing conditions and hence are more significant stabilizers to SSG income. The weakness of this argument is a) that it would reduce returns to SSG production, b) ignores the relative stability of domestic market returns, c) does not carry a similar incentive to millers to expand SSG production and d) does not incentivise a prioritization of SSG supply under conditions of contraction. However, as stability is no doubt a real concern, available subsidies should be enacted if prices fall below historic domestic market returns. This would release the industry from subsidy except under exceptional conditions.

6.2 'Development costs' to be deducted as first charge from gross proceeds

While price premiums to SSGs were one of the strongest undercurrents to SSGs' original rapid growth, a second was millers' capacity to deduct the costs of 'development companies' from gross industrial proceeds. The system specifically encouraged millers to invest in large numbers of extension officers, and co-ordinate planting and transportation logistics to grow SSG production in a period of relative contraction. It came at the effective expense of mills without significant SSG supply, but particularly large-scale growers who complained that it provided mills with an avenue by which to artificially inflate their 'costs' and hence claims on total industry proceeds. This formed a key reason for the ultimate scrapping of the 'cost-based' DoP.

However, in the absence of such companies, SSG production has suffered considerably. SSGs are dependent on the provision of services by contractors over whom they have little bargaining power, and whose revenues are premised utmost on numbers of growers serviced, rather than the quality of those services provided. The plethora of independent contractors and growers, moreover, underpin serious obstacles to co-ordination that come at direct cost to all actors involved: with SSGs suffering poor planting and transport services, contractors stretched across wide service areas, and mills suffering difficulties in planning and maintaining throughput.

Millers have nonetheless made attempts to approach the methods of the 'development companies' to augment SSG supply, as evidenced by Operation Vuselele and the Akwanze Agricultural Fund. However, without additional resources to invest outside of anticipated increases in throughput, such schemes face difficult dilemmas that have prevented them from achieving comparable results; and provide disincentives to pursue them in the future. Typically, they have (variably) relied on credit mechanisms that raise SSG's risk (and accentuate invest/consume dilemmas), rely on growers to provide land in return for a proportion of gross proceeds (expose them to agricultural and marketing risks), entail high levels of sub-contracting that expose SSG to variable and often poor services (accentuating their lack of economies of scale), high managerial fees that can negate productivity premiums that ensue, or place additional burdens on SSGs to manage co-operative structures and conflicts of interest within them, including with traditional authorities.

The price support measures above alone would be a substantial incentive to millers to invest in expanding their share of SSG production, as doing so would augment their share of the domestic market. However, the upper limit on such investments would remain related to the premiums they receive from SSG production, and ultimately costs of expanding SSG production would need to be balanced against millers' wider competitive pressures. Alone, then, the mechanism could problematically both retain millers' 'default' interest in subcontracting logistics and coordination to for-profit bodies, and hence potentially come at the expense of SSG margins, or place SSGs in an institutionally dependant position to millers.

Deducting 'development' costs tied to the managing of logistics and provision of contractual services as a first charge prior to the DoP is defensible because such costs concern both growers (SSGs benefiting from enhanced services) and millers (benefitting from expanded throughput) and the transformation agenda of the industry as a whole. Most importantly, it would re-introduce incentives to maintain trained personnel and maintained equipment for planting, transport and co-ordination services, hence reducing the risk of efforts to transform cane supply and incentivise its pursuit. These would be key to forming a cost-based competitive floor in SSGs interests, against which other service providers would be judged. That much of the industry's own recent efforts in encouraging SSG supply have been premised on formalizing SSG/contractor relations further supports the argument.

However, doing so does raise the concern that such costs might be manipulated. Consequently, cost deductions should be provided at a maximum rate tied to the actual extent of SSG production (on a quality basis, e.g. tons RV) and which provide for depreciation, but not return on capital. This further would require maximum prices to be regularly reviewed and disseminated through grower structures and be open to industry audit. This would both inhibit potential manipulation by contractual service providers, and incentivise the provision of cost-competitive services.

It is further important to promote a competitive service provision among service-providing agencies. Costs of services should be available to be deducted not only by miller prospective 'development' companies, but by any industry-affiliated agency providing contractual services. This would include initiatives by grower organizations (such as SAFDA's proposed Farm Management Services body) and independent local contractors. The provision of services by multiple agencies would help enforce the price structure and promote competition based on quality of services. Miller and grower 'development companies' would establish competitive base-lines, upon which any local contractors would measure themselves against, by providing services available to any grower on request.

6.3 Rationalizing cane planting, harvesting and transport

While providing flexible and competitive contractor services for growers is integral, however, growers would need, at a minimum to commit to planting and harvesting schedules (irrespective of which service provider is utilized) to ensure such services could be provided in a cost-efficient manner. These commitments could be bolstered by a 'last resort' measure, which would include rights to a 'development company' to assume responsibility and payment for contractual services if a grower or independent contractor is unable to meet their commitments. The capacity to 'rationalize' thousands of small-scale growers, is daunting, but would be greatly ameliorated by co-ordinating the sort of cane plant-lease arrangements that, again, were important to the historic expansion of SSG production in the 1990s.

Recommendations 1 and 2 would provide a significant incentive to leverage this mechanism in a manner that would incentivise SSG expansion in co-ordinated fashion while retaining a reduced risk-profile for SSGs. Perhaps most importantly, this would provide a measure to substantially expand SSG production on the basis that resembles the 'vernacular' plant-lease arrangements that under-pinned SSGs rapid growth in the 1990s, without requiring onerous business plans, undertaking substantial debt, or requiring SSGs to plan for re-establishment over the better course of a decade. By these arrangements, SSGs allowed contractors to bear the cost of establishing cane (ploughing, planting, and fertilizer application) on their land, while allowing contractors to take the proceeds from a first cutting to cover the costs thereto. SSGs hence enjoyed the debt-less establishment of cane from which they could enjoy proceeds from subsequent ratoons, while contractors expanded their own client base.

