

INDONESIA AND SUGAR SELF SUFFICIENCY



MAY 2023

MECAS (23)07



International Sugar Organization



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ABSTRACT

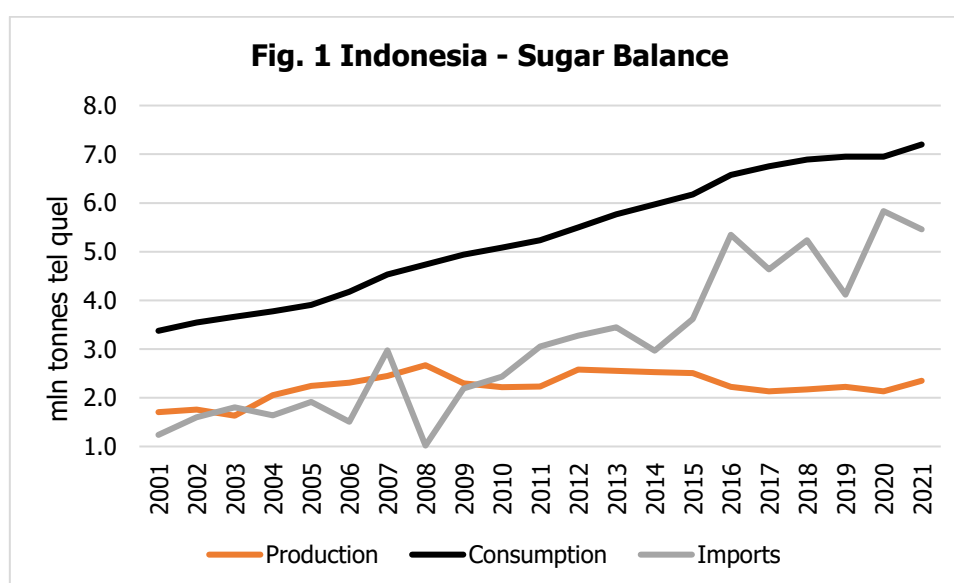
Indonesia's sugar market is characterized by strongly growing consumption, static local production and consequent rising imports, making the nation a major raw sugar importer. At the same time, the local sugar industry is reliant on smallholder growers and a milling sector dominated by state-run units constructed during the Dutch colonial period, which has been unable so far to boost production levels. Its plantation (high colour) white sugar production is reserved for local direct consumption (known as the wet market). The government has long harbored the ambition to be self-sufficient in sugar. Indonesia's President, in November 2022, announced a plan to become self-sufficient in sugar by 2030. Each previous attempt at sugar self-sufficiency has fallen short. This time, the self-sufficiency ambition would be met by expanding cane area under state-run sugar mills from 180,000ha to 700,000ha, not just in the traditional sugar heartland of Java, but also in other regions and islands. The plan has been entrusted to the state-owned plantation firm PT Perkebunan Nusantara X (PTPN X) and state-owned sugar miller PT Sinergi Gula Nusantara (PT SGN). This study delves into the key characteristics and drivers of Indonesia's sugar industry and market, highlighting key issues and challenges. Projections of local consumption, production and imports are developed using a scenario approach. A key conclusion is that self-sufficiency is very much a moving target with consumption of sugar set to continue growing, while a significant boost to local sugar production can only be achieved with a combination of area expansion, productivity gains via high yielding varieties, improved agronomic management and post-harvest technology, as well as significant investment to improve sugar mill efficiency and sugar yields.

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INTRODUCTION

Indonesia’s sugar market is characterized by strongly growing consumption, static local production and consequent rising imports (Fig. 1). Indeed, Indonesia is one of the world’s major raw sugar importers, taking over 5 mln tonnes annually (12% of world trade in raw sugar) to its large port refineries to be converted into high quality white sugar for the country’s growing food & beverages sector. At the same time, Indonesia’s local sugar industry – characterized by smallholder growers and a milling sector dominated by state-run mills constructed during the Dutch colonial period, have been unable so far to boost production levels. Its plantation (high colour) white sugar production is reserved for local direct consumption (known as the wet market). The government has long harbored the ambition to become self-sufficient in sugar. Most recently, Indonesia’s President, in November 2022, announced a plan to become self-sufficient in sugar by 2030. Is this at all possible given consumption is growing rapidly and given the cane growing and milling sectors need heavy investment? Furthermore, each previous attempt at sugar self-sufficiency has fallen short in the past. The President’s announcement suggested self-sufficiency in plantation white sugar for direct consumption would be achieved by 2028, and self-sufficiency including industrial sugar, used by the food & beverage, pharmacy, and MSG industries, would be achieved by 2030. The self-sufficiency ambition would be met by expanding cane area under state-run sugar mills to 700,000 ha from 180,000 ha, not just in the traditional sugar heartland of Java, but also in other regions and islands. This would take total cane acreage in the country to around 1 mln ha if successful. The plan has been entrusted to the state-owned plantation firm PT Perkebunan Nusantara X (PTPN X) and state-owned sugar miller PT Sinergi Gula Nusantara (PT SGN) – encompassing 36 sugar mills- to ensure government control over the expansion.



Achieving self-sufficiency could have far-reaching effects on the world sugar market, so the objective of this study is to review recent developments in Indonesia’s sugar market and to identify and examine the key drivers. This study is divided into four

parts. In Part 1, recent developments and the current situation are reviewed to identify salient features and key economic and policy drivers for Indonesia's sugarcane growing, cane milling, and raw sugar refining sectors. Key technical efficiency parameters in both the cane and milling sector are identified. The domestic sugar market is examined and assessed for both direct consumption sugar and refined sugar for the food & beverage industry. Attention is also placed on the recent dynamics in import volumes and key origins. In Part 2, the relatively minor contribution to industry revenue of sugar by-product diversification and value adding is highlighted. In part 3, prospects for the 2022/23 and 2023/24 seasons are examined in terms of production, consumption, and import demand. This is followed, in Part 4, by a longer-term assessment of industry prospects over the remainder of this decade. Sugar consumption prospects are evaluated, and a scenario approach is utilised to illustrate potential production levels under differing assumptions of land expansion and cane and sugar productivity gains. The associated degree to which self-sufficiency can be achieved and imports reduced are then presented, before the study's conclusions are set out.

PART 1: INDONESIA'S SUGAR INDUSTRY

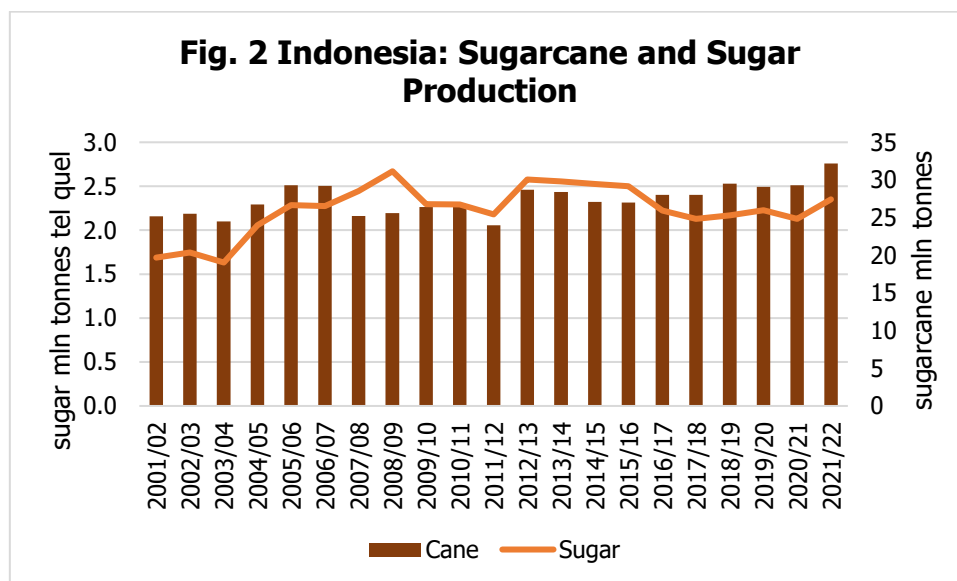
(1) OVERVIEW

Indonesia's sugar policy¹ classifies domestic sugar into three categories: plantation white sugar for home consumption (**GKP**-gula kristal putih), raw sugar for domestic sugar refineries (**GKM** - gula kristal mentah), and refined sugar for the local food and beverage industry (**GKR** - gula kristal rafinasi).

Ministry of Industry (MOI) regulation No. 3/2021 states that sugar mills can only produce plantation white sugar (GKP) and refineries can only produce refined sugar (GKR). Sugar mills use domestically produced sugarcane as the raw material while refineries source imported raw sugar (GKM). Since domestic demand for sugar far outpaces local production, significant volumes of raw sugar can also be imported by local sugar mills for off-crop refining. The government tightly controls the timing, import volume, and which companies receive import quotas. Additionally, if refined sugar with certain specifications is unavailable in the local market, food and beverage companies may be permitted to import.

As shown in Fig. 2, Indonesia's cane and sugar production has moved sideways since the mid-2000s. Over the three-year period 2019/20 to 2021/22, cane production averaged 30.2 mln tonnes and sugar production averaged 2.24 mln tonnes.

¹ Presidential Decree Number 57 of 2004 concerning Determination of Sugar as Goods Under Control



Based on this, Indonesia’s sugar industry has not expanded in recent years and has consequently fallen further behind aggregate consumption. Many issues continue to plague the national sugar industry, ranging from aging factories, reduced sugarcane fields, farm inefficiency and low productivity. More often than not, since 2016, Indonesia’s sugar imports have exceeded 5 mln tonnes and have almost reached 6 mln tonnes in 2020 – Fig. 3.



There is strict separation between household demand (through the wet market) – reserved for domestic sugar production and sold minimally at the government’s reference price – and the industrial sugar market - primarily food and beverage companies – which is supplied by 11 refining companies who source imported raw sugar under quota. Despite the intended separation up to 300,000 tonnes of refined sugar can “leak” into the wet market. Support for the domestic industry is provided by strict control of imports through quotas and import tariffs. Local white cane

sugar, which ranges in production volume from 2 to 2.2 mln tonnes/year, is allocated entirely to direct household consumption.

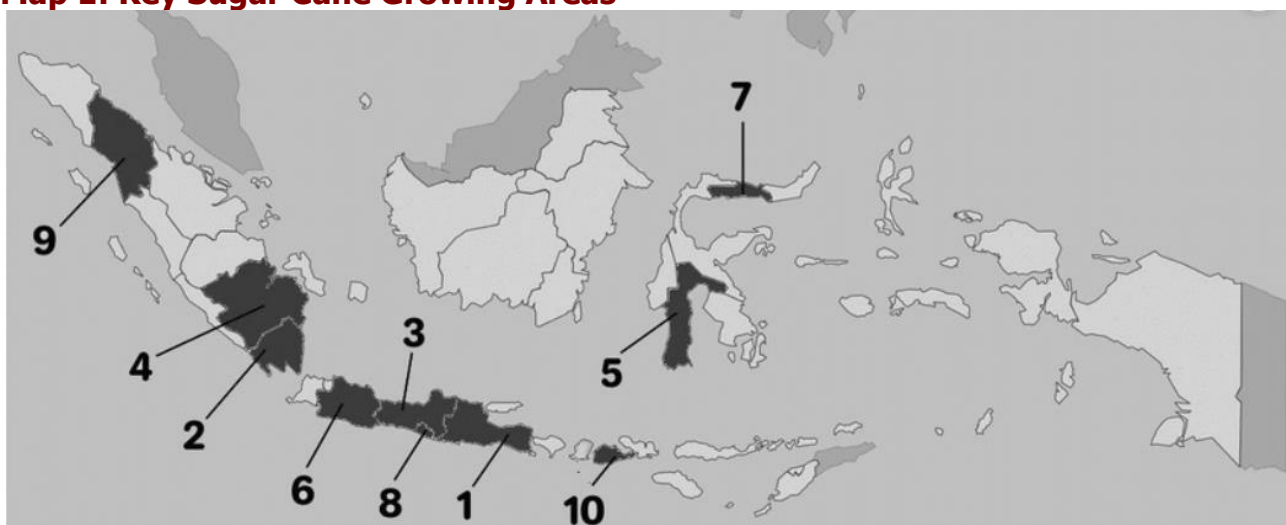
If refined sugar with certain specifications is unavailable in the industrial market, food and beverage companies can import directly– also by quota. Whenever deemed necessary, the government also awards import quotas to allow sugar mills to import raw sugar to fill idle capacity. The government has established a floor price for plantation white sugar– to support the local industry, and in 2018 it also set a maximum retail price – to ensure a fair price to consumers.

(2) CANEGROWING

(I) SUGARCANE GROWING AREAS

Indonesia's cane industry can be split into two groups: government-owned and private mills. The vast majority of mills and land under cane are located on Java. Almost all of these mills are old, state-owned and are mainly supplied by small scale growers, who are independent from the mill. In contrast, newer privately-owned mills are located on outer islands and are mainly plantation-based with the mills controlling their own cane supply. The newer, more efficient private mills perform better than state-owned mills.

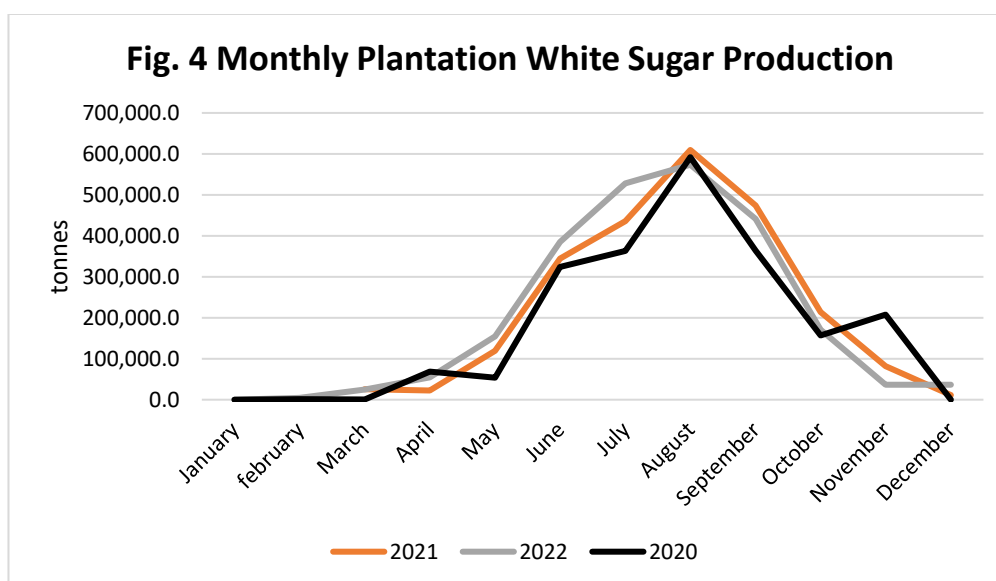
Map 1: Key Sugar Cane Growing Areas



Map 1 shows the distribution of sugarcane plantations across Indonesia in 2018 (adapted from Statistics Indonesia 2018). The numbers on the map show the provincial rank of plantation areas in Indonesia from the largest. 1. East Java (196,897 ha/ 47.4%), 2. Lampung (109,837 ha/ 26.4%), 3. Central Java (36,852 ha/ 8.9%), 4. South Sumatra (21,609 ha/ 5.2%), 5. South Sulawesi (14,636 ha/ 3.5%), 6. West Java (14,232 ha/ 3.4%), 7. Gorontalo (8,242 ha/ 2%)8. Special Region of Yogyakarta (6,805 ha/ 1.6%)9. North Sumatra (6,196 ha/ 1.5%)10. West Nusa Tenggara (357 ha/ 0.1%). After 2018, private companies expanded their sugarcane plantations in South East Sulawesi and East Nusa Tenggara.

In 2021, the Indonesian Statistics Agency (BPS) reported that smallholder farmers (as many as 1.3 mln farm families) account for approximately 56% of total sugarcane area, while the rest is managed by state-owned and private companies. Smallholder farmers' area is on the decline due to rapid infrastructure development on Java Island as well as competition from other food crops that can provide farmers higher margins or quicker returns, such as corn and paddy rice. Private companies' area expansion which reaches 5.98% outside of Java and 6.17% on Java Island offset the decline in smallholders' area. Smallholder farmers supply sugarcane to both state-owned and private sugar mills.

Indonesian mills benefit from a long crushing season of more than 200 days, typically crushing from May to November – see Fig. 4.



The APTRI² (Asosiasi Petani Tebu Rakyat Indonesia) or the Indonesian People's Sugar Cane Farmers Association is an organization of sugarcane farmers that assists farmers in strengthening their bargaining position against sugar mills.

Major state-owned sugar companies include PTPN II, PTPN VII, PTPN IX, PTPN X, PTPN XI, PTPN XII and PTPN XIV, these were all subsidiaries of PTPN Group Holding company, but are now under state-owned sugar miller PT Sinergi Gula Nusantara (PT SGN)³ (see later discussion). Land area under own cane plantation is around 64,000 ha while farmer area supplying their mills is around 116,000 ha, bringing total cane area related to PT SGN to 180,000 ha – see table 1. PTPN II, VII, XIV have the major land concession. They are outside Java. PTPN IX, X and XI are on Java. Another state owned enterprise is PT Rajawali Nusantara Indonesia RNI with a cane area of 51,500 ha.

² <https://www.aptri.or.id/>

³ <https://sinergigula.com/index.php/profile/>

**Table 1: Cane Area under PT Sinergi Gula Nusantara
(PTPN Group) January 2023**

Description	Area under cane (Ha)
PTPN II	
TS	7,927.00
TR	3.00
TS + TR	7,930.00
PTPN VII	
TS	18,584.55
TR	3,234.55
TS + TR	21,819.10
PTPN IX	
TS	2,142.68
TR	8,489.31
TS + TR	10,631.99
PTPN X	
TS	4,858.73
TR	48,222.47
TS + TR	53,081.20
PTPN XI	
TS	9,072.23
TR	52,662.34
TS + TR	61,734.57
PTPN XII	
TS	10,687.84
TR	1,447.59
TS + TR	12,135.43
PTPN XIV	
TS	10,697.70
TR	2,066.31
TS + TR	12,764.01
PT SINERGI GULA NUSANTARA (TOTAL AREA)	
TS	63,970.73
TR	116,125.57
TS + TR	180,096.30

TS – own cane.

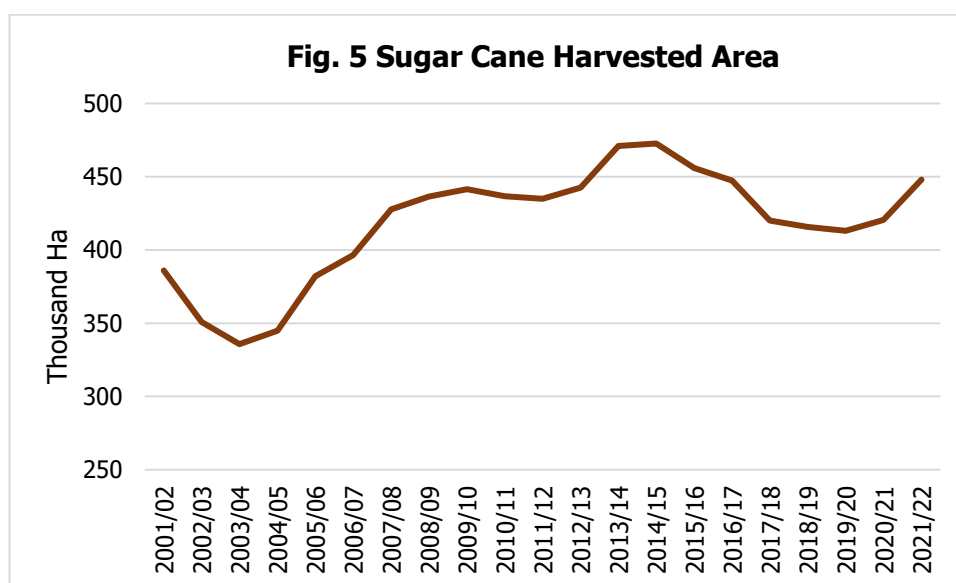
TR – farmer cane

Source: AGI

Indonesia's cane area expanded steadily from the early 2000's from 336,000 ha to a peak of 471,000 ha in the mid-2010s before shrinking over the next 5 years, back to 413,000 ha – Fig. 5. The decline in sugarcane area reflects the fact that the majority of sugarcane fields in Indonesia are owned by smallholder farmers, with 95% of sugar cane fields in Java falling into this category. The highly-fractured nature of ownership across the sector makes it susceptible to land conversion as

farmers seek out higher earning crops, particularly as land prices continue on an upward trajectory. Moreover, regional development across Java, the epicentre of sugarcane production given its land suitability, has seen swathes of agricultural land transformed into industrial and residential areas.