Here, similarly, SSGs would bear an opportunity cost in the first year of planting, as proceeds of the first cutting would be captured by the contractual agency, including the bulk of quality premiums that would incentivise quality planting. In this year, SSGs may only receive only a fixed 'rental'

income, and a small share of 'net' proceeds, but would enjoy income from subsequent cuttings, and having established cane at no direct financial cost to themselves. The further benefit of such a system is that it reduces the burden of financial planning for-replanting on the part of the SSG: net proceeds from subsequent ratoons could be consumed entirely, and cane re-established by the renewal of such an arrangement. Millers or other contractor agencies might bear the initial risk planting, but as amoritized on the first cutting, it would greatly reduce the (potentially decade long) risk of holding an agricultural asset (cane roots) on SSG land. Those SSGs capable of saving for re-planting, however, would be able to do so on their own account, at the potential benefit of not surrendering premiums in the planting year. Additional benefits of such a model would be that SSGs would no longer be compelled (while still being free) to enter into often conflictual, risky and administratively consuming co-operative arrangements in order to (re-)establish cane production.

The importance of combining local market pricing, efficient planting services and flexibility in cane husbandry cane be illustrated in Table 20 below. Here yield achievements are divided into those historically garnered in the current regulatory dispensation (24 t/ha) and more optimistic (but still conservative) averages (47 t/ha). Each is further divided into a local market pricing scenario and a scenario where current prices are received and subsidised by existing mechanisms. Further, in each case a scenario is given where the full costs of planting are borne by the grower, as with new establishments, scenarios where only the costs of ratoon management are borne, which would correspond to growers investing in cane but unable to bear any labour commitments due to age and/or opportunity costs to the self or family members, and a third scenario where labour costs are removed, effectively presuming a full commitment of household labour.

We see that under conditions of SSG's historical yield achievements, the current level of subsidy would see SSGs make a loss when bearing the full costs of planting and ratoon management – an outcome particularly severe for elderly growers unable to mobilize household labour or commit their own. Here, only full household labour commitments would push returns into the positive, but only to R1,676/ha – a fraction of even a child support grant. Local market pricing would improve the returns under this scenario, but still would be less than the value of a child support grant per hectare. Under the higher yield scenario, however, local market pricing would provide sufficient return for both contractors and SSGs to share a R3,443/ha premium on a 'full-cost' quality planting. At such yields, fully costed services would provide significant returns, equal to nearly that achieved by full household labour commitments in a low yield scenario. To the capable grower, however, good yields, local market pricing, and full labour substitution would provide nearly double the returns. For growers with two hectares under cane, these returns would approximate a full old age pension.

Table 21 Estimation of returns to rain-fed SSGs under current levels of subsidy and local market pricing conditions, and under poor and good yield scenarios

	Rainfed - low yield						Rainfed - high yield					
Assumed RV%	11.20%						11.20%					
Assumed yield (t/ha)	24						47					
RV - Local Market (R/ton)	5,773.76						5,773.76					
RV – current (R/ton)	3,573.41						3,573.41					
	Current			Local market pricing			Current			Local market pricing		
Scenario	Planting - full cost	Ratoon – full cost	Ratoon-own labour	Planting - full cost	Ratoon – full cost	Ratoon-own labour	Planting - full cost	Ratoon – full cost	Ratoon-own labour	Planting - full cost	Ratoon – full cost	Ratoon-own labour
Gross income (R/ton)	471	471	471	635.11	635.11	635.11	471	471	471	635.11	635.11	635.11
Revenue from cane	400	400	400				400	400	400			
Subsidy	71	71	71				71	71	71			
Other Income (SPF, Rebates, etc)	30.00	30.00	30.00				30.00	30.00	30.00			
Transformation Intervention 1	27.27	27.27	27.27				27.27	27.27	27.27			
Transformation Intervention 3	10.24	10.24	10.24				10.24	10.24	10.24			
Transformation Intervention 5	3.59	3.59	3.59				3.59	3.59	3.59			
Operating costs (R/ton)	962.83	789.89	401.48	962.83	789.89	401.48	491.66	403.35	205.01	491.66	403.35	205.01
Harvesting (incl. contractors)	87.89	87.89		87.89	87.89		44.88	44.88		44.88	44.88	
Haulage and transport	239.97	239.97	239.97	239.97	239.97	239.97	122.54	122.54	122.54	122.54	122.54	122.54
Fertiliser	161.50	161.50	161.50	161.50	161.50	161.50	82.47	82.47	82.47	82.47	82.47	82.47
Chemicals	80.14	80.14		80.14	80.14		40.92	40.92		40.92	40.92	
Planting	172.94			172.94			88.31			88.31		
Sundry expenses	220.39	220.39		220.39	220.39		112.54	112.54		112.54	112.54	
Net R/ton	-491.51	-318.57	69.84	-327.72	-154.78	233.63	-20.34	67.97	266.31	143.45	231.76	430.10
R/1 ha	-11,796	-7,646	1,676	-7,865	-3,719	5,607	-488	1,631	6,391	3,443	5,562	10,322
R/2 ha	-23,593	-15,29	3,353	-15,731	-7,430	11,214	-976	3,263	12,783	6,886	11,124	20,645
R/3 ha	-35,389	-22,937	5,029	-23,596	-11,144	16,822	-1,464	4,894	19,175	10,328	16,687	30,967
R/4 ha	-47,185	-30,583	6,705	-31,462	-14,859	22,429	-1,952	6,525	25,566	13,771	22,249	41,290
R/5 ha	-58,981	-38,229	8,381	-39,327	-18,574	28,036	-2,441	8,157	31,957	17,214	27,811	51,612