However, more recently, cane area has resumed an expansionary phase, returning to 448,000ha in 2020/21. With private company expansion, harvested area in 2022/23 is estimated to have increased to 488,000 ha and in 2023/24 was anticipated to continue increasing to 490,000 ha, thanks to area expansion in Sulawesi and Sumatra where new mills have been constructed. By January 2023, the AGI reported cane area had attained 500,000 ha.



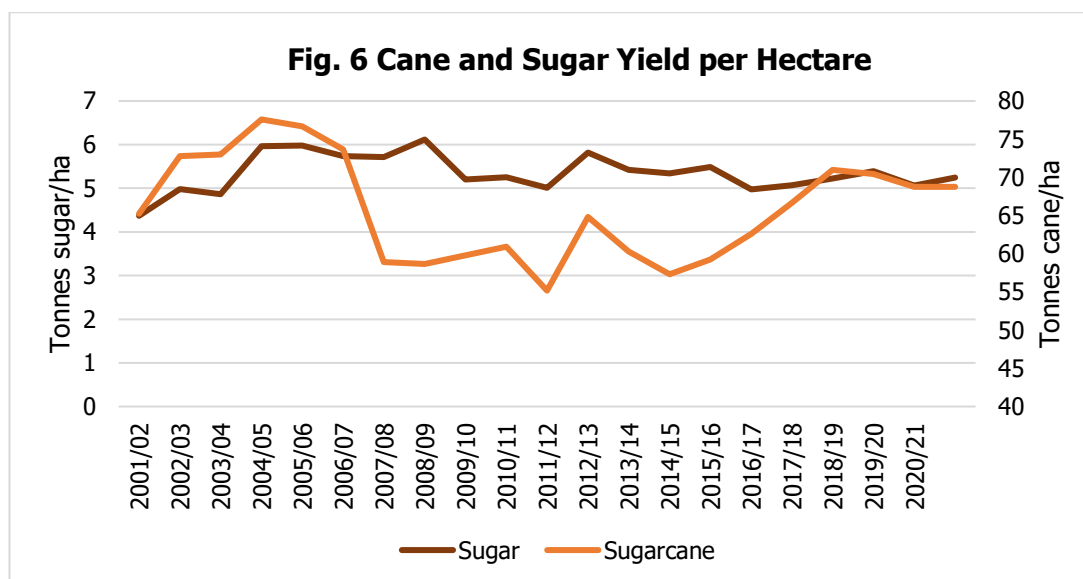
Presently, approximately 56% of sugarcane harvested area is located on Java Island, with Lampung Province in Sumatra accounting for an additional 30%.

(II) CANE AND SUGAR YIELDS

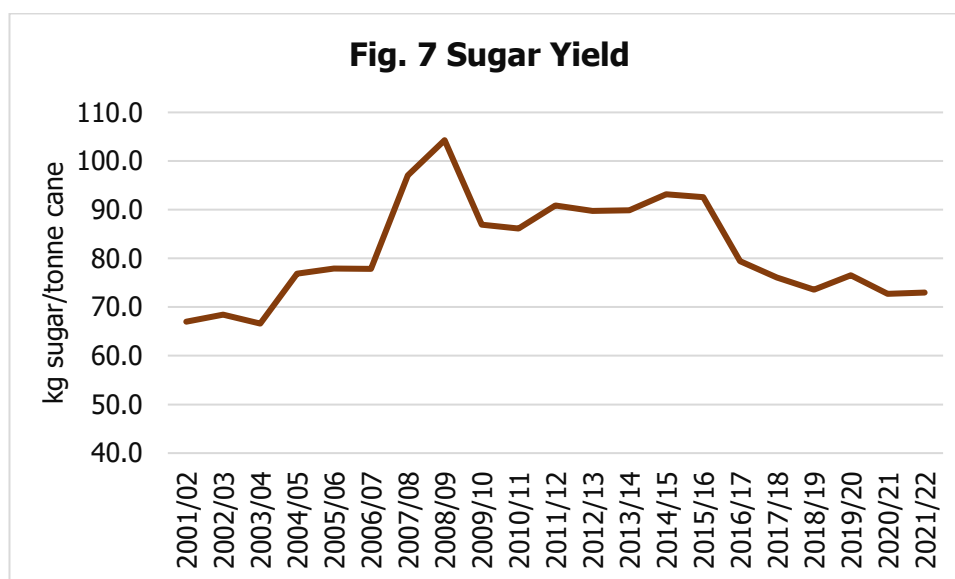
In Indonesia, sugarcane is grouped into three types based on harvest time: early harvest, middle harvest, and late harvest. The early cane harvest is May–June, the middle harvest is July–August, and the late harvest is September–October. The ideal proportion for a sugar mill is 30% early cane, 40% middle cane, and 30% late cane.

Indonesia typically achieves around 70 tonnes of cane/ha, which is low compared to other key producers including Brazil, India and Australia, where yields reach 75-90 tonnes/ha. The lower yields are due in part to Indonesia's agro-climatic conditions which are not optimal for cane growth and sugar accumulation as tropical conditions tends to inhibit sucrose formation in cane. As can be seen in Fig. 6, cane yields in the past have slumped to as low as 55 tonnes/ha because most of the farms use labour intensive methods with a minimum mechanisation system. Importantly, Indonesia's cane yields have not shown any improvement against the

level seen 20 years ago. Cane productivity is a crucial issue for the sector which, without significant improvement, will have no choice but to boost land under cane in order to increase cane production and sugar to attain self-sufficiency.



Sugar content in cane has fallen in the last eight years and recently has ranged between 71-74 kg/tonne of cane, see Fig. 7. In 2021/22 the industry produced 2.35 mln tonnes of sugar from 32.2 mln tonnes of cane returning a sucrose yield of just 7.3%. This compares unfavourably with the 10-14% achieved in Brazil, India, Thailand and Australia. Improving sugar content in cane therefore remains an avenue for improving industry productivity. Sugar recovery not only is due to sugar content in cane as impacted by agronomic conditions, cane husbandry and cane variety, it also is driven by mill efficiency and technology. Many of Indonesia’s mills are old and inefficient – as will be discussed below.



(III) CANE PAYMENT

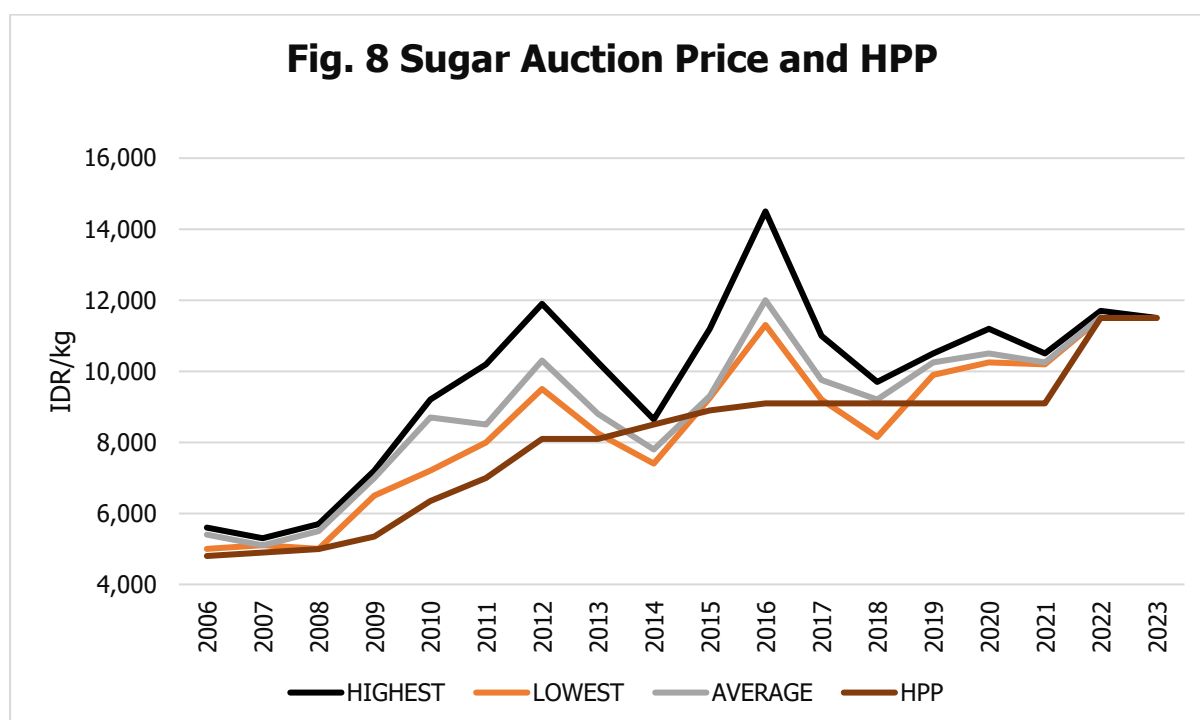
There is no payment for cane in monetary terms, but instead a sharing of sugar production between miller and grower. Almost all of the cane delivered to the state owned PTPN factories is farmers' cane. Generally, the Division of Proceeds (DOP) is 66% to the grower, 34% to the processor. The Government sets a floor price for the farmer's share of the sugar each year, which is meant to cover average costs plus a 10% margin – the Harga Pokok Produksi (**HPP**). A new minimum buying price for farmers' sugar was set as of May 2021 (prior to the 2021/22 milling season at IDR10,500/kg. This was agreed by the PTPN and the RNI Group (both state owned companies) together with the APTRI (Sugar Cane Farmers Association) and endorsed by Ministry of Trade.

The National Executive Board of the Indonesian Sugar Cane Farmers Association (DPN APTRI) urged the government early in 2022 to revise the HPP and the maximum retail price (HET – Harga Eceran) of farmers' sugar (plantation white sugar for the wet market), which had not increased for six years⁴. The HPP for farmers' sugar was IDR 9,100/kg and the associated HET was IDR 12,500 per kg. Growers argued that the HPP was well below the cost of production (which was now around IDR 11,000/kg). The APTRI recommended to the government to set the HPP at IDR 11,500/kg.

The HPP used to be established by the Ministry of Trade each April before the milling season begins. Since the President established the National Food Agency or Bapanas (NFA) in early 2022, the decision of HPP shifted from the Ministry of Trade to NFA and the latest reference price (according to Joint Letter Of NFA and Director General Domestic Trade of MOT, No : 65.1/PANGAN/06/2022, dated 10 June 2022,) was IDR11,500/kg, up from IDR9,100/kg. Furthermore, the Government retail reference price (now HAP, superseding the HET/ceiling price) was IDR13,500/kg.

The evolution of auction prices as against the HPP is shown in Fig.8. The auction is normally done by the sugar milling company every two weeks. For the PTPN group (encompassing the 36 sugar mills owned by government), the auction is done by KPBN, their trading company. The buyers are the big distribution companies, mostly private. Most farmer sugar (that is, the farmer's share of sugar produced at the mill) is bought by the infamous 7 samurai, a group of traders that control most of the country's distribution and retail networks. The size of each auction is normally more than 1,000 tonnes. For the farmers sugar, the auctions are normally done by their commercial business unit under the association of cane farmers. The advantage the farmers have over the factories is that they sell their sugar exempt from VAT.

⁴ [SugarCane Farmers Urge Government to Increase Farmers' Sugar Prices | Republika Online...](https://ekonomi.republika.co.id/berita//r80jbr383/petani-tebu-desak-pemerintah-naikkan-harga-gula-petani)
<https://ekonomi.republika.co.id/berita//r80jbr383/petani-tebu-desak-pemerintah-naikkan-harga-gula-petani>



All sugar is packed in 50kg sacks. The distributors who buy the factory or farmers sugar either transport the sugar directly to wholesalers or retailers (wet market), or in some cases ship to packaging facilities where machines repack the sugar into 1kg and 2 kg packs. Transport costs are borne either by the distributor or by the wholesaler.

The private sector factories, which source up to 80% of processed cane from mill-owned land, sell their sugar to the market via selected distributors who are invited to submit closed tender bids for a fixed quantity of sugar. The selected distributors/wholesalers then pass on the transport and associated costs from the factory warehouse to the retailers. Some sugar factories package sugar in 1kg and 2 kg packs and sell this directly to the retailers.

Table 2: Sugar Reference Prices

Year	HPP Harga Dasar	Auction Price (Harga Lelang)	Retail Price (Harga Eceran)		
			4 cities	34 cities	Average
2009	5,350	7,056	-	-	8,205
2010	6,350	8,478	-	-	10,502
2011	7,000	8,191	-	-	9,981
2012	8,100	9,707	-	-	11,513
2013	8,100	8,605	-	-	11,510
2014	8,500	8,360	10,276	-	-
2015	8,900	9,842	11,528	-	-
2016	9,100	10,663	13,057	13,194	-
2017	9,100	10,850	12,967	13,178	-
2018	9,100	10,628	12,995	13,160	-

2019	9,100	10,290	13,081	13,357	-
2020	9,100	10,630	13,065	13,350	-
2021	9,100	10,631	13,003	13,351	-
2022	11,500	11,586	13,806	14,323	-

Source: AGI

(3) SUGAR MILLING SECTOR

(I) MILLERS

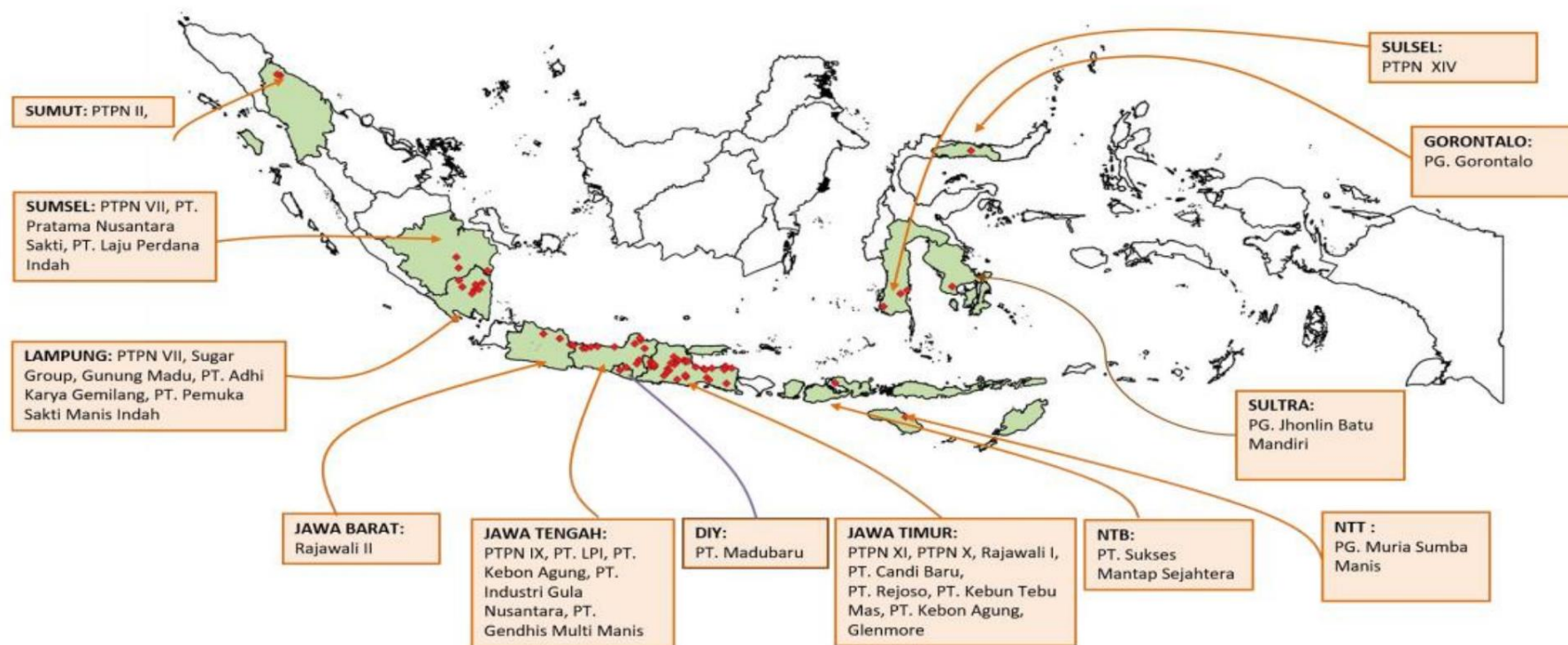
Eighteen companies own 62 cane mills in Indonesia, of which 43 are state-owned and 19 are private. Map 2 shows the geographic spread of the mills. The major sugar milling groups are shown in table 3. The Indonesian Sugar Association⁵ (AGI), represents sugar millers.

Many state-owned mills were built during the Dutch colonial era and approximately 37 out of 43 are over 100 years old, with low rates of productivity. The industry's capacity expansion in recent years has come from the 19 privately owned mills of which 7 mills have been built since 2015, with installed capacity ranging from 8,000 to 12,000 tonnes of cane per day (TCD). During the same period, due to aging machinery and low efficiency, 12 state-owned sugar mills on Java Island closed.

⁵ <https://asosiasigulaindonesia.org/>

Map 2: Major Sugar Factories of Indonesia, 2020

Major Sugar Factories of Indonesia, 2020



Source: Ministry of Agriculture, 2020

Table 3: Major Sugar Groups

Sugar Company	Area (Ha)
JAVA :	
1. PT. Sinergi Gula Nusantara (SGN) Regional Jawa (SOE)	145,320
2. PT Rajawali Nusantara Indonesia RNI (SOE)	
- PT Rajawali-1	28,639
- PT Rajawali-2	17,590
- PT Candi Baru	5,255
3. PT. Madu Baru	5,936
4. PT. Kebon Agung	40,222
5. PT. Industri Gula Nusantara	3,619
6. PT. LPI (PG Pakis Baru)	6,017
7. PT. Gendhis Multi Manis	6,107
8. PT. Kebun Tebu Mas	20,057
9. PT. Redjoso Manis Indo	16,667
Total State-Owned Enterprises Java	196,804
Private companies	98,625
Total Java	295,428
OUTSIDE JAVA:	
10. PT. Sinergi Gula Nusantara (SGN) Regional Sumatra (SOE)	41,401
11. PT. Gunung Madu Plantation	29,210
12. PT. Sugar Group Companies	63,653
13. PT. PG Gorontalo	8,483
14. PT. Pemuka Sakti Manis Indah	24,400
15. PT. LPI (PG Komerling)	13,614
16. PT. Sukses Mantap Sejahtera	5,174
17. PT. Adhi Karya Gemilang	14,817
18. PT. Pratama Nusantara Sakti	7,810
19. PT. Muria Sumba Manis	2,583
20. PT. Prima Alam Gemilang	3,034
Total State Owned Enterprises Outside Java	41,401
Private Companies	172,778
Total Outside Java	214,179
Total State-Owned Enterprises - Indonesia	244,312
Total Private Companies - Indonesia	265,295
GRAND TOTAL INDONESIA	509,608

Source: Perusahaan-perusahaan gula (diolah di Ditjenbun, 2023)

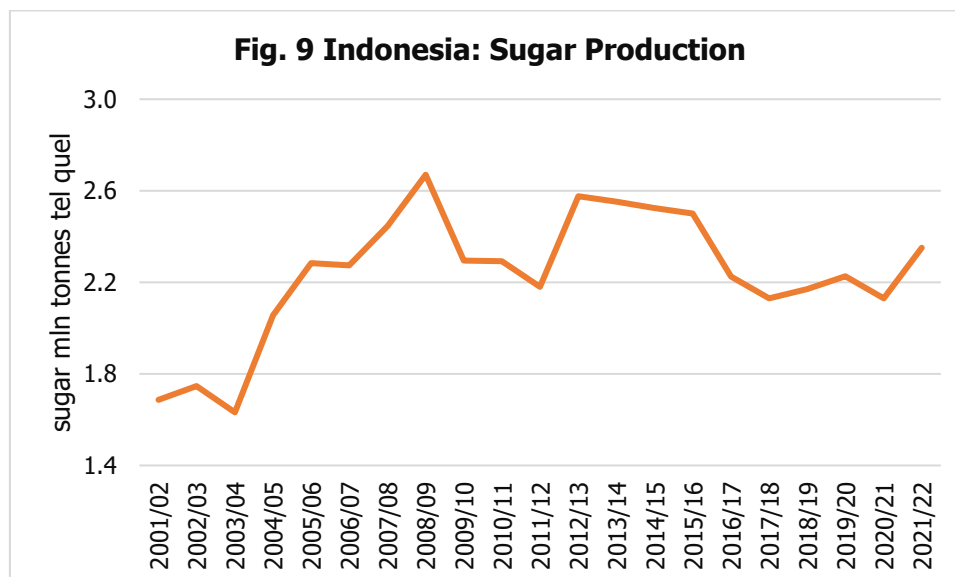
The 62 sugar mills are estimated to have an installed capacity of 316,950 TCD. Trade house Czarnikow suggests annual milling capacity is 51 mln tonnes of cane. Sugar mills have an average capacity of 3,900 TCD per factory.