A similar dynamic is evident in irrigated budgets, albeit with potential returns much higher. Here, under current pricing and subsidy conditions, an irrigated SSG with poor yields would make a loss of approximately R8,578/ha upon establishment, and a marginal R973/ha for a fully costed ratoon. However, even decent yields of 71 t/ha would witness a loss of approximately R293/ha upon establishment. Returns from good yield ratoon cuttings would be significant, at R9,257/ha fully costed and nearly R16,000/ha utilizing family labour alone. However, at local market pricing, these returns would be surpassed under even low yield conditions, and high yields would provide even more significant returns at approximately R23,700/ha and R30,400/ha respectively. Clearly, these returns would offer a stronger foundation for irrigated producers to face questions of how to re-establish cane, pay for group irrigation infrastructure, or surrender productivity premiums to project managers and debtors. Although at substantially different levels of returns, irrigated SSGs would enjoy far more latitude in either allowing quality-incentivised contractors to manage production entirely (enjoying a relatively passive income while pursuing other opportunities) or for skilled growers without other prospects to claim these from their own-labour – amounting in the cases of larger areas to approximate full-time job equivalents. At seven hectares, under good yield conditions, and utilizing largely family labour, a SSG would enjoy net returns of around R213,000.

Table 22 Estimation of returns to irrigated SSGs under current levels of subsidy and local market pricing conditions, and under poor and good yield scenarios

	Irrigated - low yield						Irrigated - higher yield					
Assumed RV%	12.50%						12.50%					
Assumed yield (t/ha)	55						71					
RV - Local Market	5,773.76						5,773.76					
RV - current	3,573.41						3,573.41					
	Current			Local market pricing			Current			Local market pricing		
Scenario	Planting - full cost	Ratoon - cost	Ratoon-own labour	Planting - full cost	Ratoon - cost	Ratoon-own labour	Planting - full cost	Ratoon - cost	Ratoon-own labour	Planting - full cost	Ratoon - cost	Ratoon-own labour
Gross income	518	518	518	722	722	722	518	518	518	722	722	722
Revenue from cane	447	447	447	722	722	722	447	447	447	722	722	722
Subsidy	71	71	71				71	71	71			
Other Income (SPF, Rebates, etc)	30	30	30				30	30	30			
Transformation Intervention 1	27	27	27				27	27	27			
Transformation Intervention 3	10	10	10				10	10	10			
Transformation Intervention 5	4	4	4				4	4	4			
Operating costs	674	500	378	674	500	378	522	387	293	522	387	293
Harvesting (incl. contractors)	42	42		42	42		33	33		33	33	
Haulage and transport	211	211	211	211	211	211	164	164	164	164	164	164
Fertiliser	90	90	90	90	90	90	69	69	69	69	69	69
Chemicals	70	70	70	70	70	70	54	54	54	54	54	54
Planting	174		-	174		-	135		-	135		-
Levies	7	7	7	7	7	7	6	6	6	6	6	6
Sundry expenses	80	80		80	80		62	62		62	62	
Net Per ton	-156	18	140	48	222	343	-4	130	225	200	334	429
1 ha	- 8,578	973	7,674	2,639	12,190	18,891	-293	9,257	15,958	14,187	23,737	30,438
2 ha	-17,156	1,946	15,348	5,278	24,380	37,782	-587	18,515	31,917	28,373	47,475	60,877
3 ha	-25,734	2,919	23,022	7,917	36,570	56,673	-880	27,772	47,875	42,560	71,212	91,315
4 ha	-34,312	3,892	30,696	10,556	48,760	75,564	-1,174	37,030	63,834	56,746	94,950	121,754
5 ha	-42,890	4,865	38,370	13,195	60,950	94,454	-1,467	46,287	79,792	70,933	118,687	152,192

6.4 Sugar-tax funds to subsidize 'green'-harvesting' for improved health and labour conditions in cane

A under-considered question in this report is the position of cane-labour. Indeed, as sugarcane labour is often highly casualized and vulnerable (often comprised of foreign migrants and women on both LSG and SSG farms) and not represented in the industry structure, the position of cane workers is a highly neglected aspect of sugarcane production in general. At the same-time, labour costs (both direct wages and overheads in sourcing/oversight) represent one of the most difficult areas for LSGs and SSGs. With SSGs almost categorically unable to pay minimum wages rates, the low returns and danger of work act as a major disincentive to local youth and others to seek casual employment in cane. For LSGs, while the level of compliance is unknown and historical tendencies for wage adjustment slow, barriers to productivity raising mechanization measures, and general cane-price pressures would certainly act as an incentive not to do so where possible or retrench workers - with 53% in a recent SACGA survey having claimed to have done so (Nicholson 2018). In both cases, this limits the local employment 'multipliers' in cane employment (Dubb 2016, Woodhouse & James, Visser & Ferrer 2015, O'Laughlin 2017, Lazzarini 2017).

Burning cane is consequently a wide-spread practice that generally reduces the cost of harvest, primarily by improved rates of cutting, including by the elimination of pests, but also contributes to soil degradation and is a considerable health and safety risk to workers directly, as well as to the air quality of those in the vicinity of cane production. Moreover, for SSGs in particular, cane-burning increases the risks of accidental and 'runaway' fires, whether actual or staged (for purposes of gaining preferential delivery access). For millers, burnt cane also improves the efficiency of crushing cane as there is less fibrous material and fewer propensities for breakdowns/stoppages (Bundaberg CaneGrowers N.D., Graham *et al* 2001, Dubb 2015, Muir *et al* 2009, Pierossi *et al* 2016).