Throughput is considerably lower at government-owned mills compared to the larger private mills. The private and newer mills are much larger, averaging 8,000 TCD compared with 3,000 TCD for government-owned mills, allowing them to benefit from economies of scale. Furthermore, processing costs, such as energy, are much higher for government owned mills.

In 2022, only **59** mills operated, of which **41** are state owned and **18** were private. Several state-owned mills closed down that year due to lack of cane supply while others are under rehabilitation or regrouping. For the 2023 season, 3-4 more state-owned mills are likely to operate with improved cane supply.

(II) SUGAR PRODUCTION

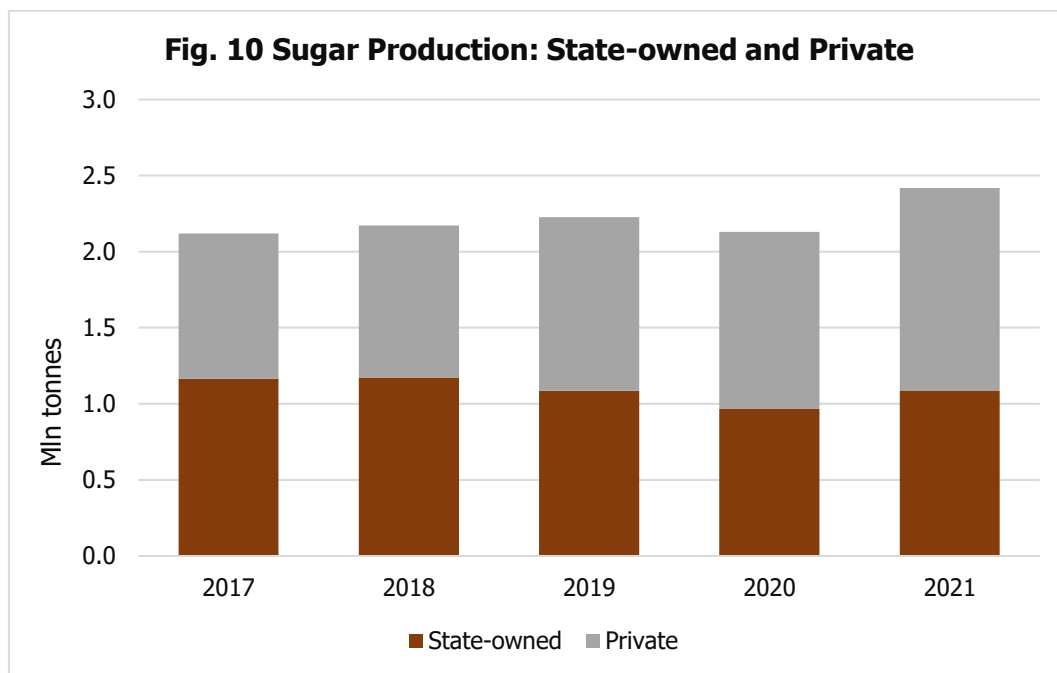
Indonesia's production of plantation white sugar⁶ has only exceeded 2.6 mln tonnes once over the past 2 decades and the production capacity of existing sugar factories has been relatively stagnant with an average production output for the last 5 years of around 2.2 mln tonnes per year, see Fig. 9.



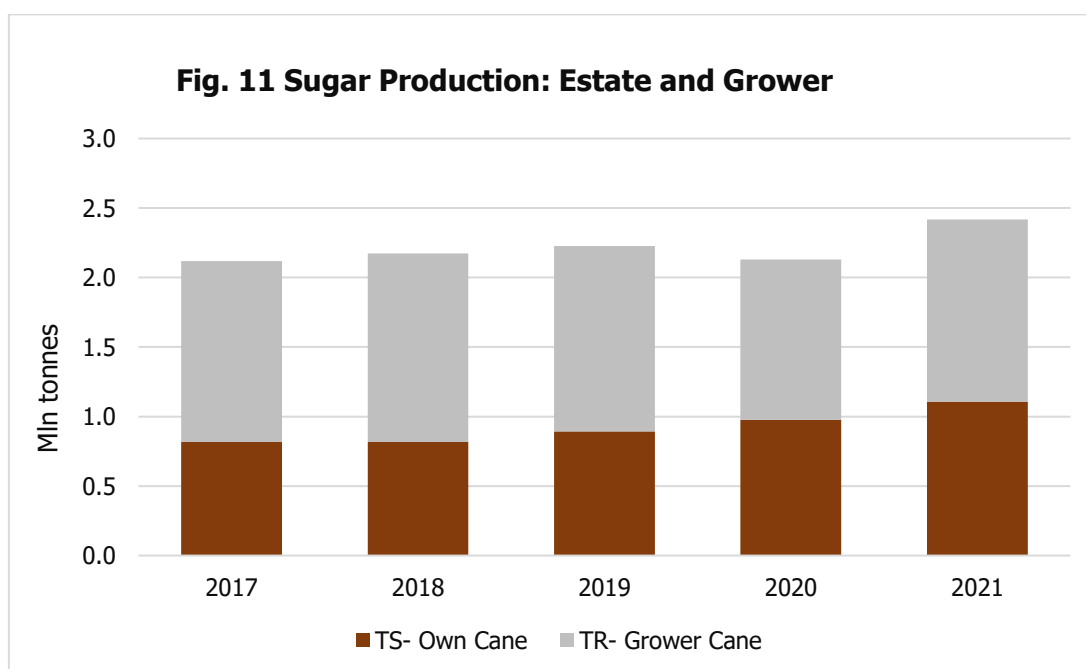
The key dynamics within the milling sector relate to a number of binary factors: own cane vs grower cane; Java vs out of Java; State-owned vs private; and new vs old sugar mills. The share of sugar produced by state-owned mills has contracted over recent years, falling to under 50% in 2021, see Fig. 10.

⁶ Sweet indo lampung and Sungai Budi are both producing refined sugar as well.

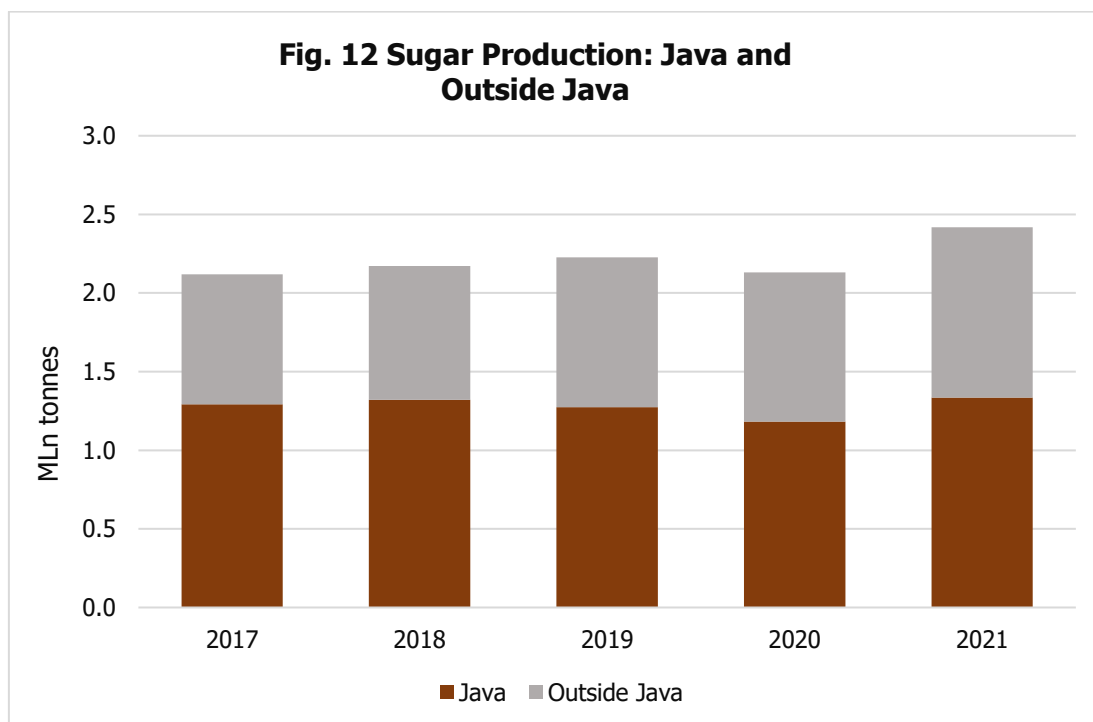
The contribution of state-owned sugar mills has declined as private companies, with more efficient machinery and technology, expand production. In addition, the state-owned companies' ownership of the sugarcane plantation is decreasing. During the period of 2016 to 2021, production of the state-owned companies declined by 4.33% per annum while private companies' production grew by 5.99% per annum. In 2021, state-owned sugar mills represented 45% of total national production, a first uptick in three years, see - Fig. 10.



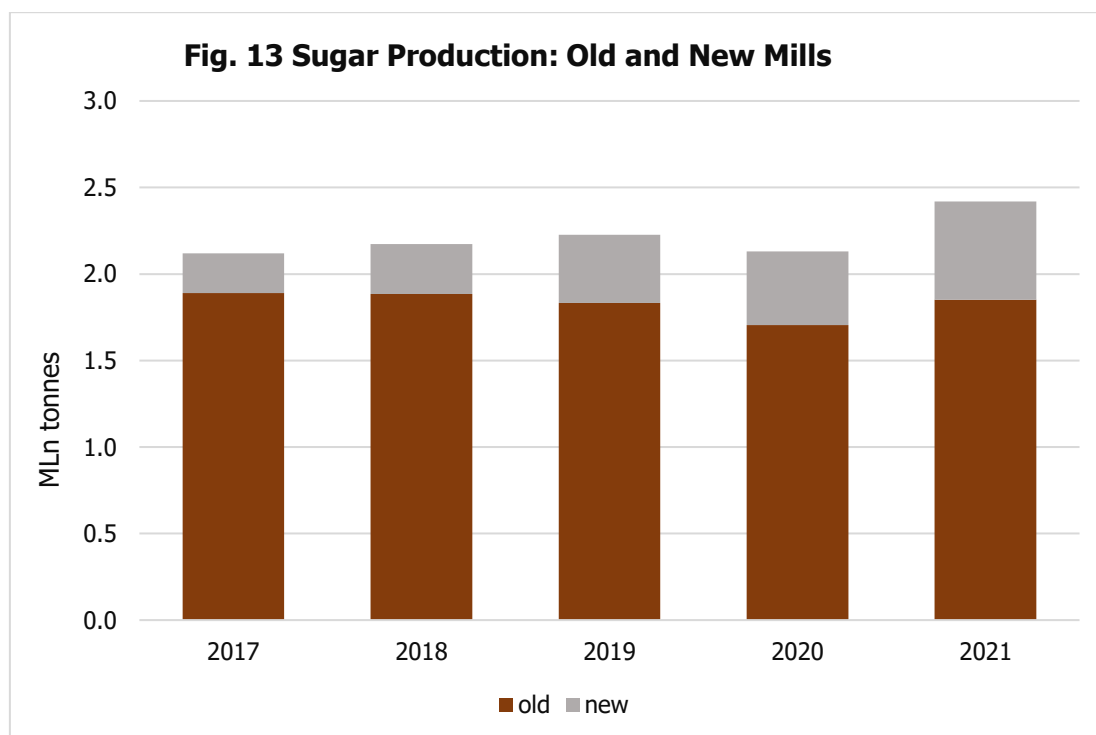
At the same time, the volume and share of private mill own cane in sugar production has been growing, reaching 46% in 2021 – Fig. 11



Java’s importance to national sugar production is also waning, falling from over 60% to 55% in 2021, see Fig. 12. Java’s industry is characterised by old state-owned mills, all supplied by small growers.

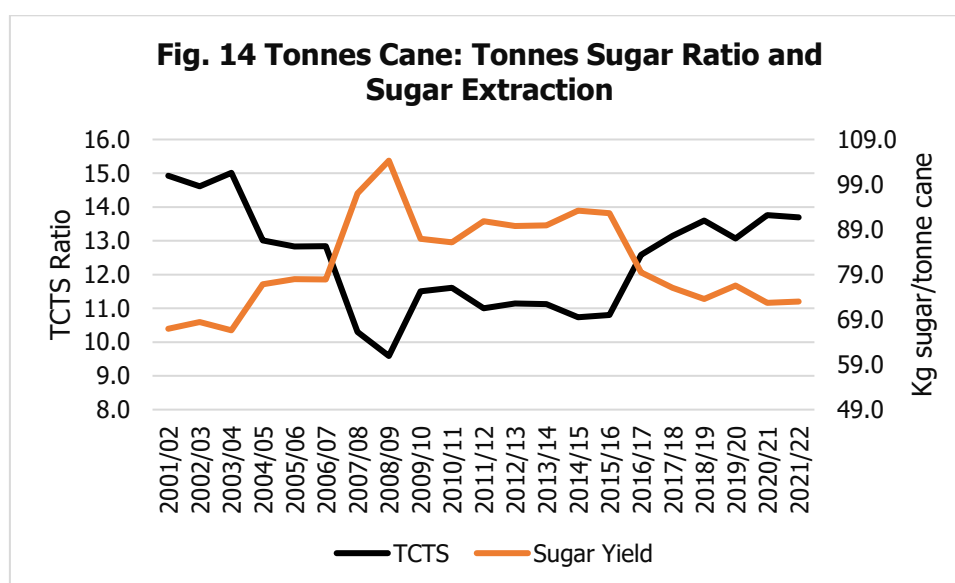


Finally, the share of old mills - which still make up the bulk of the milling sector – has fallen from 90% in 2017 to 76% in 2021, see Fig. 13.



(III) CANE QUALITY AND FACTORY EFFICIENCY

Historically, Indonesia’s sugar extraction rate had been in line with global averages and, in 2008/09, reached 104 kg of sugar/tonne of cane. In the subsequent years to 2015/16 sugar extraction declined, to between 79kg and 93 kg. The extraction rate then crept lower still and since 2018/19 has remained around 73kg-74kg, see Fig. 14. Cane quality and sucrose extraction can be summarised by considering the performance benchmark of the tonnes of cane required per tonne of sugar (TCTS). The ratio had ranged between 10 and 11.6 during 2008/09 to 2015/16 but has since risen to average close to 13 to 13.8 TCTS.



Sugar yields are considerably lower for state-owned mills. While tropical conditions tend to inhibit sucrose formation in cane across the country, the older mills lose a larger quantity of sucrose in the sugar production process than the private sector mills. In general, recovery rates are low compared to top cane producing countries because government-owned mills drag down the average. To improve efficiency at government-owned mills would require substantial investment in milling operations. Average sugar yield (rendement) of 7.3% is low compared to Thailand, which has 57 sugar mills and a sugar yield of 11.3%.

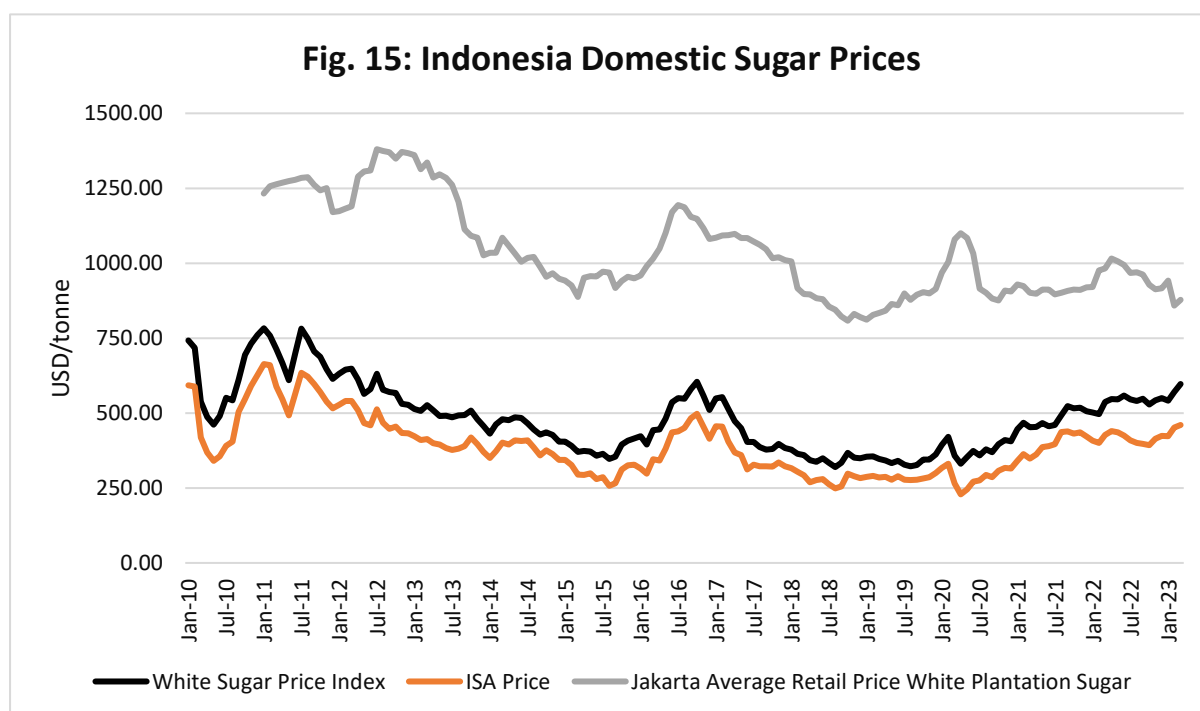
(4) DOMESTIC SUGAR PRICE

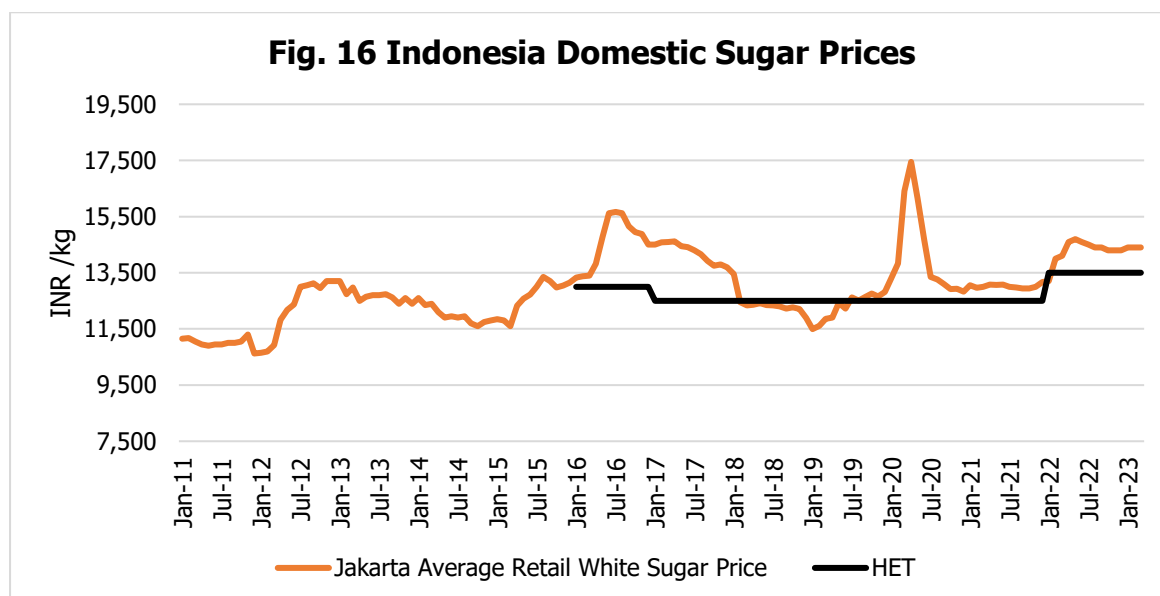
Domestically-produced plantation white sugar trades at a premium to refined sugar. Furthermore, regional prices can vary considerably given the size of the country and the inherent logistical difficulties. Indonesian retail refined sugar price is well above the world benchmarks – see Fig. 15 – but at the same time the world white sugar price index displays an 80% positive correlation with Indonesia’s monthly retail prices.

As noted in the previous section, the government establishes a **plantation white sugar floor price (HPP)** at a level to encourage domestic sugar cane production, presently it is set at IDR11,500/kg (equivalent to USD 0.29/lb), see Fig. 16.