An alternative to burning is manually or mechanically harvesting and topping 'green' (unburnt) cane. The leaves and tops of unburnt cane have several potential benefits. In the first instance, tops and

leaves can be left in the field to contribute to the maintenance of soil health (Graham *et al* 2001) and reduction in weeds and evaporation (Bundaberg CaneGrowers N.D). Secondly, in principle, sugarcane tops are potentially valuable as animal feeds. The FAO estimating that approximately 21 tons of cane are needed to generate sufficient tops to maintain 1 large livestock unit (LU); or approximately 2-3 LU per hectare given large-scale rain-fed yields (Naseeven N.D). For small-scale growers, for whom cane production often comes at the expense of grazing lands, the potential for sugarcane to contribute to livestock production is an under-researched area. Thirdly, Pierossi *et al* (2016) note that tops and leaves represent approximately a third of sugarcane weight but have the same energy content as the rest; consequently about a third of energy potential is not utilized. Tops represent about 2-5% of combined leaves and tops.

In general, but particularly in the absence of clear downstream processing of leaves and tops into other products (whether electricity or animal feeds), and an amendment to the RV pricing system this would imply, the prime barrier to 'green' harvesting remains the additional labour costs involved – whether direct in wages or indirect in loss of productivity premiums. It is not clear from this study whether the sale of tops for animal-feed manufacture, possibly by millers, would provide sufficient revenue to cover raised labour costs thereto.

Subsidizing 'green' cane, however, may provide another avenue to encourage this less-detrimental labour practice – as an unconditional end in itself, but also possibly encouraging a critical mass that other processing opportunities become more feasible. Even if not, however, incentives to green harvesting could be useful to encouraging on-farm synergies between cane and cattle production, a particular concern with SSGs.

The form of subsidy might occur within the industry should feed processing become durable, for example including 'tops' in the RV system of payment, but another avenue may be to utilize the revenues generated from the HPL, particularly owing to the health and environmental benefits of reducing annual cane burning. To date, the HPL has generated approximately, R2.5bn in revenue; assuming even a 20% allocation of R500m toward the subsidization of green cane, and assuming even a total uptake for 19mt of cane, this would amount to an approximate R26.32 per ton subsidy, highly significant given existing estimates of rainfed labour costs of around R140/ton on LSG farms, and nearly equal the SPF/rebate subsidies on SSG farms (Dlamini *et al* 2018). Presuming a low SSG yield of 24 t/ha, this would translate to R631/ha, and form a significant subsidy to a (CPI adjusted) 2010 labour-cost estimate of R3,101.56 per ratooned hectare (Dubb 2015).

6.5 Integrating SSG support with Land-Reform policy

The sugar industry has been renowned for its pro-active approach to land reform since its inception. This included, most notably, the redistribution of millers' estate lands to large and medium-scale black growers, the establishment of the Inkezo Land Company to facilitate 'willing-buyer, willing-seller' market-based land redistribution, and on-going efforts to effect large restitution claims, often complex, protracted and involving many beneficiaries without prejudicing land under cane.

Less commonly discussed, however, has been how these land reform initiatives have come at the expense of visions of expanding SSG production, and the difficulties faced by the industry in adapting to an ever-changing field of wider land reform policy. Land reform initiatives largely occurred in the aftermath of the reform of the DoP and the consolidation of the two-pools pricing system. This undermined millers' incentive in advancing SSG cane, as well as the economic sustainability of SSG production itself. Consequently, the movement to establish independent black commercial farmers was borne of a dual pressure to conform to government's emerging vision of establishing economically specialized and independent black agriculturalists amidst the mounting decline of SSG production. The movement to the PLAS programme has largely undermined these initiatives, and indeed heralded the closure of Inkezo. In the meanwhile, although the extent is not clear, on-going SSG support mechanisms are being utilized to support the incomes of many beneficiaries of effected

but often complex and conflictual restitution schemes, most of whom are not directly involved in cane production.

Should the mechanisms to support SSGs be adopted, these would form a significant boon to existing restitution schemes and incentivise millers to advance the resolution of outstanding claims. In this sense, a SSG-focused support programme would go some way to inverting the current standing of restitution as a threat to cane supply of mills towards a differential opportunity. If SSG production receives domestic prices, and supports are given to administrating the cane production on SSG land, the accelerated settlement of restitution would offer enhanced incomes for beneficiaries and bolster the sugar incomes of millers whose cane supply has been most 'transformed'.

In regard to redistribution, it is clear that, in the absence of preferential support to SSGs, that the thrust of policy would need to remain on encouraging the establishment of large-scale black growers in rainfed areas, although in irrigated areas smaller farms (by area) are far more economical. This is owing largely to the reality that returns to cane are simply too small in rainfed areas to replace the combined multiple livelihoods strategies SSGs draw upon in order to survive, except at substantial levels of scale. Moreover, even where large tracts of land are acquired, the substantial levels of capital required and technical and managerial knowledge necessary to run a large-scale farm place beneficiaries in a position of considerable risk. This is particularly true of SSGs, many whom are elderly and under-educated, and accentuated by a general context of consolidation of large-scale cane production and the drop-out of many large-scale commercial farmers (both 'white' and NFG). While one of the central constraints to SSG production is land area, a defining feature of their 'smallness', achieving 'economic' scales through redistributive land reform, targeting under-capacitated SSGs for effective relocation from their existing livelihood networks to manage large commercial enterprises under unfavourable economic conditions would be a recipe for disaster, and no doubt require large levels of on-going government funding to maintain at all. Even with capable black commercial farmers, the now suspended RADP-programme has been a necessary intervention to maintain commercial production.

However, should the previous recommendations be accepted, the shift in proceeds to SSGs and the incentives to expand SSG production that accompany them would provide ample opportunity to leverage existing land reform structures, the industry's own institutional experiences, and the uneven capacities of SSGs themselves, to advance a broad-based redistributive policy. Rather than envisioning a 'shock' shift in scale and location, the PLAS programme could be leveraged to acquire areas bordering and/or in close proximity to existing SSG supply areas, and road infrastructure extended with government funding. New lands in proximity to SSG supply areas could be focused on five-fold principles:

1) Providing land at median levels for settlement to community lineages with little or no access to land, wherein land for cropping (and differentially sugarcane) would be included;
2) Providing land at median levels for settlement with households with insufficient lands for unemployed children and (independently) landless parents, wherein land for cropping (and differentially sugarcane) would be included;
3) Providing larger plots of land for settlement to 'accumulating' growers facing barriers to expansion on their current plots, with the expectation that portions of their existing lands would be surrendered to neighbours at a given ratio (e.g. 1.5 hectares of new land for the surrender of 1 hectare of existing land);
4) Providing areas to be committed to the communal grazing for livestock of new residents;
5) Providing direct permanent rights of settlement and use to new residents, alienable by sale to other communal area residents, but not utilized as security for mortgages or other debt-instruments;

A simple illustration of the basic principle is in Figure 59. The benefits of such a policy would be several fold. In the first instance, it would obviate substantial risks associated with 'sudden' management of large tracts of land against existing multiple livelihood activities and the social networks in which they are embedded.

Secondly, while planting sugarcane would be an option for beneficiaries, it would not be a necessity. This would allow sugarcane production to expand at distances to mills that remain economical, but if not lessen the pressures on existing sugarcane lands posed by other cropping and livestock activities. 'Rationalization' of existing SSG cane lands would hence proceed according to the shifting capacities of SSGs themselves.

Thirdly, it would reduce feelings of relative neglect or prejudice, as new lands would be provided at levels that already pertain, and to those who are relatively (and in rural areas, hence, especially) deprived, and connect with established social mores of needs-based allocation.

Fourth, this would obviate the risk of manipulation by traditional authorities with substantial tracts of land already.

Fifth, and relatedly, it would provide an avenue for nascent 'accumulators' committed to cane to expand their land under cane while reducing pressure on less advantaged neighbours – similarly enabled to expand their land undercane.

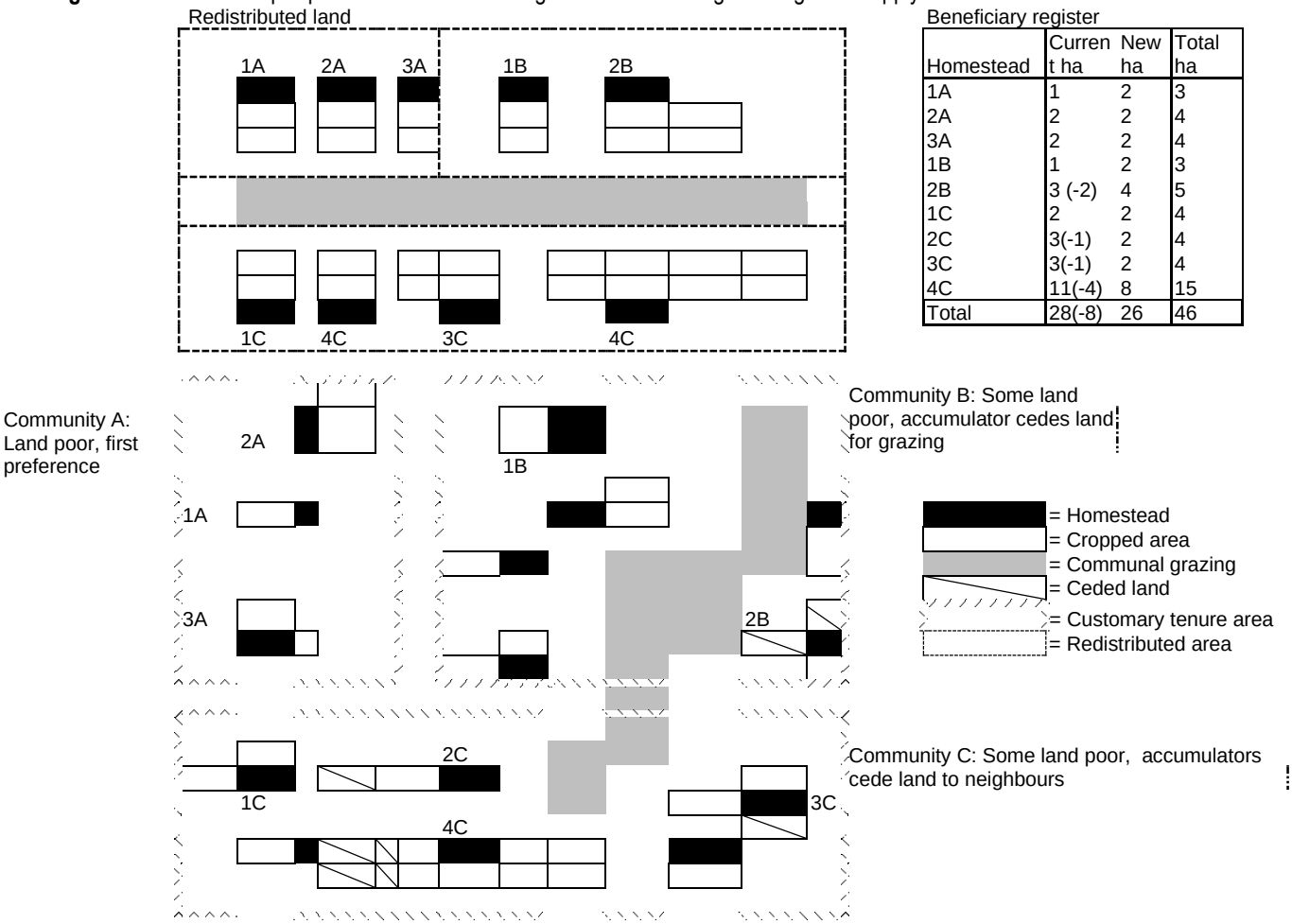
Sixth, the close relationship between relative accumulation in cane and contracting would encourage such accumulators to also provide a base for contracting services to other settled growers, particularly if new lands were at distances judged uneconomical by miller and grower 'development' companies.