The MOT issued regulation 96/2018 “**Farmer Level Purchase and Consumer Level Selling Reference Prices**” on September 19, 2018. Reference prices are intended to ensure availability and price stability for a range of agricultural products for both producers and consumers, as per Presidential decree 71/2015 on essential commodities. Soon after, in October 2018, the MOT issued an additional regulation establishing a Maximum Retail Price (Harga Eceran Tertinggi, **HET**) for several commodities, including sugar (**Minister of Trade Decision No 58 Year 2018**). More recently, the MOT issued regulation 7/2020 regarding “Farmer Level Purchase and Consumer Level Selling Reference Prices” on 5th February 2020. The new regulation maintained the reference prices for sugar as previously stipulated, i.e. Minimum Buying Price for Farmer’s Sugar at IDR 9.100/kg and reference Selling Price to customer at IDR 12.500/kg.

The average retail price of plantation white sugar remained above the HET maximum price of IDR 12,500/kg (USD857/tonne) in 2020, see Fig.16. Retail plantation white sugar prices surged in the first quarter of 2020 following the implementation of social distancing restrictions and government appeals to conduct all social activities from home to curb the spread of COVID-19. Prices of plantation white sugar peaked at IDR18,550/kg in April 2020, and began to decline when new crop supplies from sugar mills entered the market in June 2020. Prices declined further as imports of raw sugar for processing were found to encounter a few logistical bottlenecks due to movement restrictions and state-owned procurement agency BULOG began direct imports of white sugar.

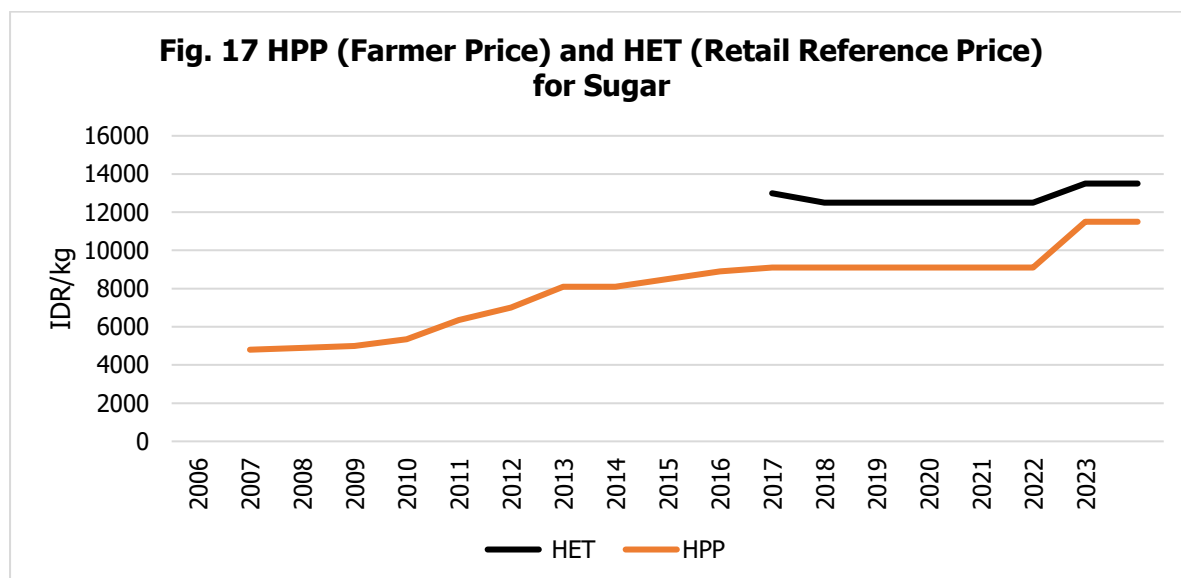




Retail plantation white sugar prices again surged following higher demand during the year-end festivities in 2021 and the upcoming 2022 Eid 'Al Fitr celebration while the 2022/23 milling season had not yet begun. In line with increasing white sugar production costs, the MOT issued a circular letter (Letter No 06, Year 2022 from Directorate General Domestic Trade of MOT) increasing the maximum retail price (HET) for sugar to IDR13,500/kg (USD940/tonne) from IDR12,500 IDR/kg (USD870/tonne). However, plantation white sugar retail prices remained well above the new maximum retail price. The HET was raised to IDR 13,500/kg later in 2022 (Letter No 10 Year 2022 from Directorate General Domestic Trade of MOT). Furthermore, retail outlets were allowed to sell packed retail sugar at IDR 14,500/kg in certain regions (Eastern Part of Indonesia namely: Papua, West Papua, Maluku, North Maluku, and East Nusa Tenggara (NTT)).

Most recently, higher demand and increased production cost had further increased retail prices of plantation white sugar above the government's price cap. In order to stabilise the price, the government in December 2022 issued a **National Food Agency**⁷ regulation on reference prices for purchasing and selling of soybean, shallots, chiles, beef, buffalo meat, and sugar. The sugar reference price for retail customers – known as **HAP** (Harga Acuan Penjualan di Konsumen) was set at IDR 13,500 to IDR14,500/kg (USD901 to USD968/tonne), compared to the previous HET of IDR13,500 set in 2022 (as noted earlier the associated Reference prices for plantation white sugar at the producer's level (HPP- Harga Acuan Pembelian di Produsen) were set at IDR 11,500/kg (USD768/tonne)). The evolution of the HET/HAP against the associated farmer level HPP is shown in Fig. 17. Despite this attempt to align the maximum price more closely with market prices, average retail price has remained higher.

⁷ Authorization to manage and coordinate food and basic commodity has shifted from Ministry of Trade to National Food Agency.



(5) REFINERS

Indonesia is a significant deficit market with local production meeting little more than 30% of consumption over the past few years. Consequently, Indonesia is importing up to 5 mln tonnes of sugar yearly - making it the world's second largest sugar importer after China. Note, however, that only about 3.0-3.5 mln tonnes is used to feed the Nation's 11 stand-alone sugar refineries; 250-500 thousand tonnes can be imported for fermentation, depending on molasses prices, and up to 600 thousand tonnes is imported to be refined off-crop by domestic mills for the domestic wet market. Most of these stand-alone refineries came into operation between 2003 and 2009 but four refineries were launched in 2013, contributing a further 5,300 tonnes/day to total capacity.

Indonesia's 11 sugar refineries now have a combined annual capacity of 5.01 mln tonnes, as shown in Table 4. Because Indonesia's government segregates retail and industrial markets, through different supply chains and product specifications, stand-alone refineries solely supply the industrial market. In other words, refined sugar produced from imported raw sugar is prohibited from being distributed to retail markets for human consumption, although as noted above there are "leakages" of refined sugar to the wet market. The refinery output tends to be bottlers' grade refined sugar, while direct-consumption sugar tends to be a crystal white of around 150 ICUMSA in colour. Running capacity of these refineries varies depending on the government's issuance of raw sugar import permits (discussed below).

Table 4: Indonesia's Stand-alone Refineries Capacity

Location	Refinery	Capacity tonnes
Java	PT Angels Products	500,000
Java	PT Jawamanis Rafinasi (Wilmar)	533,200
Java	PT Sentra Usahatama Jaya	540,000
Java	PT Permata Dunia Sukses Utama (FKS Group - Enerfo)	396,000
Java	PT Dharmapala Usaha Sukses - PT DUS (Mitr Phol)	250,000
Sumatra	PT Sugar Labinta	540,000
Java	PT Duta Sugar International (Wilmar)	300,000
Sulawesi	PT Makassar Tene (FKS Group - Enerfo)	462,000
Java	PT Berkah Manis Makmur	600,000
Java	PT Andalan Furnindo	400,000
Sumatra	PT Medan Sugar Industry	495,000
TOTAL		5,016,200

Source: AGI

Eight of the refineries are on Java, two on the island of Sumatra and one on Sulawesi (Map 3). Of the eight refineries located on Java, six refineries share the discharge ports of Cigading and Ciwandan - five are near the port or in the local town of Cilegon, while one refinery is based in the province's capital city of Serang. Of the other two refineries, one uses the port of Tanjung Priok – near the capital Jakarta – while the final refinery uses the port of Cilacap, on the south coast. The refineries in Java hold around a 70% share of imports in recent years. The two refineries based on the island of Sumatra are relatively far apart. A new refinery – operational since 2013 – is based near the port of Belawan – in the proximity of the city of Medan. This operation is part of the Samora Group, which is an existing sugar refiner in Indonesia, owning two refineries on Java, one in Cilegon and new refinery using the port of Tanjung Priok. The other refinery on Sumatra is near the southern port of Lampung, essentially across Sunda Strait from the concentration of refineries on Java Island. It was opened in 2008 and holds the largest share of import licences issued by the government, at around 17% of the total. The last refinery, on Sulawesi, is near the main port of Mekassar. Like some of the other refineries in Indonesia, it is not port-based. This requires the imported raw sugar to be transported by truck to the production facility.

In the most recent ownership change, Olam International divested its remaining 50% stake in its Indonesian sugar joint venture Far East Agri - which operated sugar refinery PT Dharmapala Usaha Sukses (PT DUS) in Cilacap, Indonesia - to its Thai partner Mitr Phol Sugar.

Map 3. Location of Sugar Refineries



Source: <https://www.agri.or.id/home.html>

The running capacity of these refineries varies depending on the raw sugar import allocation assigned by the government each year. The gradual reopening of the economy, after steady declines in COVID-19 cases globally and domestically, is increasing demand for sugar in food and beverages. So increased raw sugar import allocations, along with higher demand for refined sugar from the food and beverage industry, will likely increase refinery capacity utilisation. In 2021/22, capacity utilisation increased to 66%, compared to 65% in 2020/21. Food and beverage industry demand for refined sugar in 2022/23 is expected to increase by 5% to 3.4 mln tonnes (3.64 mln tonnes of raw sugar equivalent) compared to 3.23 mln tonnes (3.47 mln tonnes of raw sugar equivalent) in 2021/22. Accordingly, 2022/23 refinery capacity utilisation is forecast to reach approximately 73%.

Backwards Integration Policy

Despite growing demand, no new sugar refineries are expected to come online soon. This reflects the fact that current refining capacity is under-utilised and is also consistent with Indonesia's Presidential Regulation No. 36/2010, which places sugar refineries on the Negative Investment List for foreign direct investment. Instead, refiners are encouraged to backwards integrate into the local sugar sector. Wilmar is reportedly endeavouring to do so on the back of its PT Duta refinery. The government in 2017 offered new incentives to encourage investment in integrated sugar mills (which include sugar plantations). Through these incentives the Industry Ministry aims to attract four new investors in Indonesia's sugar industry each year. The two main schemes within its incentive package involve uncapped imports of raw sugar and tax breaks for imports of machines. In particular, a key incentive is to allow investors of integrated sugar mills to import raw sugar, without a volume

restriction or a requirement for licences, for a maximum of seven years (if the mill is located outside Java) or a maximum of five years (on Java), or three years (for existing mills). Previously, the government only allowed raw sugar imports, without a licence, when investors were still in the trial stage of their mills.

Refiners look to boost capacity utilisation

The Asosiasi Gula Rafinasi Indonesia - AGRI⁸ – or the Indonesian Refined Sugar Association, known as "Agri" - is a forum formed by the 11 sugar refiners. The Association notes that current capacity is underutilised. This results in inefficient refinery performances and there is a necessity to increase production capacity utilisation so as to achieve higher economies of scale and optimal returns. In response, AGRI members are looking to take advantage of various facilities and incentives that can increase production and competitiveness.

One approach is to increase production capacity utilisation by taking advantage of the KITE facilities (Fasilitas Kemudahan Impor Tujuan Ekspor) or Import Facility for Export Purposes. Under this facility, raw sugar can be imported and refined for re-export (toll refining) without distorting the domestic market or the government's Commodity Balance framework for determining import needs. A special event – entitled Increasing Production Capacity Utilization of the Indonesian Refined Sugar Industry by Utilizing KITE Facilities - was organized by the Ministry of Industry on October 11th, 2022, in Jakarta. Interest in the KITE facility was heightened in response to the Viet Nam government's decision to apply an Anti-Circumvention Import Duty. Earlier in June 2022, refiners celebrated the first shipment of refined sugar to Vietnam. The 55 thousand tonne shipment was an initial realisation of a 100 thousand tonne commitment by the Vietnamese buyer.

In a further effort to boost refined sugar exports and increase production capacity utilisation, AGRI members in November 2022 conducted a workshop on Customs facilities and International Trade Preferences which discussed, together with the relevant Ministries and Institutions, the facilities that could be used by members of AGRI.

Refiners also see further opportunities for refined crystal sugar (GKR) in the domestic market⁹ by fully satisfying the needs of micro, small and medium enterprises/MSMEs, and by assisting MSMEs to increase their competitiveness and product quality through the use of this sugar. Promoting the use of GKR in MSME-scale industries can simultaneously boost the quality and competitiveness of food and beverage products, especially for household and small industries which are significant at the regional economy level. Based on data from the Ministry of Cooperatives and SMEs, the number of MSMEs in Indonesia stands at 64.19 million, of which the number of Micro and Small Enterprises is very large, namely 64.13 mln or around 99.92 % of the entire business sector, which includes the food processing industry and drinks.

⁸ <https://www.agri.or.id/home.html>

⁹ <https://www.antaraneews.com/berita/2922345/agri-peluang-pasar-domestik-pasokan-gkr-di-indonesia-terbuka>

(6) HIGH FRUCTOSE CORN SYRUP (HFCS)

In 2017 there were two corn wet mills operational in the country producing corn starch, HFCS 55, glucose syrup, and maltodextrin from imported corn. As the sector is growing, there are now a total of four wet mills in operation, with installed capacity of 4,500 tonnes/day compared to 1,700 tonnes/day in 2017. In 2022/23, the industry was forecast to produce a total of 106,000 tonnes of HFCS-55 (which equates to 86,920 tonnes of raw sugar equivalent), a decline of 11.7% from 120,000 tonnes of HFCS-55 (equivalent to 98,400 tonnes of raw sugar) produced in 2021/22. Despite the local production decline, imports of HFCS 55 have decreased to 32,183 tonnes of raw sugar equivalent in 21/22 from 34,534 tonnes of raw sugar equivalent imported in 2020/21. During the period of May 2022 to January 2023, imports of HFCS 55 declined significantly to 5,314 tonnes of raw sugar equivalent from a total of 28,882 tonnes of raw sugar equivalent imported during the same period of the previous season. During the period of May 2022 to January 2023, Indonesia imported HFCS 55 from Turkey (41%), China (40%), and South Korea (13%).

(7) DOMESTIC MARKETS

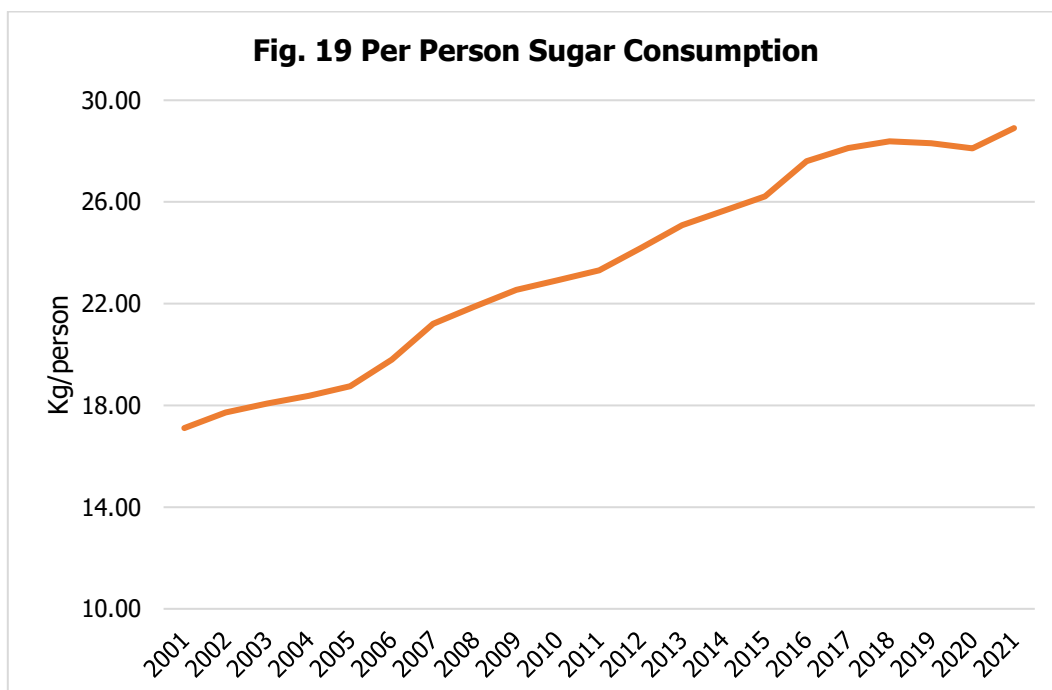
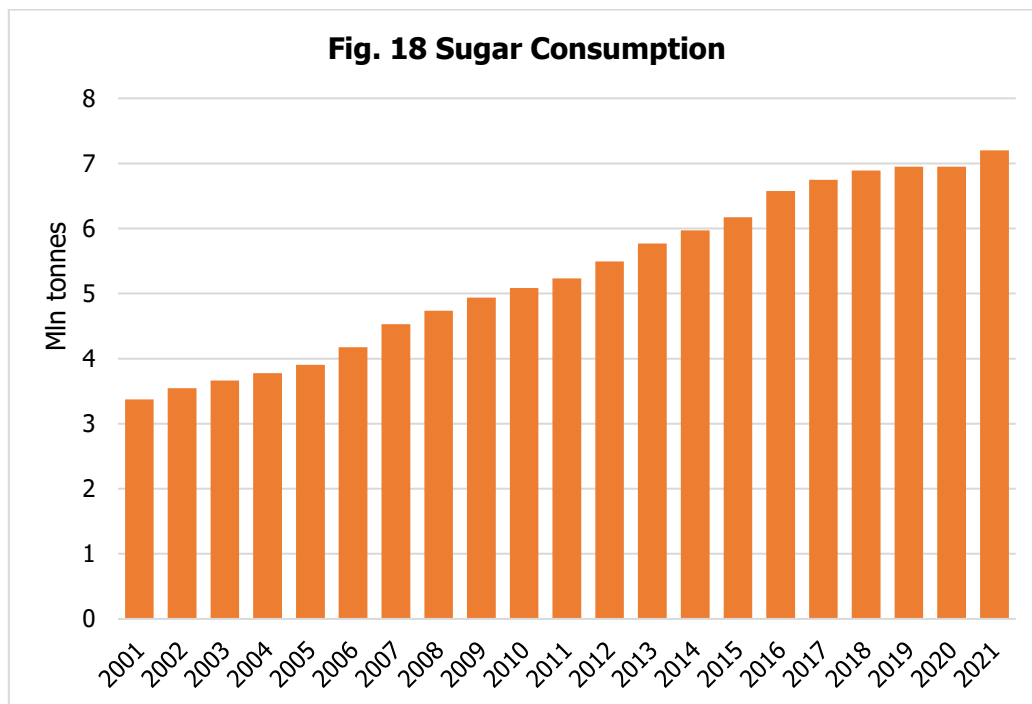
Domestic sugar is classified into three categories: white sugar for consumption by households, restaurants, and hotels, and by small-scale food and beverage vendors – known locally as white crystal sugar (GKP - gula kristal putih), raw sugar for domestic sugar refining (GKM - gula kristal mentah), and refined sugar (GKR - gula kristal rafinasi) that can only be used by food, beverage, and pharmaceutical industries (large, medium, and small-scale). Refined sugar produced from imported raw sugar is prohibited from being distributed to retail markets for human consumption.