Seventh, as there would be no condition for lands to be placed undercane, the failure of sugar in a particular area would not be tied to rights to land.

Eighth, the simultaneous acceptance for 'vernacular' markets in land with proscription of using land for debt-financing would allow households to differentially 'exit/reduce' their involvement in agriculture if desirable to the benefit of those who are more invested, without alienating redistributed lands under the circumstances of broader economic/livelihood shocks. The state would hence remain the effective 'owner' of redistributed lands without encumbering market relations or security of tenure.

Ninth, the policy would not come at the expense of either restitution projects or willing-buyer, willing-seller –like policies oriented towards the expansion of capable large-scale black growers.

Figure 59 Illustration of pro-poor land redistribution agenda for areas neighbouring SSG supply areas

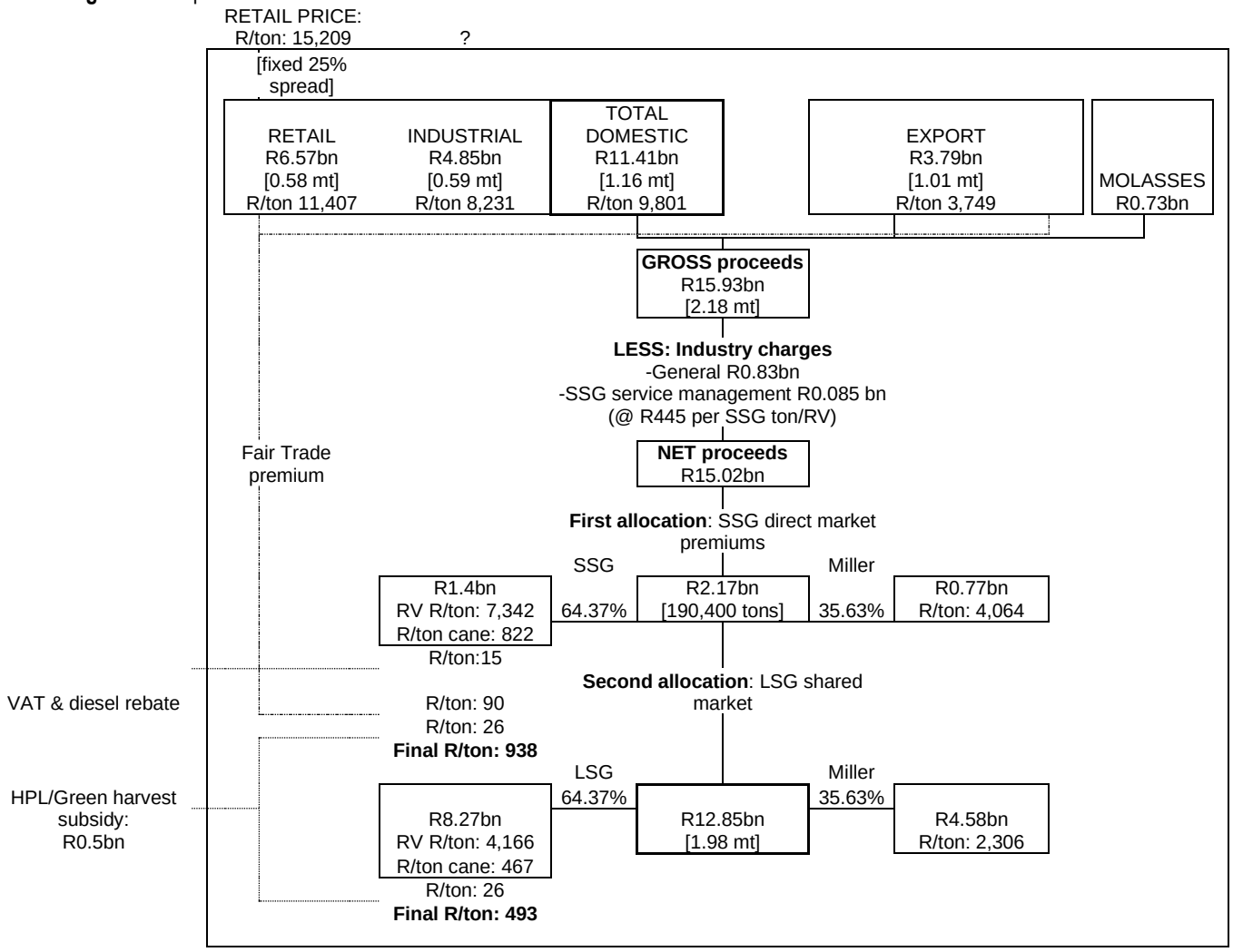


6.6 The estimated employment benefits of a SSG – centred reform of the sugar industry

It is perhaps worthwhile to review, however schematically, the potential employment benefits of these proposals.