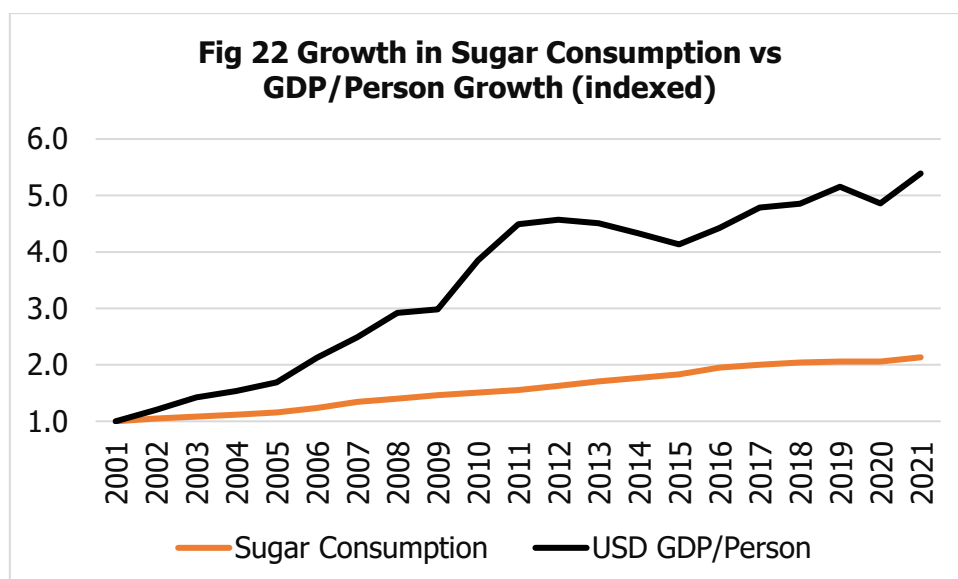
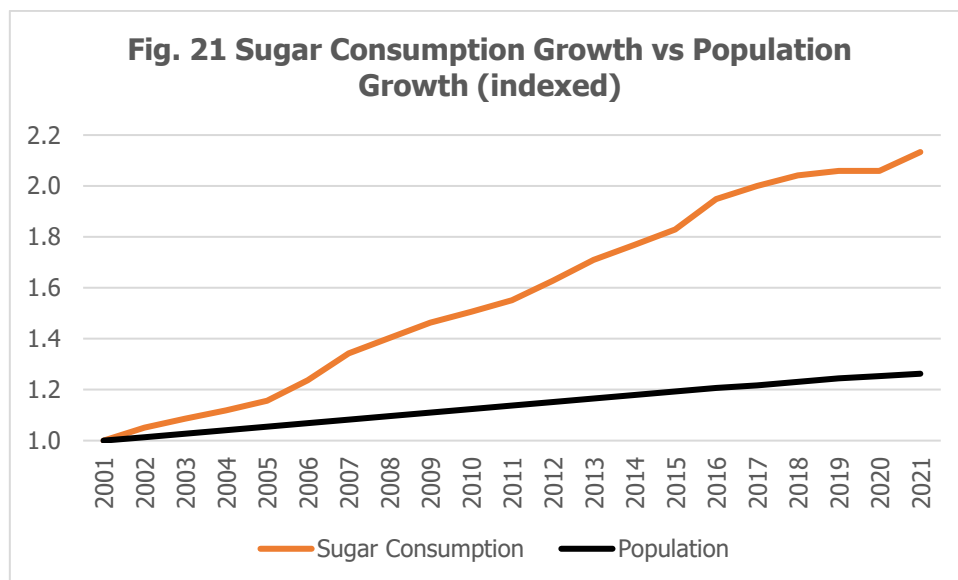
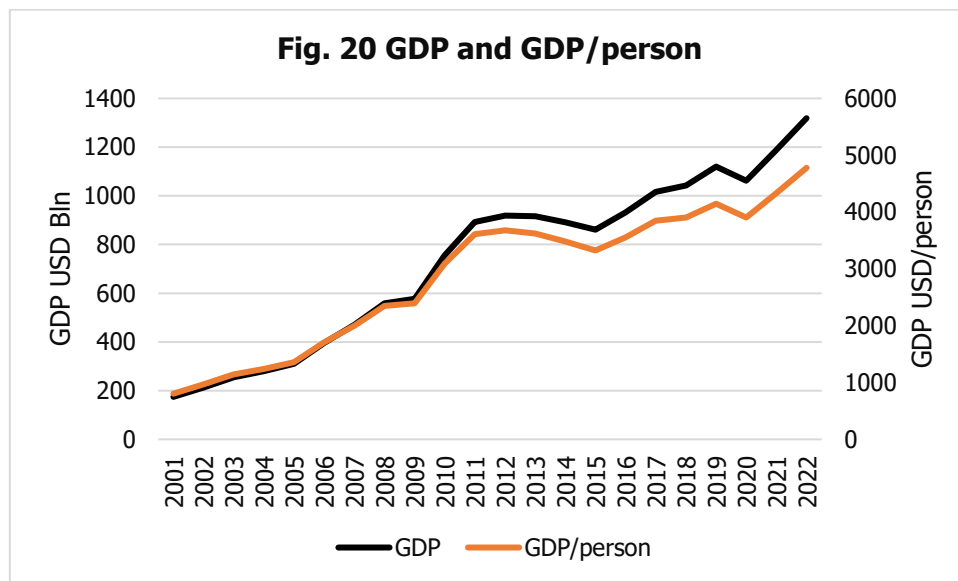
As estimated by the ISO, Indonesia's sugar consumption had reached 7.2 mln tonnes in 2021, more than double the total of 3.375 mln tonnes seen two decades earlier, see Fig. 18. Over the past decade, Indonesia's sugar consumption has grown by 40%, against a global average of around 9%, and equally spectacularly when compared to other large consumers, such as India and China, which saw just 7.8% and 6.8% growth over the same period.

Before 2020 (when COVID restrictions disrupted normal consumption patterns), Indonesian sugar consumption was growing by 4.3% annually. This high growth rate was underpinned by increasing wealth and strong populations growth – with the country's population rising from 217 mln in 2001 to 276 mln in 2022, an annual growth rate of 1.2% (see Fig. 21). Growth in per capita consumption has been a key driver of the aggregate consumption growth – see Fig 19 – rising from 17.1 kg/person in 2001 to 28.9 kg/person in 2021, representing annual growth of 2.8%.

Importantly, Indonesia's economy has grown exponentially, with GDP rising from USD 174.5 bln in 2001 to USD 1.32 trillion in 2022, see Fig. 20. GDP per capita rose from USD804 to USD 4,778 over the period. This gives people larger disposable

incomes and a tendency to adopt the western diet, which is higher in added sugar, see Fig. 22. Furthermore, economic development tends to correlate with increased urbanisation; and as populations urbanise, sugar consumption increases.





Tourism can also play a significant role in increasing sugar consumption, as tourists tend to consume more sugar. In Indonesia, particularly, it's likely that tourists will consume more on a per capita basis as a large number of the country's tourists come from nations with higher per capita consumption. Indonesia had one of the fastest growing tourism sectors until 2020, when the outbreak of the COVID pandemic saw visitor numbers slump. There were 7.65 mln visitors in 2011 and this had surged to 16.11 mln in 2019. However, visitors fell to 4.05 mln in 2020 and collapsed further to 1.55 mln visitors in 2021. Data from the World Tourism Organization shows visitor numbers in 2022 rose sharply to 5.47 mln.

Market segmentation

Data compiled by AGI shows Indonesia's wet market (GKP market) was put at 3.35 mln tonnes in 2021, growing from 2.95 mln tonnes in 2016, see table 5.

Table 5: Dynamics of Indonesia's Domestic White (GKP) Sugar Balance

Year	Initial Stock	Local White Sugar Production	Sugar Import (White sugar)	White Sugar Availability	End Stock	Consumption
2016	816.6	2,202.70	1,558.19	4,557.40	1,626.50	2,950.90
2017	1,626.50	2,118.20	871.90	4,616.60	1,608.60	3,008.00
2018	1,608.60	2,171.00	1,118.40	4,898.00	1,836.70	3,061.30
2019	1,836.70	2,227.00	116.10	4,179.80	1,084.50	3,095.30
2020	1,084.50	2,130.72	1,365.58	4,580.80	1,417.86	3,162.93
2021	1,417.86	2,330.77	796.94	4,545.58	1,193.93	3,352.39

Refined sugar use by food&beverages/pharmacy tallied 3.2 mln tonnes, see Table 6, giving a sugar consumption total of 6.55 mln tonnes for 2021. This figure compares to the higher ISO sugar consumption estimate of 7.3 mln tonnes, which also takes account of the significant sugar imports for MSG production.

Table 6: Dynamics of Indonesia's Refined (GKR) Sugar Balance

Year	Initial Stock	Refined Import	Refined from Imported Raws	Refined Sugar Availability	End Stock	Consumption
2016	116.75	15.36	3,093.64	3,225.75	112.10	3,113.65
2017	112.10	51.49	2,983.42	3,147.02	221.35	2,925.67
2018	221.35	93.55	3,005.61	3,320.51	135.97	3,184.54
2019	135.97	50.0	3,168.30	3,354.27	98.29	3,255.98
2020	98.29	23.6	3,095.99	3,217.88	81.03	3,136.85
2021	81.03	23.0	3,149.99	3,254.03	39.27	3,213.75

(8) IMPORTS

The government tightly controls the timing and total volume of sugar imports, as well as which companies are granted import quota allocations. Sugar mills are obligated to use domestically produced sugarcane for their raw material, while refineries use imported raw sugar (allocated import quotas) to process into refined sugar for the food and beverage industry. Since domestic demand far outpaces local production, sugar mills also can import raw sugar to supplement their supply to the wet market. Additionally, if food and beverage companies need a certain refined sugar product with specific technical specifications that is unavailable locally, they may be permitted to import these specialized products.

(I) IMPORT QUOTAS

Industrial Import quotas (i.e., for refining) are administered under an Import Permit (IP) system. IP releases are subject to stock levels and domestic market prices. IPs have been issued on a quarterly, half-yearly and yearly basis. Over recent years, the annual import quota has been set between 2.8 and 3.6 mln tonnes, see Table 7. In 2021, sugar refineries imported a total of 3.303 mln tonnes of raw sugar out of a total allocation of 3.349 mln tonnes. In 2022, sugar refineries imported a total of 3.478 mln tonnes of raw sugar from the total allocation of 3.48 mln tonnes. The increase is in line with higher demand of refined sugar by the food and beverage industry. For 2023, the government announced plans to import 3.6 mln tonnes of raw sugar for industrial use and about 991,000 tonnes of white sugar for wet market consumers.

Table 7: Indonesia's Import Quotas for Raw Sugar for Refining

Year	Quota (mln tonnes)
2012	2.30
2013	2.20
2014	2.80
2015	3.10
2016	3.20
2017	3.50
2018	3.60
2019	3.15
2020	3.00
2021	3.35
2022	3.48
2023	3.60

The Trade Ministry can also issue white sugar import permits for household consumption (the wet market). These permits are issued to five or six companies including state-owned sugar mills and a unit of the state food procurement agency. These import permits are only issued during the off-crop period to avoid impacting local prices. White sugar can only be imported to strengthen national stock as well

as to stabilise prices. Only state-owned companies and API-P importers can import white sugar upon authorization from the government.

Most recently, the Indonesian National Food Agency (NFA) in late March 2023 announced that state-owned food enterprises - ID Food and Plantation Holding Company PTPN - could import 215,000 tonnes of whites during March and April to ensure adequate supply as Ramadan and Eid al-fitr would both fall ahead of the 2023 sugar harvest. Domestic sugar production in calendar year 2023 should reach 2.6 mln tonnes and wet market demand was estimated at 3.4 mln tonnes, while opening stocks stood at 1.1 mln tonnes in January, it added. The imported sugar was expected to come from a number of origins, namely Thailand, India and Australia, sources said.

The decision to import was agreed upon during a ministerial coordination meeting in January 2023. The move is aimed at maintaining stability in food supply and prices and improving the government's food reserves. Based on NFA's food prices panel on March 24th, the average price of sugar at the consumer level was stable at IDR14,416/kg (around USD0.9/kg) since October 2022, still below its selling reference price (HAP). The HAP for sugar at the consumer level was set at IDR14,500/kg, according to NFA Regulation No. 11 of 2022.

The government earlier had authorised state-owned companies to import a total of 991,000 tonnes of white for direct household consumption in 2023, up from an allocation of 891,627 tonnes in 2022.

Indonesia also allows imports of raws by local sugar mills for off-season refining. Imports totalled around 680,000 tonnes in 2021. The authorization was issued earlier and in a larger volume compared to the previous year, when permits were issued in March 2020 for a total of 472,630 tons of raw sugar. For 2022, the government authorised sugar mills to import a total of 891,627 tonnes of raw sugar to be processed into plantation white sugar for direct household consumption, an increase of 31% from the allocation of 680,000 tonnes in 2021. The imported raw sugar for sugar mills was expected to arrive before the beginning of the milling season in May 2023. Imports were as much as 1.2 mln tonnes in 2018 and 1.6 mln tonnes in 2016. Two of the biggest beneficiaries are Sweet Indolampung and Sungai Budi, both located on Sumatra.

In addition to the above, depending on the price, there are raw sugar imports to the tune of 350-400,000 tonnes/year for MSG industries.

2021 Revised Import Regulations

Considering the seasonal supply of sugarcane for white sugar production and to ensure continuous supplies of both white sugar for direct consumption and refined sugar for the food and beverage industry, on 28th January, 2021, the Ministry of Industry (MOI) issued regulation 3/2021 on Assurance of Raw Material Availability for Sugar Industry to Meet National Sugar Needs. The regulation stated that companies producing plantation white sugar (sugar mills) and sugar refineries

producing refined sugar can use raw materials from domestically-produced sugarcane or from imported raw sugar. When domestic raw materials are not sufficient to meet the demand to produce plantation white sugar and refined sugar, imports of raw material can be granted after obtaining an import recommendation from MOI. The imported raw sugar must be no less than ICUMSA 600 IU (discussed further below). Sugar mills must only produce white sugar from the imported raw sugar while refineries must only produce refined sugar for food and beverage industry from the imported raw sugar. However, only mills and refineries which hold industrial business licenses or have expanded production capacity since May 25, 2010, are eligible to receive the import recommendation. The regulation has created controversy among industry players as these requirements disqualified most older sugar mills.

2022 Commodity Balance Import Scheme

Indonesia's government in 2022 implemented a new policy to determine import allocations known as the Commodity Balance approach, aiming to ensure a stable price of plantation white sugar for direct household consumption. Sugar is now subject to the new policy according to Presidential Regulation No. 32/2022. The commodity balance approach compiles data and information that includes, among others, the situation of consumption and production of certain commodities for the needs of the population and industrial needs within a certain period of time that is determined and applied nationally. The government explains that the concept of the commodity balance is essentially a formula that incorporates data gathered from different stakeholders, including consumption and production data of certain commodities (beef, fish, rice, salt, and sugar for 2022) to meet consumer needs and industrial needs within a calendar year. The commodity balance for each commodity to which this policy applies is determined at an inter-ministerial meeting¹⁰ that takes place prior to the issuance of import permits. One outcome of the commodity balances approach is the determination of an import volume (by commodity) to be permitted by government each year. The inter-ministerial meeting to determine the commodity balance for each commodity is organized by the Coordinating Ministry for Economic Affairs (CMEA) and is scheduled to take place no later than the first week of December in order for import licenses to be issued in time for the upcoming year. The new scheme requires industry to submit import applications in September. Nonetheless, since the commodity balance is a new import scheme, the process to evaluate the application has resulted in the delayed issuance of import licenses for several commodities, including sugar.

Based on the newly implemented Commodity Balance policy, in January 2023, the Ministry of Industry authorised a total of 3.6 mln tonnes of raw sugar for the 11 sugar refineries. During an inter-ministerial meeting in September 2022, the Government of Indonesia estimated total national demand sugar at 7.3 mln tonnes,

¹⁰ A ministerial Meeting (ministry of Agriculture; Ministry of Industry, Ministry of Trade and the National Food Agency) under the coordination of the ministry of Economics:

- Determines the sugar balance;
- Determines consumption;
- Determines production; and
- Allocates import quotas (raw and white)

consisting of 4.1 mln tonnes of refined sugar for the food & beverage industry and 3.2 mln tonnes of plantation white sugar for household consumption. Import permits for the allocation were issued in early 2023.

Import Tariffs

Indonesia's WTO-bound tariff rate for sugar is 95% but it has never adopted tariffs approaching this level. The current import duty is IDR 550/kg for raw sugar and IDR790/kg for white and refined sugar, see table 8. Tariffs on all sugar imports were lowered from 1st October 2009 to 30th April 2010 to help stabilise domestic prices. Tariffs returned to their previous levels on 1st May 2010. Of importance, the import duty is fixed in IDR and does not fluctuate with the exchange rate.

Table 8: Indonesia's MFN Sugar Tariffs

	Raw Sugar	White / Refined Sugar
Applied import duty rate	IDR 550/KG	IDR 790/KG
WTO Commitments		
Tariffs		
BOUND Rate	95%	95%

Indonesian Customs Tariff Book, 2017.

As mandated by Law No. 7/2021 concerning the Harmonization of Tax Regulations, the government increased the value-added tax for imported sugar to 11%.

ASEAN Concession

Indonesia is part of the ASEAN Group. ASEAN sugar trade has been liberalised within the ASEAN Economic Community (AEC) Free Trade Agreement. The duty rate for sugar originating in ASEAN countries is 5%.

Special Concession to India

In 2019, Indonesia changed the import duty for Indian raw sugar to 5% from previously a nominal duty of IDR550/kg - the regulation took effect on July 8th, 2019. The government had previously said it was making changes to the import duty rules for Indian products in hope that India will reciprocate by opening up its market to Indonesian exports such as palm oil. The concession to India also changed the minimum colour from 1,200 ICUMSA to 600 ICUMSA.

Safeguard duties against HFCS

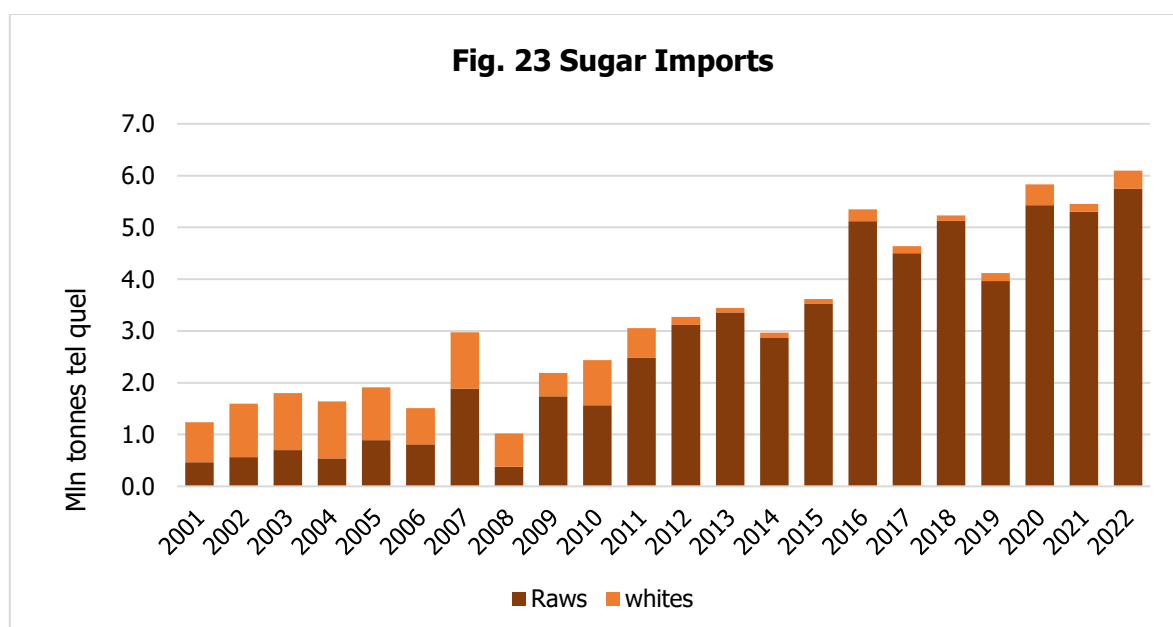
An investigation by the Indonesian Trade Safeguard Committee (KPPI) found the domestic sugar industry suffered serious losses due to a surge in imports of fructose syrup products. As a result, on September 9th, 2020, the Ministry of Finance issued regulation 126/2020 on the Imposition of Safeguard Duty on Imports of Fructose Syrup. All products under HS Code 172.60.20 are subject to this regulation. The safeguard duty is in addition to the general import duty (Most Favoured Nation); or additional preference, based on import duties for goods traded under international trade agreement schemes. The safeguard duty was established at 24% for the first year, effective 16th September 2020, falling to 22% in the second year and further to 20% in the third year. The safeguard duty is imposed on imports of HFCS 55 from all countries except countries listed on the appendix of the regulation. Imports from the exempted countries must include a Certificate of Origin. The regulation appears

to target imports of HFCS 55 from China and South Korea, which are not listed on the regulation’s appendix.