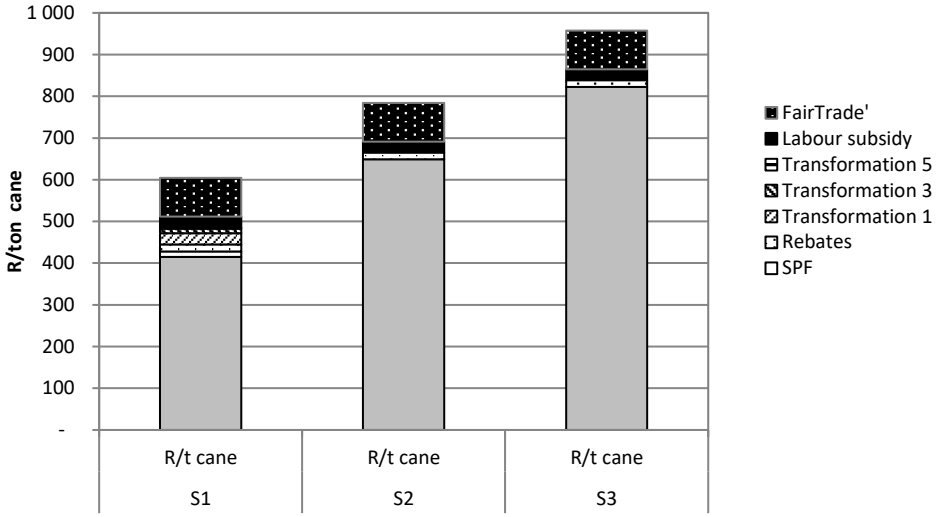
Figure 60 illustrates the how the Division of Proceeds would be altered to accommodate the new pricing regime most optimistically, that is, inclusive of a fixed mill-retail price spread of 25%. This alone, it should be noted, would increase RV prices significantly, including for LSGs. Here, similar to the 'cost-based' division of proceeds, a provision of deductions for SSG service management is provided as a 'first-charge' deduction from gross proceeds(here estimated at approximately R445/ton of SSG RV), along with other SASA and industry obligations. Then, payments on SSG sugar are allocated at returns from direct sale rates, and allocated between millers and growers according to the DoP. The remainder of proceeds are then allocated according to the DoP between large-scale growers and millers. SSG and LSG prices are further inflated by the proposed HPL 'green' harvest subsidy, with SSGs also continue to receive their VAT and diesel rebate, and potential 'FairTrade' premiums. They do not receive subsidy from the SPF or the 'Transformation Fund'.

Figure 60 Proposed accelerated transformation SSG-centred Division of Proceeds



The combination of all measures can be illustrated in Figure 61, below. Here we can see that in the first scenario (S1) that the current RV and subsidy structure would greatly be enhanced by the labour subsidy and FairTrade premium, if pursued. Gains to around R600/ton, however, would be surpassed in Scenario 2 (S2) by local market RV pricing alone, particularly if augmented by labour subsidy, rebates and FairTrade premium, to near R800/ ton. Direct marketing prices, however, undoubtedly garner the most substantial return, of over R800/ton on RV prices alone, and up to R938 with the rebates, labour subsidy and FairTrade premium.

Figure 61 Comparison of returns to cane under different RV and subsidy scenarios

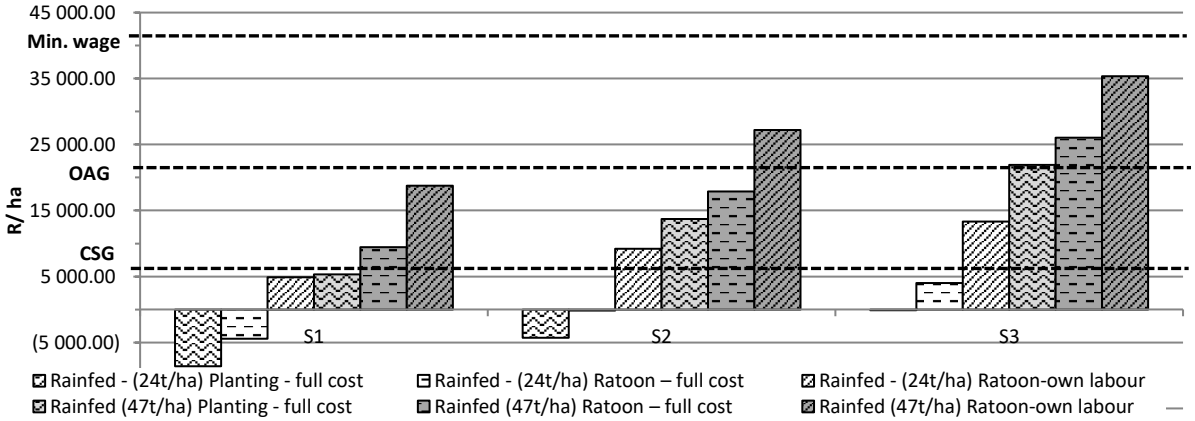


*Assumes an RV composition of 11.2%

It is important to try and place these differentials into the broad perspective of SSG incomes. As observed, the diversity of production regimes and shifting rainfall conditions makes generalization difficult, but in Figure 62 and Figure 63 estimate net returns for rain-fed and irrigated SSGs by integrating these different price scenarios, and using the cost estimates utilized previously. Also illustrated are the thresholds for annual values of the Child Support Grant, Old Age Grant, and recent R3,500/month minimum wage.

Under S3, the potential benefit to SSGs is, of course, most significant. Presuming decent yields, a rainfed SSG contracting out labour entirely would still garner more than the value of an additional old-age grant for each hectare placed under production. Given that SSG households are often old, and dependant on grants for food and other purchases, this is highly significant. However, also clear is that a capable and knowledgeable SSG that provided their own-labour commitments, would be able to achieve minimum wage returns at around every 1.19ha harvested. Low yields dramatically change the circumstance, however, with fully contracted ratoons only approaching the value of a child-support grant, and full labour commitments only returning the value of just over two child support grants. As rainfed growers have historically exhibited a median land size of around two hectares, however, these values all carry the potential of at least doubling for the majority of rainfed SSGs.