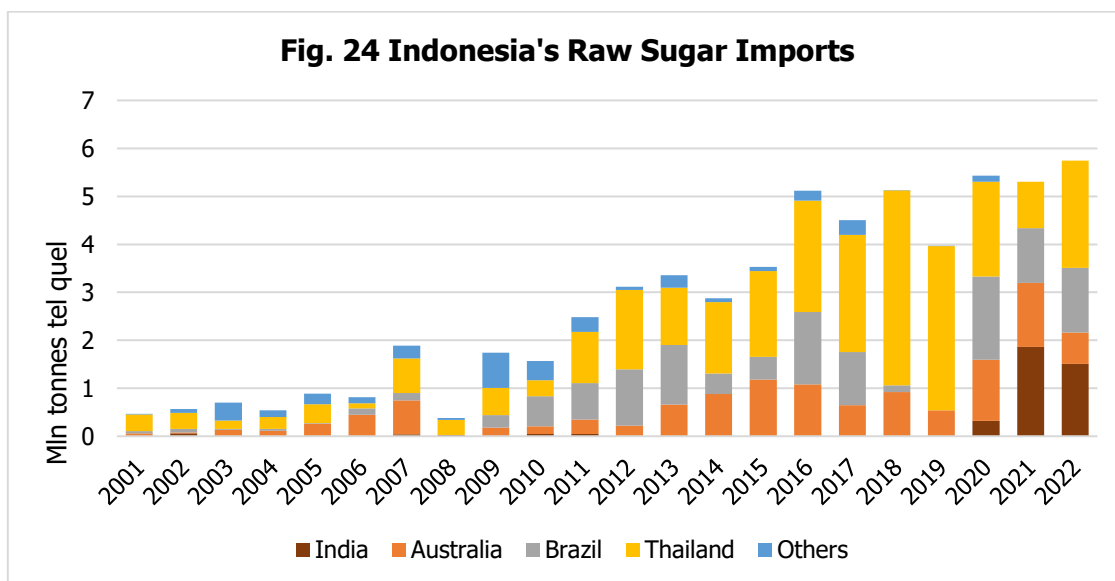
(II) IMPORT DYNAMICS AND MAJOR ORIGINS

As shown in Fig 23, reflecting the structure of the local market and level of domestic production, imports are nearly all raws. Shipments have risen sharply over the past two decades and have exceeded 5 mln tonnes in recent years – including raw sugar for refiners, the fermentation industry and for off-crop refining by sugar mills.

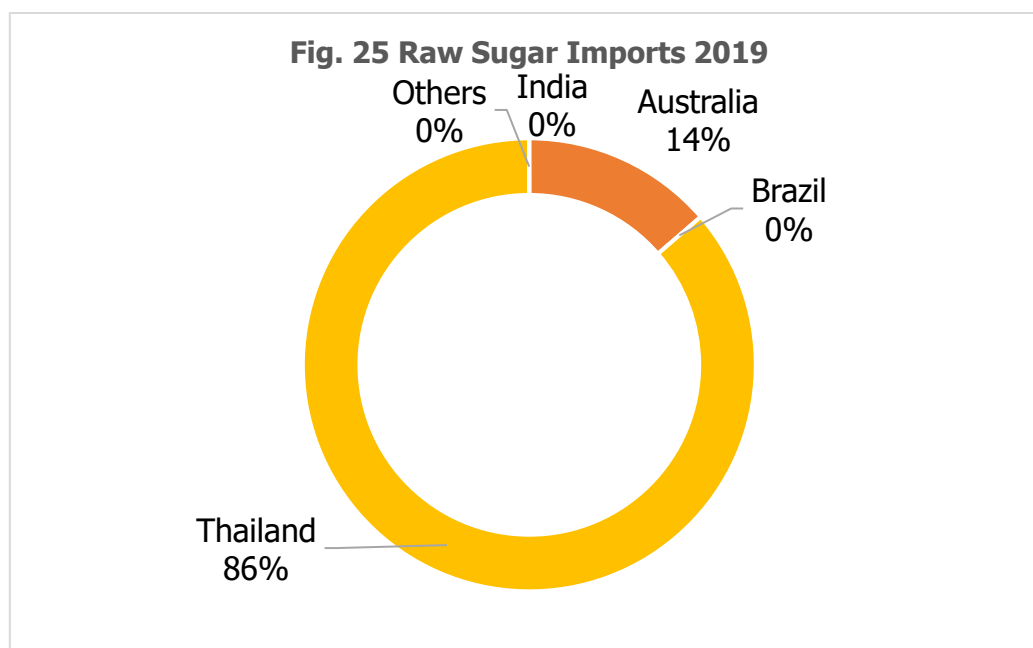
Thailand has typically been the major origin for raw sugar requirements, see Fig. 24 with preferential access given under the ASEAN FTA, while an FTA with Australia¹¹ saw the tariff rate set at 5%, consistent with the ASEAN concession. Around 10% of Indonesia’s raw sugar imports were sourced from Australia during 2017-20. The slump in export availability from Thailand as a consequence of two years of drought, saw shipments from Thailand replaced primarily by Brazil and India. A change in the minimum ICUMSA spec also facilitated the return of Brazilian shipments, hitting 1.14 mln tonnes in 2021 and 1.35 mln tonnes in 2022, even after Thailand exports returned with shipments of 2.2 mln tonnes.

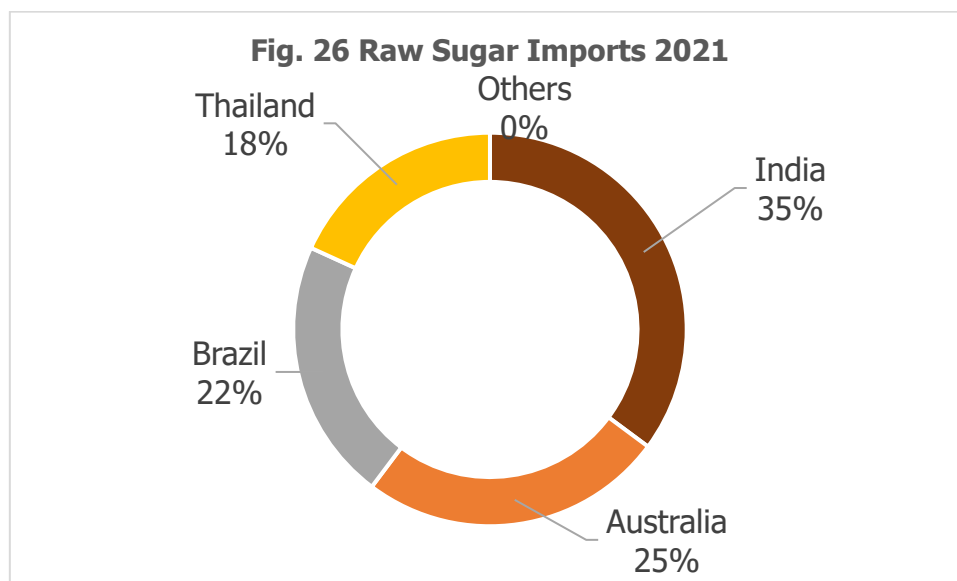


¹¹ The import duty on sugar from Australia under the Australia-Indonesia Comprehensive Economic Partnership Agreement was reduced from 10% to 5% (consistent with Thailand under ASEAN).



The key changes in the origin profile for Indonesia’s raw sugar imports is shown in Fig 25 and Fig. 26 which compare the major sources in 2019 and 2021. Thailand’s share shrunk from 86% to 18%, whilst India rose from nil to 35%. Brazil rose from nil to 22% and Australia’s share rose from 14% to 25%. With higher export availability in 2022, Thailand regained market share, primarily at the expense of Australia and with Brazil substituting for India during the second half of 2022.





Importantly, there is a minimum quality specification for raw sugar imports. Thailand had dominated Indonesian imports of the raw sugar due to a freight advantage, and Thailand's ability to meet Indonesia's specification requirements of minimum ICUMSA 1200 IU for raw sugar and maximum of ICUMSA 45 IU for refined sugar. In order to ease imports of sugar to help stabilize domestic prices, on 17th February 2020, the Ministry of Trade issued regulation number 14/2020, providing flexibility on raw sugar specifications. In short, the Indonesian government amended the minimum colour on raw sugar imports from 1200 ICUMSA to 600 ICUMSA. This has mitigated the reduction in export availability from Thailand, with both Indian and Brazilian raw sugar now conforming to this revised quality requirement. Previously the ICUSMA 1,200 minimum quality specification limited the number of available origins and in particular created a barrier for Brazil shipments from standard port-warehouse stock.

Minimum ICUSMA levels for refined sugar were amended to 75 ICUMSA and for white sugar to an allowable range of ICUMSA 81-200 IU. White sugar imports were high at over 400,000 tonnes in 2020. India was a key origin, with reliance on Thailand having been eroded by reduced export availability, see Fig. 27. White sugar imports declined to 152,000 tonnes in 2021, with Thailand's shipments fractionally higher than in 2020, but with India's shipments receding to only 75,700 tonnes from 287,000 tonnes the year before (Fig. 28). In 2022, white sugar imports rose to around 355,000 tonnes, with 200,000 originating from Thailand and the bulk of the remainder from India.

Fig. 27: Indonesia White Sugar Imports 2020
400,865 tonnes

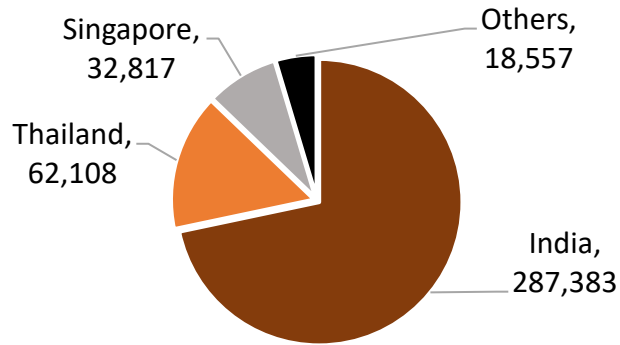
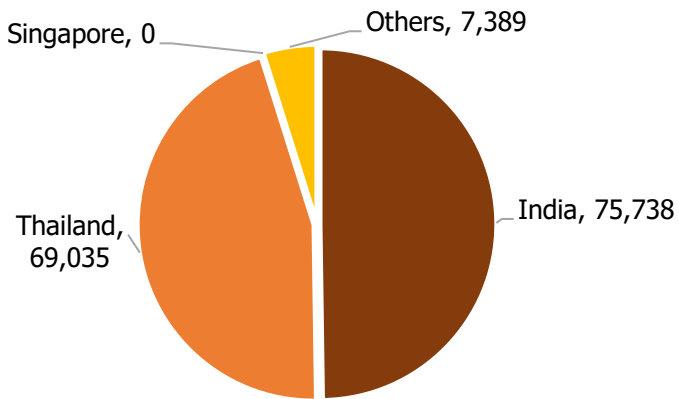


Fig 28 Indonesia White Sugar Imports 2021
152,162 tonnes



PART 2: DIVERSIFICATION AND VALUE ADDING

(1) ETHANOL

Indonesia produces mostly industrial grade ethanol for both domestic use and exports. There is no significant beverage alcohol production given it is a Muslim nation. Demand for fuel grade ethanol is virtually non-existent, as the bioethanol mandate program has been inactive since 2010.

Indonesia's ethanol production was expected to reach 205 mln litres in 2022, a 3% increase from 2021 (FAS GAIN Report No ID2022-001). According to the MOI, Indonesia's cumulative ethanol installed capacity is roughly 254 mln litres/year across seven active ethanol producers, while industry data suggest 244 mln litres/year across eight active producers, see table 9. More than half of this ethanol capacity is located in East Java province. Indonesia's ethanol production relies on molasses as the main feedstock. However, competition for this feedstock continues to pose challenges for local ethanol producers as molasses is also used in food processing, the production of monosodium glutamate and for export. Molasses production in the 2021/22 season reached 1.5 mln tonnes. Of that, around 559,000 tonnes were exported, above an average 497,000 tonnes during the previous 3 years, and the remainder was used domestically. The volume of molasses exports tends to be higher when world molasses prices are favourable.

Table 9: Ethanol Producers and Capacity

	Company Name	Status	Location	Capacity ([']000 litres/yr)
1.	PT. Basis Indah	Idle	South Sulawesi	5,000
2.	PT. Energi Agro Nusantara	Active	East Java	30,000
3.	PT Ethanol Ceria Abadi	Active	East Java	12,000
4.	PT. Indo Acidatama Tbk	Active	Central Java	50,000
5.	PT. Indonesia Ethanol Industry	Active	Lampung	50,000
6.	PT. Madu Baru (PS Madukismo)	Active	DI Yogyakarta	7,500
7.	PT. Medco Ethanol Lampung	Idle	Lampung	40,000
8.	PT. Molassindo Alur Pratama	Idle	North Sumatra	3,600
9.	PT. Molindo Raya Industrial	Active	East Java	90,000
10.	PT. Permata Sakti	Idle	North Sumatra	5,000
11.	PT. PG Rajawali II-PSA Palimanan	Active	West Java	5,000

12.	PTPN XI Pasa Jatiroto	Idle	East Java	5,000
13.	PT Indo Lampung Distillery	Active	Lampung	40.000
	TOTAL ACTIVE CAPACITY			303,140

Source: AGI

There is a producer association, the APROBI (Asosiasi Produsen Biofuel Indonesia-Indonesia Biofuel Producer Association) consisting of biodiesel and bioethanol companies that is building a partnership with government and other parties to develop the usage of biofuels as a new transportation fuel in Indonesia.

(I) FUEL ETHANOL

Indonesia's fuel grade ethanol (FGE) consumption has remained negligible since 2010 due to a lack of financial support to run the blending program and a mandate that was never enforced. From 2006-2009, Pertamina (Pertamina is the national energy company, 100% owned by the Government of Indonesia) was able to sell E2 gasoline on a limited basis due to state subsidies covering the price difference between bioethanol and gasoline. However, due to increasing costs of production for FGE and a limited state-budget for subsidies, Pertamina received limited supplies from ethanol producers and the E2 programme collapsed after 2009. Unless the government re-enacts a subsidised nationwide blending mandate for bioethanol, like it did for palm oil based biodiesel, domestic fuel ethanol production is unlikely to be viable.

In March 2020, Pertamina removed a prohibition on ethanol as a component in gasoline import tenders. The removal opened the market for ethanol-blended finished gasoline, imported as RON 88 and RON 92 gasoline. The government was placing considerable pressure on Pertamina to reduce petroleum imports to improve the current account deficit, which so far had been realised through the country's biodiesel programme reducing diesel imports. Although commercial bioethanol blending in Indonesia has not yet started, Pertamina and the Ministry of Energy and Mineral Resources (MEMR) continue to assess the potential cost savings and supply chain viability of importing finished gasoline blended with ethanol or direct imports of ethanol for in-country blending. Because global ethanol prices are currently lower than gasoline prices, there is renewed interest within MEMR to pursue an E2 pilot project.

Sugarcane Bioethanol Program for Energy Security

Looking forward, in order to support the bioethanol industry in Indonesia, while trying to achieve the government's sugar self-sufficiency target, the President launched the Sugarcane Bioethanol Programme for Energy Security in early November 2022. The program targets production of sugarcane bioethanol in 2030 at 1.2 bln litres, on the back of the planned expansion in state-run cane area to

700,000 ha. The Energy Ministry in December 2022 announced there were plans to start rolling out an E5 fuel ethanol blend in three years' time, starting with a few provinces of the country. Under a new roadmap, which was developed with the Bandung Institute of Technology, the introduction of E5 could begin by mixing sugar-based ethanol with Pertamina's gasoline 90 or higher products, the ministry said, with implementation starting in the capital Jakarta and in East Java. In the medium term, the mix is expected to be increased to 10% and rolled out in other areas on the heavily populated island of Java, the roadmap said. By 2031, the blend could rise to 15% and would be distributed nationally.

(II) NON-FGE

According to the USDA (FAS GAIN Report No ID2022-001) Non-Fuel Grade Ethanol (Non-FGE) consumption is expected to slightly increase to 168 mln litres in 2022 from 167 mln litres in 2021. Demand for antiseptic products surged in 2020 but slowed down in 2021 in line with the easing of pandemic-related sanitation restrictions. In addition to the antiseptic industry, non-FGE uses include pharmaceuticals, cosmetics, and chemical solvents.

Indonesia's non-FGE ethanol exports recovered to 82 mln litres in 2021 after a sharp decline in 2020 due to a temporary ban on ethanol exports in the early months of the pandemic as the government sought to ensure adequate local supplies for use in antiseptic products such as hand sanitizers. Ethanol exports in 2022 are thought to have increased to 85 mln litres. The Philippines remains the main market for Indonesian ethanol. In 2021, Indonesia shipped 97% of its ethanol exports to the Philippines, with the rest going to Thailand, Vietnam, Malaysia, and Singapore. Ethanol imports were expected to decline 16% to 45 mln litres in 2022, as demand for sanitizer peaked in 2020 and then contracted in 2021, lowering ethanol consumption to 167 million litres last year from 175 mln litres in 2020. Ethanol from Pakistan made up 89% of total imports in 2021 and is thought to have made up most of Indonesia's ethanol imports in 2022. Indonesia signed a Preferential Trade Agreement (PTA) with Pakistan in 2019 establishing a zero-import duty rate for ethanol.

(2) COGENERATION (BIOMASS POWER)

There is presently no cogenerated electricity sold to the national grid. Even so, there are reportedly efforts underway to help mills modernise and generate new revenue streams from cogeneration.

PART 3: CURRENT MARKET SITUATION

The recent seasons of Indonesia's sugar balance are shown in Table 10, together with estimates for 2022/23 and a projection for 2023/24. The Muslim fasting month of Ramadan started in late March 2023. In an effort to avoid labour shortages, most mills began the milling season in May 2023 and will conclude harvesting by November 2023. Plantation white sugar production 2023/24 is forecast to increase to 2.6 mln tonnes from 2.4 mln tonnes in 2022/23, with a larger forecasted harvest area outweighing lower yields, due to a weather-induced shortened vegetative period. Last season, the tremendous rise of fertiliser prices encouraged farmers to reduce its use, impacting yields adversely.

Table 10: Indonesia's Sugar Balance (October/September)

Year	Opening Stocks	Production	Consumption	Closing stocks	Imports	Exports
2023/24f	3,211	2,600	7,700	3,711	5,600	0
2022/23f	3,304	2,440	7,600	3,211	5,067	0
2021/22	3,059	2,387	7,300	3,304	5,158	0
2020/21	2,913	2,294	7,138	3,059	5,249	259

Source: ISO

As noted previously, to meet domestic demand, the government increased the allocation of raw sugar imports for refineries (GKR sugar) to 3.6 mln tonnes in 2023 compared to 3.36 mln tonnes of imports authorised in 2022. Additionally, despite the forecast increase of domestic white sugar production, the government also authorised the import of 991,000 tons of white crystal sugar (GKP) for consumption as well as another 50,000 tonnes of sugar for special needs, giving a total import volume of 4.641 mln tonnes.

As Indonesia expanded its Covid vaccination programme (launched in January 2021), fewer social distancing and travel restrictions reduced home consumption of sugar, but increased demand for out-of-home products from the food and beverage industry, boosting consumption of refined sugar. As a result, sugar consumption in 2022/23 is estimated to increase to 7.6 mln tonnes, consisting of 4.1 mln tonnes of sugar for direct consumption and 3.5 mln tonnes for industrial use in the food and beverage industry. In line with population growth, sugar consumption in 2023/24 is forecast to increase to 7.8 mln tonnes.

Early in 2023, cane farmers (through the APTRI) expressed concern that the announced increase in raw sugar imports for refining (3.6 mln tonnes of GKP sugar) could flood the local sugar market, arguing that seepage of refined sugar into the consumer (wet) sugar market could reduce the price of sugarcane¹² since GKP

¹² <https://www.kompas.id/baca/ekonomi/2023/01/22/selamatkan-petani-dari-residu-pahit-importasi>, 14 February 2023

stocks in early 2023 were high and growth in sugar demand by the food and beverage industry might not be as great as anticipated. The point of leakage of refined sugar in the consumption market is at the distribution level.

Previously in October 2022, domestic cane growers had asked the government not to import white sugar because the current supply of white sugar was seen as excessive¹³ in light of an expected increase in planted areas and yields and anticipated year-end stock levels. They also feared demand for locally-produced white sugar could fall amid rising prices of consumer goods and the risk of a global recession.

¹³ <https://www.kompas.id/baca/ekonomi/2022/10/13/awas-suplai-berlebih-stop-impor-gula-konsumsi>
14 October 2022

PART 4: OUTLOOK TO 2030 (2030/31)

Indonesia's government has repeatedly renewed the deadline for self-sufficiency in sugar, but the target has never been achieved (Box 1). Because sugar is classified as an essential commodity, the government has tried to address this issue through its national development programme. The National Sugar Production and Productivity Acceleration Programme 2003–2008 was established in 2003. In 2006, the programme was updated to become the Road Map for National Sugar Self-Sufficiency 2006–2009 and continued as the Road Map for Sugar Production 2010–2014, where production and consumption were targeted to balance at 3.1 mln tonnes annually. Later, under the government's Sugar Roadmap 2016–2045 programme by 2019 Indonesia would fulfil its direct sugar consumption demand of

Box 1 Previous Self Sufficiency Programs

As early as in 2003, the Ministry of Agriculture announced that the country was set to become self-sufficient in sugar in 2007. That time the annual production target was put at 3 mln tonnes, white value, through both expanding cane areas and increased productivity. In mid-2005 the self-sufficiency target date was moved to 2009. In 2006, the authorities announced a 'revitalisation program' for the sector, which aimed at achieving self-sufficiency for direct consumption in 2009 and for total demand in 2010. Both these goals were missed. There is a host of explanations why the program failed. According to market analysts, one was certainly the very ambitious time horizon. Completing an expansion scheme involving several million tonnes of production in just 3 years, starting from in 2006, carried a large risk of failure. It has to be noted, however, that, as a result of the revitalisation scheme, two old mills were refurbished and re-opened, while one completely new factory started crushing cane. The government launched a processing equipment revitalization scheme in 2008. The program provided reimbursement to any sugar mills that purchased new equipment, increasing installed capacity of the existing sugar mills, developing new sugar cane plantation, and developing new sugar mills. The government would reimburse 12.5% of the cost of new equipment, and an additional 10% would be given if the equipment was domestically produced. The revitalization program was only for sugar mills producing plantation white sugar from sugar cane and was not for refineries.

The government did not abandon the self-sufficiency policy. A new plan with the target to become self-sufficient in sugar by 2014 was developed in 2010. As envisaged by the plan, cane area had to increase by about 300 thousand ha or 64%, while agricultural and industrial yields had to increase by 9.5% and 15%, correspondingly. As a result, sugar production by 2014 was targeted to grow to 5.7 mln tonnes, as against actual production of 2.67 mln tonnes in 2009. In the longer run, the government also aimed for a further growth of production, in line with the fast-growing domestic demand for sugar, to 8.9 mln tonnes of sugar by 2025 (after revitalising and constructing 11 new sugar mills). According to the adopted regulation, foreign investors must set up joint ventures with local partners and limit their ownership to 49%. The government also re-launched the processing equipment revitalization scheme. The government allocated IDR9 tln (USD1.05 bln) to revitalise its ageing sugar mills, but only IDR1.5 tln had been utilised by 2011. As early as in 2010, the industry warned that problems acquiring land for new sugar plantations and mills would likely prevent the country from meeting its goal of becoming self-sufficient in sugar by 2014. Thus, the industry reported a lack of progress in surveying and zoning land to be used for sugar cane plantations and mills in Papua, South Sulawesi, and Sumatra. In September 2012, the Indonesian Sugar Association arrived at the conclusion that it would not be possible to reach the self-sufficiency target (5.7 mln tonnes of domestically produced sugar by 2014). This conclusion was shared by the Ministry of Agriculture, which noted that there had been no expansion of sugar cane plantations as planned, while the revitalisation of sugar mills had not worked either, and the plan to build new mills had not been implemented. As a result, the Ministry slashed the country's sugar production target for 2013 to 2.8 mln tonnes (from the 4.9 mln tonnes set in the government's long-term Industry Development Plan).

3.2 mln tonnes from local production. In 2020, Indonesia was targeted to achieve sugar self-sufficiency by fulfilling total sugar needs (direct and local industries consumption) of 6.3 mln tonnes. From 2025 to 2045, Indonesia aimed to be self-sufficient and to increase production to contribute to the world sugar demand.

In October 2020, State plantation holding company PT Perkebunan Nusantara III announced that it plans to expand sugarcane plantations and renovate mills in a bid to double annual production of sugar by 2025¹⁴. At that time the group's white sugar output accounted for 40% of domestic production, and it hoped to reduce Indonesia's import requirements as output increases. It would partner with state forestry firm Perum Perhutani and small plantation holders to expand the plantation size to 300,000 ha from 60,000 ha within five years. The expansion was to include conversion of some rubber plantations. Furthermore, to improve its sugar business further, the company expected to develop investor partnerships, with possible joint ventures. An initial public offering is also in the pipeline after it completes its debt restructuring. The group acts as the holding company for 14 state plantation firms and three agriculture-related firms and was in the process of obtaining IDR4 trillion of government bailout funds to finance activities during the pandemic.

Meanwhile, the Industry Ministry was encouraging the development of sugar mills that are integrated with sugar cane plantations to meet the increasing demand in the domestic market. The development of such integrated sugar plants would require a strategic policy that created a conducive investment climate, according to the Industry Minister.

Most recently, in November 2022, President Widodo announced that Indonesia will become self-sufficient in plantation white sugar for direct consumption by 2028, and self-sufficient in GKP, including industrial use by the food& beverage, pharmaceutical and MSG industries, by 2030. The government is proposing to expand state-managed cane area to 700,000 ha from 180,000 ha, not just in the traditional sugar heartland of Java, but also in other regions across the archipelago. This would take total cane acreage to around 1 mln ha if successful.

In its entirety, the sugar self-sufficiency programme will cover:

- Sugarcane land expansion up to 700,000 hectares from plantation, social forestry, agroforestry, and smallholders;
- Sugarcane yield increase to 93 tonnes/ha from the current 72.3 tonnes/ha through improved agriculture practices;
- Improved efficiency, utilisation, and capacity of sugar mills to reach a sucrose recovery yield of 11.2%; and
- Improved sugarcane farmers welfare.

The plan has been entrusted to the state-owned plantation firm PT Perkebunan Nusantara X (PTPN X) and state-owned sugar miller PT Sinergi Gula Nusantara (PT SGN) to ensure government control over the expansion. However, sugar consumption is growing rapidly, and the cane and milling sector needs substantial

¹⁴ [Indonesia Double Sugar in 5 Years | Sugar Asia Magazine \(sugar-asia.com\)](https://sugar-asia.com)

capital investment. So, there is a real question over whether the revitalisation of the national sugar industry can succeed in achieving self sufficiency.

(1) REVITALISATION OF NATIONAL SUGAR INDUSTRY

The government announced in October 2022 that it was establishing what will become the nation's largest sugar company by 2028, aiming to seize control of the local sugar market in the same way it dominates the palm oil sector. The Minister of State-Owned Enterprises (SOEs) inaugurated the revitalization of the national sugar industry to support food and energy security in Mojokerto, East Java in October 2022. The inauguration marked the beginning of the organizational structuring of the state-owned plantation firm PT Perkebunan Nusantara III (Persero) (PTPN Group)¹⁵ through the establishment of state-owned sugar miller PT Sinergi Gula Nusantara (PT SGN) which will play important roles in supporting food and energy security¹⁶.

PT SGN is the realisation of business transformation acceleration at PTPN Group Holding from the merger of assets of the sugarcane plantation companies owned by PTPN Group, namely PTPN II, PTPN VII, PTPN IX, PTPN X, PTPN XI, PTPN XII and PTPN XIV. The transformation of PTPN also established two other entities: PT Sinergi Sawit Nusantara, and PT Aset Manajemen Nusantara.

As the sole operating entity of 36 sugar mills, owned by PTPN Group, PT SGN will become the largest sugar company in Indonesia and will be implementing further land expansion for sugar cane to 700,000 ha (from 180,000 ha) over the next six years by 2028. With this land area, it is expected that PT SGN will be able to control 60%-70% of the national sugar market by 2028. Revitalization of the National Sugar Industry carried out by PT SGN includes *on-farm* as well as *off-farm* intensification and extensification so that the national market for plantation white sugar for direct consumption is expected to reach self-sufficiency by 2028, and for industrial use by the food&beverage, pharmacy and MSG industries by 2030.

In addition to food self-sufficiency purposes, PT SGN is also projected to help realise Indonesia's energy self-sufficiency programme through sugarcane-based bioethanol. So, in line with the increase in sugar productivity achieved by PT SGN, the production of sugarcane-based bioethanol is also anticipated to increase, with state owned national energy company Pertamina as the intended user in fuel blends.

¹⁵ <https://holding-perkebunan.com/company-profile/?lang=en>

PT Perkebunan Nusantara III (Persero) is a State-Owned Enterprise (BUMN) engaged in the management, processing and marketing of Plantation products. The commodities cultivated are palm oil, rubber, sugarcane, tea, coffee, tobacco, various woods, fruits and various other plants.

¹⁶ <https://www.medcom.id/english/business/zNArdX3b-thohir-team-forms-pt-sinergi-gula-nusantara-to-support-food-and-energy-security>

The government first announced its intention to establish a holding company for state-controlled sugar mills in September 2021¹⁷. Sugar mills under the state plantation group PT Perkebunan Nusantara III (PTPN III) were noted as currently transferring their assets to a new holding company, which will invest around IDR20 trillion (USD1.40 bln) for expansion, including for new mills. National plantation holding firm PT Perkebunan Nusantara III (PTPN III) established SugarCo, officially named PT Sinergi Gula Nusantara (PT SGN), on August 17th by placing 35 sugar factories – previously owned by seven PTPN III subsidiaries – under the new company.

Key Elements of National Sugar Self-Sufficiency Acceleration Programme

In direct recognition of the determination of the President to achieve sugar self-sufficiency by 2030 (National Sugar Self-sufficiency Acceleration Programme) and boost bioethanol production, the December 2022 National Sugar Summit 2022¹⁸ (NSS 2022), which was convened in Yogyakarta, adopted the theme of "Challenges and Strategies For Accelerating Sugar Self-Sufficiency in Supporting National Food and Energy Security". NSS 2022 was organized by the Indonesian Sugar Association (AGI) and Indonesian sugar expert (IKAGI) in collaboration with PT Perkebunan Nusantara III (Persero) and PT LPP Agro Nusantara. The 460 participants discussed three key issues:

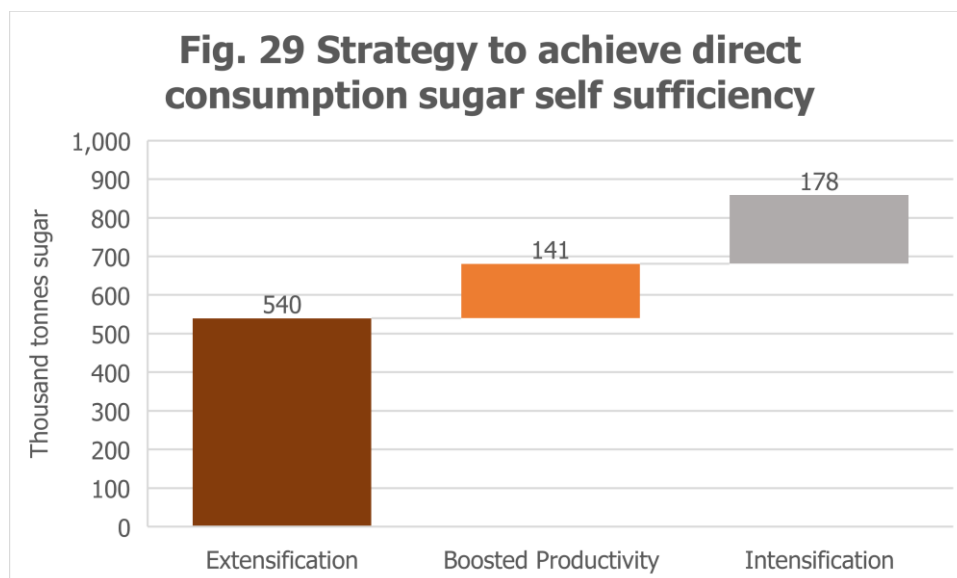
1. Land provision for sugar cane (up to 700,000 ha), including partnerships with farmers.
2. Increased productivity of sugar cane (93 tonnes/ha with a yield of 11.2%); and
3. Increasing bioethanol production in order to reduce dependency to fuel oil.

From a Ministry of Agriculture paper, as noted at the Informa 2022 Sugar & Ethanol Asia Conference¹⁹, the three key strategic elements to boost local production of plantation white sugar for direct consumption by 850,000 tonnes in 2028 are: extensification, boosted productivity and intensification – as set out in Fig 29. The basis to these estimated production gains is set out in Box 2.

¹⁷ [Indonesia plans 2024 sugar output boost, lower imports with new firm | Sugar Asia Magazine \(sugar-asia.com\)](https://sugar-asia.com/)

¹⁸ <https://asosiasigulaindonesia.org/wp-content/uploads/2022/12/Pres-release-pembukaan-Rev1-2.pdf>

¹⁹ Dwi Purnomo Putranto, Indonesia Sugar Association (AGI), Indonesia: Supplying the Sugar Deficit.



Box 2– Achieving self-sufficiency in direct consumption sugar by 2028

1. **Extensification** – develop new cane plantations amounting to 75,000 ha.
2. **Boost productivity** to 85 tonnes/ha and sugar yield to 8.47% to produce an extra **539,692** tonnes of sugar.
3. **Intensification** – replanting and ratoon maintenance.
 - a. Replanting – 75,000 ha (ratoon removal)
 - b. Productivity improvement - +15 tonnes/ha, sugar yield +0.85%.
Equates to 75,000 ha*85 tonnes cane/ha *8.35% (532,313 tonnes sugar) Vs 75,000ha*70 tonnes/ha *7.45% (391,125 tonnes sugar) = **141,189** tonnes sugar
Ratoon intensification = 125,000 ha (ratoon maintenance).
 - c. Productivity improvement +13 tonnes cane/ha, yield +0.55% equates to 125,000 ha*83 tonnes cane/ha * 8.0% (830,000 tonnes) vs 125,000 *70 tonnes cane/ha *7.45% (651,875 tonnes) = **178,125** tonnes sugar.

Extensification and boosted productivity and intensification - +539,692 tonnes +141,189 tonnes + 178,125 tonnes = **859,006** tonnes of extra sugar.

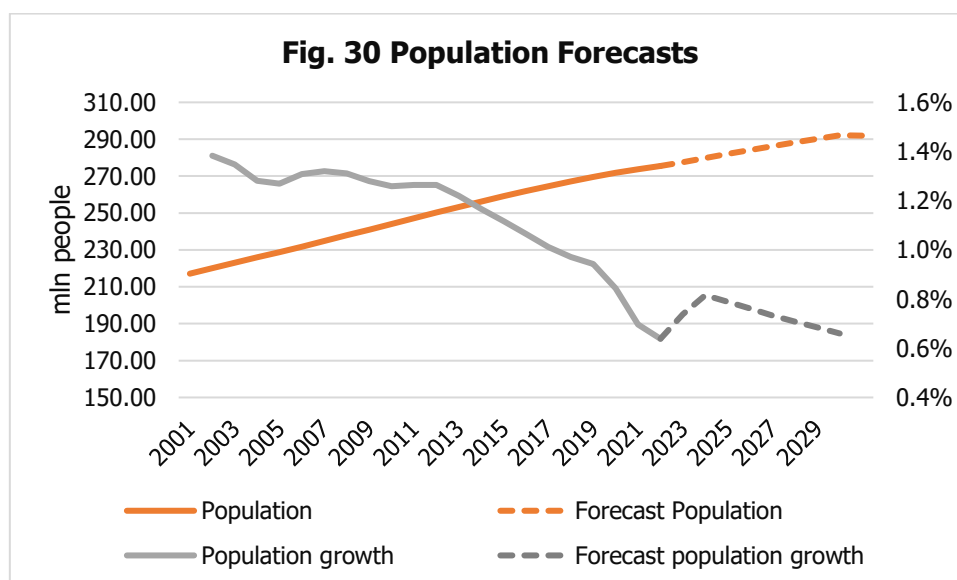
Late in 2022, President Joko Widodo was optimistic that Indonesia can attain self-sufficiency in sugar. At an event in November 2022 - "Cane Bioethanol for Energy

Security"²⁰ - the President noted that good cropping systems, soil fertility, and superior varieties of sugarcane currently being planted support the government's efforts to increase the country's sugar production.

But by January 2023, sugarcane farmers were expressing doubt over the President's optimism regarding self-sufficiency in sugar²¹. Farmers who are members of APTRI cited inadequate road infrastructure as a key barrier. The General Chairperson of APTRI admitted to being pessimistic about the government's target of realizing self-sufficiency in direct consumption sugar by 2027. The needs of farmers ranging from good seed cane to fertilizers, in order to producer good quality cane, are still difficult to obtain. Furthermore, identifying 700,000ha of new cane land adjacent to factories would be difficult. Farmers on Java continue to opt for growing food crops such as rice, corn, or soybean that can be harvested up to three times in a year. Lack of infrastructure make it difficult to expand area outside of Java. The only area feasible for sugarcane plantation expansion is in southern part of Sumatra. Yet, even in that region, sugarcane faces strong competition from cassava. Therefore, instead of expanding, Indonesian sugarcane acreage have tended to decline over recent years.

(2) CONSUMPTION OUTLOOK

The key drivers boosting sugar consumption were identified above and included population growth together with rapidly-rising per capita income and a strong rate of urbanization. Looking forward, the rate of change in each of these key factors is likely to slow.

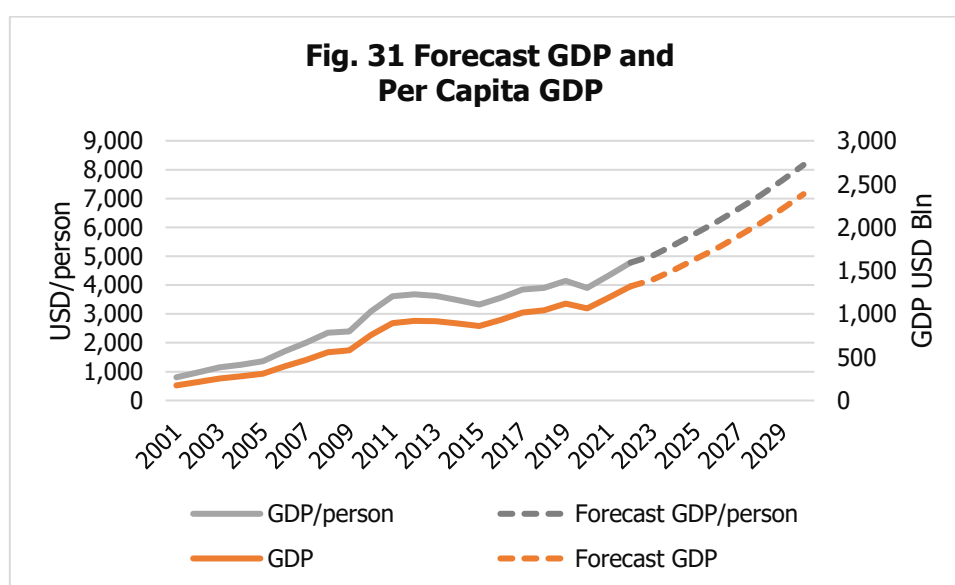


²⁰ <https://regional.kompas.com/read/2022/11/04/161037578/jokowi-optimistis-indonesia-swasembada-gula-dalam-5-tahun?page=all>

²¹ <https://news.majalahhortus.com/petani-tebu-ragukan-optimisme-presiden-soal-swasembada-gula/>

According to the UN, annual population growth is forecast to slow to 0.68% by 2030, compared to much higher historic levels, albeit the rate of population growth has been slowing over the past two decades, see Fig. 30. Not only is the rate of population growth slowing, but Indonesia’s population is aging. The UN shows the percentage of the population aged 65 and over will increase by 50% in the period to 2030. This fact will also tend to slow the rate of sugar consumption growth as there is evidence that per person consumption falls with age.

Whilst Indonesia’s slowing urbanisation rate and population growth rate will likely work to reduce the annual growth in sugar consumption, rising per capita incomes suggest more disposable income which is supportive of higher per capita sugar consumption. The IMF projects per capita GDP to continue growing strongly²² (Fig. 31) at an average rate of 7.6% annually to 2030 (in nominal terms).



Threats to Sugar Consumption

(i) Sugar Tax

Sugar consumption could be adversely impacted by the threatened imposition of a sugar tax – over 50 countries globally have introduced taxes targeting sugar consumption, principally in soft drinks. In July 2022 there were reports that Indonesia’s government was proposing to impose an excise duty on sugar-sweetened beverages (Minuman Berpemanis Dalam Kemasan or MBDK) from the beginning of 2023. The Finance Ministry and the House of Representatives Budget Committee (Banggar) agreed to include sugary drinks as goods subject to excise tax in next year’s budget²³. Earlier in 2020, Indonesia's finance minister proposed to levy excise taxes ranging from IDR1,500 to IDR2,500/litre (USD0.11-USD0.18 at the time) on sugar-sweetened beverages, such as bottled tea, coffee, carbonated soft drinks and energy drinks.

²² IMF World Economic Outlook Database April 2023.

²³ : <https://www.thejakartapost.com/indonesia/2022/10/05/govt-includes-sugary-drink-tax-in-2023-budget.html>

The justification for a sugar tax is to dampen the rise in consumption of sugar-containing soft drinks, which had risen strongly over the last 20 years. The sponsors of the legislation argued that the high level of consumption is significantly impacting Indonesia's health and social and economic development. Such a sugar tax was aimed at generating a tax revenue of IDR1.5 trillion/year (USD100 million).