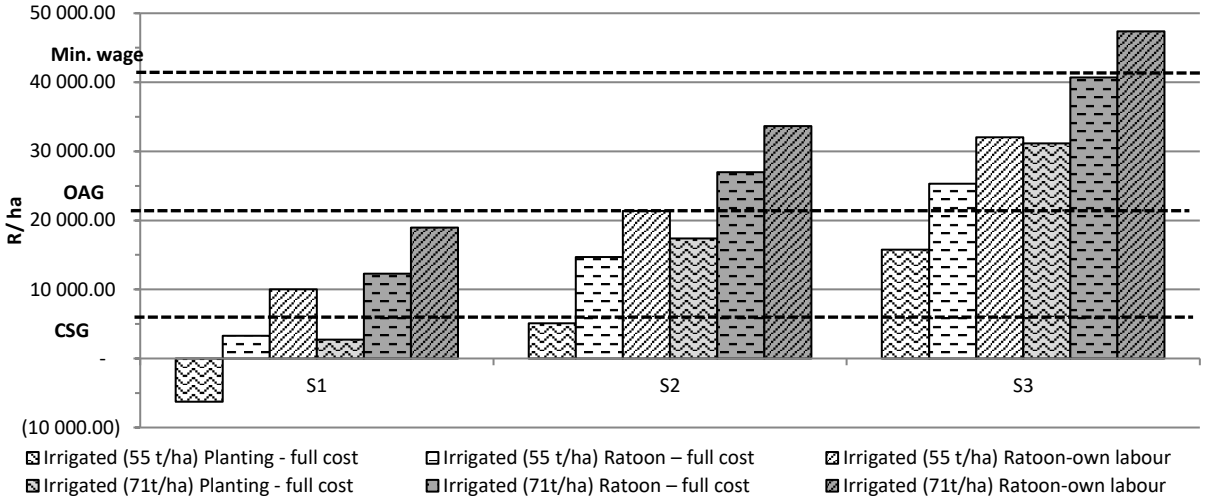
Figure 62 Estimated net returns to rain-fed SSGs under differential yield, pricing and labour commitment scenarios



*Co-ordinates of Old-age grant (OAG), Child support grant (CSG) and minimum wage not exact.
** Assumed OAG = R1,780 per month (R21,360 p.a), CSG = R430 (R 5,160 p.a), and minimum wage = R3,500 per month (R42,000 p.a)

Irrigated SSGs, of course, exhibit even more substantial returns. Under S3, a grower fully paying and contracting for all labour processes would nearly achieve returns equalling the minimum wage per hectare, even under only medium yield conditions, and surpassing it if they adopted labour-processes directly. As irrigated growers historically carried an average 5ha, these returns would together garner the income of a significant full-time job of over R200,000.

Figure 63 Estimated net returns to irrigated SSGs under differential yield, pricing and labour commitment scenarios



*Co-ordinates of Old-age grant (OAG), Child support grant (CSG) and minimum wage not exact.
** Assumed OAG = R1,780 per month (R21,360 p.a), CSG = R430 (R 5,160 p.a), and minimum wage = R3,500 per month (R42,000 p.a)

In these most optimistic scenarios, SSG returns are assumed to be inflated by own-labour commitments substituting for the bulk of labour purchases. This is not a currently representative assumption, however increased returns may encourage it becoming more common. Here, net returns given full own-labour commitments are also utilized for the purposes of establishing a broad estimate of the extent to which SSG production would contribute to employment under the raised price conditions of S3.

In Table 22 estimated prospective net returns under high and low yield circumstances for rainfed and irrigated growers are divided by the minimum wage. Resulting 'minimum wage equivalents' provide some estimation of the value available to be distributed, although in practice may remain within the SSG household. Nonetheless, as employment is generally low in the communal areas, and in SSG households, this remains significant. Here we can see that net returns would garner a rainfed and irrigated growers an average of 0.28-0.75 and 0.68-1 minimum wage equivalents per hectare. Although not directly comparable, this appears, at worst, competitive with SASA's estimate of 133 permanent jobs and 210 seasonal jobs per 1,000ha of large-scale cane, i.e. around 0.343 jobs per hectare. In per SSG terms, (assuming a median two hectares under cane), S3 would garner rainfed growers with approximately 0.56-1.5 minimum wage equivalents, with irrigated SSG (assuming a median five hectares under cane) garnering an even greater 3.39-5.01 in minimum wage equivalents. Depending on yield conditions, S3 would hence broadly provide a range of 13,000-31,000 minimum wage equivalents given aggregate SSG figures (although this does not account for 'group' schemes under SSG codes). Moreover, if SSG numbers doubled (near their historical peak), this would amount to the potential addition of between 13,-31,000 minimum wage equivalents.

Table 23 Broad estimate of minimum wage equivalents generated by Scenario 3 pricing under medium and low yield conditions for rain-fed and irrigated SSGs.

			Rainfed		Irrigated	
N		Numbers of growers registered	17,779		905	
Item	Estimation		Low yield	Medium yield	Low yield	Medium yield
A	S3, own-labour	Net return (R/ha)	13,343	35,364	32,035	47,389
B	A X (8/9)	less establishment year (R/ha)	11,860	31,435	28,476	42,124
C	B/42,000	Estimated min wage equivalent p/ha	0.28	0.75	0.68	1.00
D	B X est. median land size	Net return per grower	23,721	62,869	142,378	210,619
E	C X median land size	Estimated min wage equivalent per grower	0.56	1.50	3.39	5.01
F	E X N	Total estimated min wage equivalents	10,041	26,613	3,068	4,538
G	F X 2	Potential	20,082	53,226	6,136	9,077

.

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