However, the threatened tax has not yet been signed into law by the President. Concerns over the cost-of-living crisis have seen several countries postpone decisions over the introduction of new taxes.

(ii) Alternative Sweeteners

A longer-term issue, when considering future sugar consumption growth, is possible erosion due to rising use of alternative sweeteners, both caloric and non-caloric. The major caloric alternative to sugar in Indonesia, as already noted, is high fructose corn syrup (HFCS).

Even so, HFCS presently accounts for a minor share of Indonesia's sweetener use. This in part is due to a high import tariff on imports (which would come from China and South Korea). Government policy on imported HFCS is likely to ensure little future growth in HFCS use, as the priority is to support local sugarcane growers and millers, especially in the context of its sugar self-sufficiency goals.

Another caloric sweetener is palm sugar (gula semuit Aren, or gula jawa), a traditional sweetener used mainly in desserts and cakes, which over recent years has begun to substitute for sugar with several companies marketing the sweetener as an alternative to sugar for direct consumption. For instance, drinking coffee with palm sugar is gaining prevalence – especially palm sugar milk coffee. One significant producer is Gulare organic palm sugar, with a core mission to provide its customers with a delicious healthy alternative to cane sugar²⁴. Indonesia is reportedly the largest coconut and palm sugar producer in the world. Producers also export palm sugar to overseas customers. Whilst a significant industry in its own right, the palm sugar sector is outside the scope of this study, but the potential for palm sugar to substitute for sugar in some home and industrial applications is acknowledged.

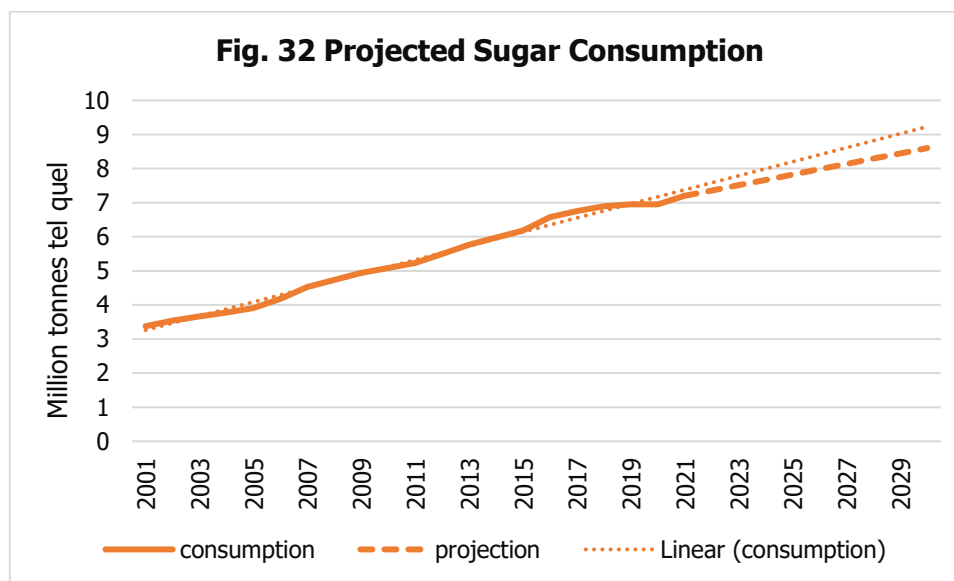
For non-caloric alternative sweeteners, little information is available concerning their prevalence and consumption level, and for the purpose of this study, the assumption is that such sweeteners do not represent a significant material threat to sugar consumption growth.

Projection to 2030

On balance, the ISO anticipates that sugar consumption can rise beyond the predicted population growth rate, with ongoing urbanization and rising GDP/person inflating likely gains in consumption, engendering further expansion of the food & beverage industry. That is, we expect per capita consumption to rise further from the 2022 level of 28.9 kg/person. Our expectation is for sugar consumption to rise from the 2022 level of 7.25 mln tonnes to 8.6 mln tonnes in 2030, factoring a

²⁴ <https://gulare.co.id/about-us>

forecast population of 292 mln and allowing per capita consumption to rise further to around 29.5 kg/person, see Fig. 32.



The ISO is not the only organisation predicting further growth in sugar consumption. Early in 2023, the Minister of Trade noted expectations were that sugar demand for the food & beverage industry would increase by between 5%-7% per year. "With the growing national demand for sugar, in 2030 it is projected that the national sugar demand will reach 9.81 mln tonnes"²⁵. Elsewhere, the Organisation for Economic Co-operation and Development (OECD) predicts that Indonesian consumption growth between 2020 and 2030 will be second only to India and reach 9.0 mln tonnes in 2030²⁶.

The predicted consumption growth to 2030 is extremely significant in the context of the government's drive for self-sufficiency, necessitating a huge increase in production over the remainder of this decade, while overcoming existing limitations in terms of scale and sugar quality.

(3) PRODUCTION OUTLOOK AND SCENARIOS

(i) Key Issues

The problems in sugar production in Indonesia include a declining sugarcane acreage, farm inefficiency, lack of good seed cane varieties, low productivity, and inefficient and aging sugar mills. Therefore, achieving national self-sufficiency target cannot be separated from land extensification. To achieve sugar self-sufficiency, policies to increase agricultural area planted with cane, productivity and sugar yield need to be executed simultaneously. This is the approach taken by the government's latest self-sufficiency strategy.

²⁵ <https://news.majalahhortus.com/produksi-minim-2023-pemerintah-akan-impor-gula-46-juta-ton/>

²⁶ OECD/FAO (2022), "Sugar", in *OECD-FAO Agricultural Outlook 2022-2031*, OECD Publishing, Paris, <https://doi.org/10.1787/363f8d84-en>.

The long-term outlook for Indonesia's sugar sector and the degree to which self-sufficiency can be achieved is not easily ascertained. Boosting production will be challenging and the enormity of the undertaking can be ascertained by considering several key issues that must be addressed to ensure local production can expand.

These include:

- Land extensification;
- Cane yields need improvement; and
- Sucrose yields are poor.

To address these challenges, the sugar industry needs to expand the sugarcane plantation area, use high yielding varieties, improve agronomic management and postharvest technology, and increases sugar mill efficiency²⁷.

Three consequent strategies to fulfil sugar demand in Indonesia are: (1) Increasing cane production, which includes increasing cane productivity, reducing loss at harvest time, and increasing farming efficiency. (2) Extensification via new land development and land consolidation are required to increase sugar cane production. (3) Increasing sugar yield and value added products through revitalization of existing sugar mills, establishing new mills outside Java, and the development of downstream value-add industries. That is, to increase production and move towards self-sufficiency, two approaches need to be executed simultaneously: an increase in sugarcane planting area, and an increase in cane productivity and sugar yield.

Concerning land extensification, the existing sugarcane area is mainly on Java Island, where land and labour costs are very high. A sugar agroindustry needs to be developed outside of Java, given the rapid growth in population and population density. In the long run, the sugar industry needs to expand to dryland areas and islands outside of Java, managed by the private sector. But there is also a problem of land competition with palm oil. Land acquisition is a considerable obstacle in Indonesia. To obtain new land for sugar plantations, several aspects have to be considered such as (1) the status of the area as development of a new area is only limited to certain land use class (2) land suitability for sugarcane needs to be assessed and (3) land ownership. An important factor is the current fragmented agricultural land. Fragmented agricultural land has caused land degradation and hampered agricultural development. Fragmented land parcels are characterized by inefficient farm management, high labour cost, restricted irrigation application, and poor crop management. Land consolidation can increase farm sizes and farming efficiency. For smallholder farmers, land consolidation is voluntary, and the emphasis is on local development with the provision of infrastructure.

²⁷ This conclusion and the following discussion are taken from Andi Amran Sulaiman , Yiyi Sulaeman , Novia Mustikasari, Dedi Nursyamsi and Andi Muhammad Syakir, 2019, Increasing Sugar Production in Indonesia through Land Suitability Analysis and Sugar Mill Restructuring, Land 2019, 8, 61; doi:10.3390/land8040061

Concerning cane yield improvement, as already noted, productivity in the domestic sugar industry is low, reportedly due to mismanagement, excess ratooning and lack of varieties. While increases in cane area are the focal point of the government's self-sufficiency goal, looking to improve cane yields through better land management, cane varieties, field inputs, farming practices²⁸ and harvest scheduling should also be key focal points. Currently, high-yielding sugarcane varieties planted by smallholder farmers are lacking. High-yielding sugarcane varieties have high production potential and high tolerance and resistance to certain pest attacks. However, the characteristics of these varieties have not yet been fully realized. Whereas the high-yielding varieties can be supplied in large amounts with modern propagation technology, such as tissue culture, they also require a proper soil and cultivation management system. The adoption of the new varieties and farm technology remains poor. Using high-yielding varieties without applying best management practices and best post-harvest practice will not boost production. Elsewhere, efficient harvesting via mechanization and post-harvest logistic can decrease loss and produce better cane yield and sugar yield.

Finally, it is clear that the mills also require investment and as noted above, achieve a comparatively low average sucrose yield of 7.3%, with obsolete and old machinery and equipment and low milling capacity utilisation. Importantly, development of a downstream industry is key to revitalising mills. Currently, diversification of sugarcane products is lacking, so developing a downstream industry will develop new income sources that will strengthen the sugar industry. Sugar mills can be reoriented to produce several products. Beside crystal sugar, sugar mills, with the investment in new processing technology, can produce liquid sugar, brown sugar, and other speciality sugar while also being able to produce the substrate for all fermentation outcomes. The emphasis in the government's revitalisation strategy however is the production of fuel ethanol from molasses, as will be discussed later.

(II) PRODUCTION GROWTH SCENARIOS

Based on the above discussion, three alternative scenarios are considered against the current situation:

Scenario 1: Area Increase;

Scenario 2: Yield increase; and

Scenario 3: A combination of area and yield increase, as set out in table 11²⁹

In each scenario the government's targeted gains in area, together with agricultural and sugar yields are used.

²⁸ In terms of increasing farming efficiency, agronomically, improving production requires sophisticated site-specific nutrient management, water management via irrigation, and integrated weed, pest, and disease control. Site-specific nutrient management requires regular soil and plant nutrient testing so that efficient fertilizer recommendations can be formulated to increase yield and reduce overfertilization. A proper water balance calculation for irrigation scheduling is necessary.

²⁹ These scenarios were identified by Czarnikow in an article published November 10th 2022: Stephen Geldart , "How Realistic is Indonesia's Sugar Self-Sufficiency Plan?"

Table 11: Production Scenarios 2030

	Current	Scenario 1 Area Increase	Scenario 2 Yield Increase	Scenario 3 Combination
Cane Area (mln ha)	0.45	1.0	0.45	1.0
Agricultural Yield (tonnes/ha)	72	72	93	93
Cane grown (mln tonnes)	32.4	72	41.9	93
Sucrose Yield (%)	7.3	7.3	11.2	11.2
Sugar Produced (mln tonnes)	2.35	5.2	4.7	10.4
Self Sufficiency	No	No	No	Yes

SCENARIO 1: CANE AREA EXPANSION

Under this scenario, cane area increases to 1.0 mln ha, but there is no agricultural yield improvement and no sucrose yield improvement. Around 72 mln tonnes of cane would be grown – a massive 40 mln tonne rise - exceeding current milling capacity of 51 mln tonnes.

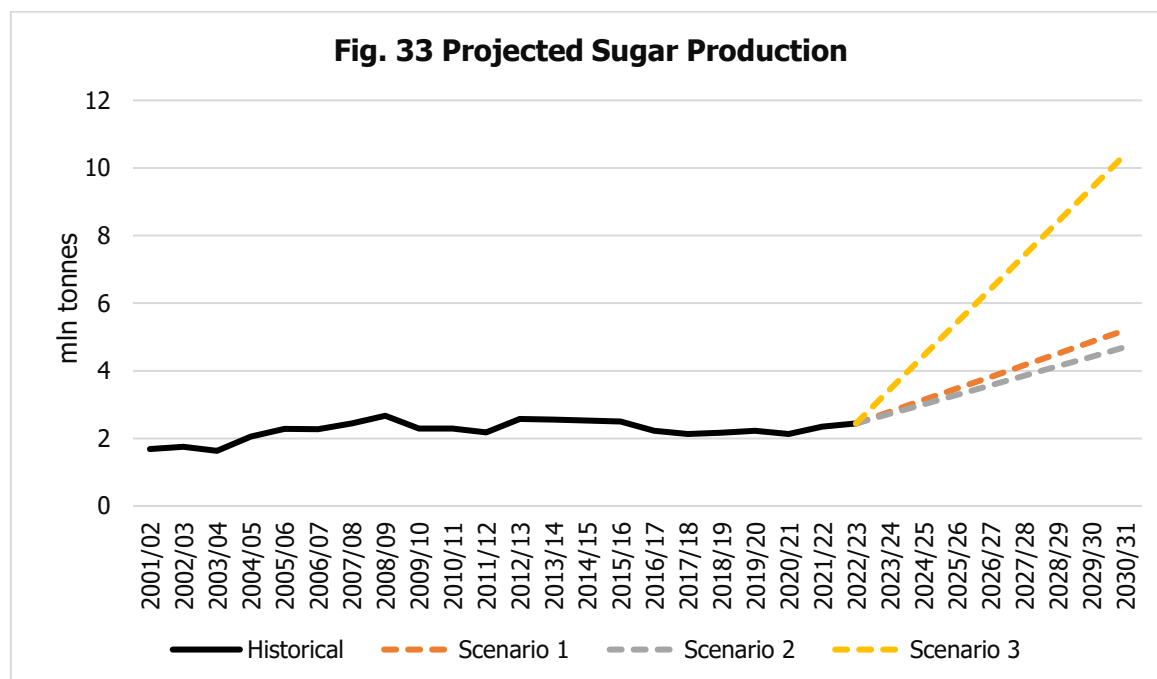
Although the proposed area of land may be available, a 2.5-fold expansion of land under cane will require considerable crop estate and infrastructure investment and investment in new milling capacity to process the 120% increase in sugar cane production. Sugar production would be boosted to 5.2 mln tonnes, but not enough to be self-sufficient by 2030.

SCENARIO 2: YIELD INCREASE

Under this scenario, cane acreage remains unchanged at the 2022 level of 450,000 ha. Agricultural yields are assumed to increase to 93 tonnes/ha, and sucrose yields are increased to 11.2%. A total of 41.9 mln tonnes of cane would be grown. Indonesia already has the capacity to process this volume of cane. Some 4.7 mln tonnes of sugar would be produced, but not enough to be self-sufficient by 2030. This scenario requires support to provide loans, or subsidies, to smallholder farmers to replant existing sugarcane areas with high-yielding varieties, for instance.

SCENARIO 3: CANE AREA EXPANSION & YIELD INCREASE

Based on the above two scenarios, a balance between maximising productivity and increasing planting land area would generate the largest uptick in sugar production. Under this scenario, cane area increases to 1 mln ha and agricultural yields increase to 93 tonnes/ha. Sucrose yields are increased to 11.2%. A total of 93 mln tonnes of cane would be grown (a 60 mln tonne rise) and 10.4 mln tonnes of sugar would be produced. This would make Indonesia a surplus sugar producer. But the investment required is huge: increasing cane acreage, improving yields and also increasing milling capacity. Self-sufficiency in 2030 could be achieved with less land, and assuming the targeted cane and sugar yields are reached of cane harvested would generate 10.42 tonnes of sugar, so self-sufficiency in 2030 could be reached with an expansion of 0.375 mln ha under cane to 0.825 mln ha.



Projected production levels to 2030 for each scenario are shown in Fig. 33. This simple scenario approach can be strengthened by considering the matrix shown in Table 12. The matrix calculates the volume of cane grown under different area and agricultural yield scenarios, with the shaded cells indicating cane production in excess of the current crushing capacity of 51 mln tonnes.

Table 12: Sugar Cane Production Matrix 2030

Ag yield (tonne/ha)	70	75	80	85	90	95
Cane Area ('000 ha)						
400	28.0	30.0	32.0	34.0	36.0	38.0
500	35.0	37.5	40.0	42.5	45.0	47.5
600	42.0	45.0	48.0	51.0	54.0	57.0
700	49.0	52.5	56.0	59.5	63.0	66.5
800	56.0	60.0	64.0	68.0	72.0	76.0
900	63.0	67.5	72.0	76.5	81.0	85.5
1,000	70.0	75.0	80.0	85.0	90.0	95.0
1,100	77.0	82.5	88.0	93.5	99.0	104.5

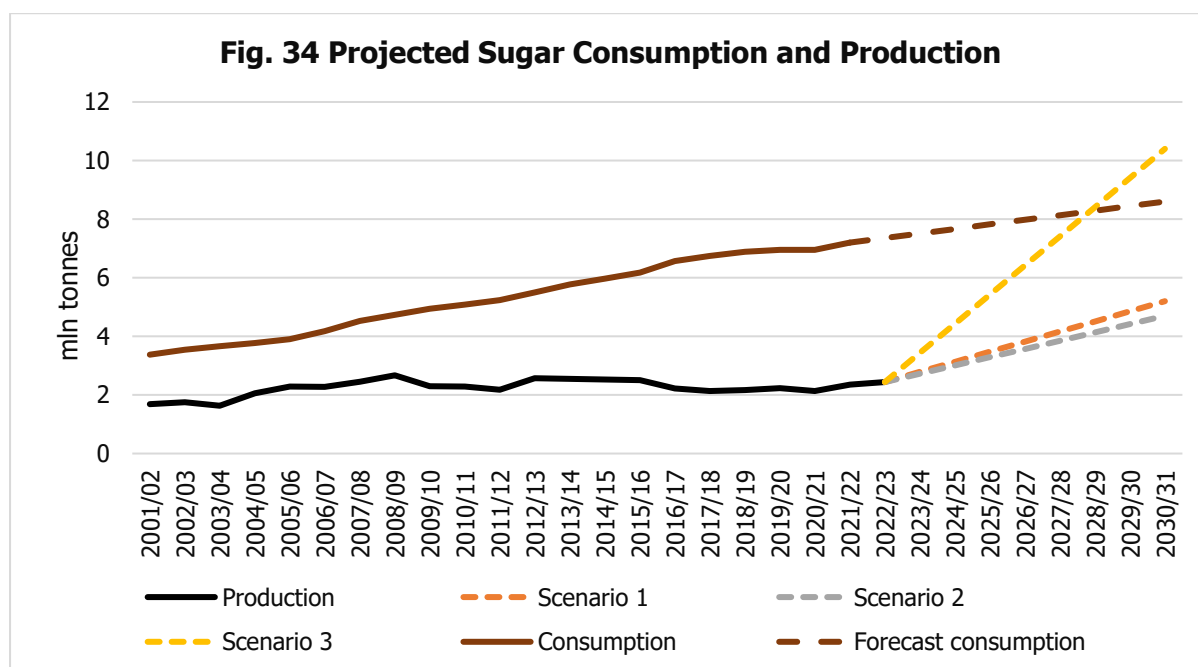
The associated matrix in table 13 shows volume of sugar produced under different cane tonnage and sucrose yield scenarios. The table easily illustrates that Indonesia requires major yield increases to reach self-sufficiency, (forecast above to be 8.6 mln tonnes in 2030). At best, self-sufficiency in 2030 could be achieved at a cane tonnage of 80 mln tonnes and a sugar yield of 11%.

Table 13: Sugar Production Matrix 2030

Sucrose Yield (kg/tonne cane)	70	80	90	100	110	120
Cane Grown (mln tonnes)						
30	2.1	2.4	2.7	3.0	3.3	3.6
40	2.8	3.2	3.6	4.0	4.4	4.8
50	3.5	4.0	4.5	5.0	5.5	6.0
60	4.2	4.8	5.4	6.0	6.6	7.2
70	4.9	5.6	6.3	7.0	7.7	8.4
80	5.6	6.4	7.2	8.0	8.8	9.6
90	6.3	7.2	8.1	9.0	9.9	10.8
100	7.0	8.0	9.0	10.0	11.0	12.0

(4) SELF-SUFFICIENCY & IMPORT OUTLOOK

In this section, the resulting implications for imports to 2030 arising from the consumption and production projections are briefly presented. As shown in Fig. 34, and as alluded to in the previous section, only scenario 3 sees Indonesia reaching self-sufficiency. Scenarios 1 and 2 see Indonesia continuing to import, as self-sufficiency is not achieved, but imports ease from the current level of around 5 mln tonnes.



As set out in table 14, under scenario 3: imports reduce to zero by 2028/29, and an exportable surplus of almost 1.8 mln tonnes is generated by 2030/31. However, the surplus cane could instead be converted into fuel ethanol under the government’s plans to grow the domestic biofuels sector. Under scenario 2: imports reduce to 3.9

mln tonnes by 2030/31. Under scenario 1: imports reduce to 3.4 mln tonnes by 2030/31.

Table 14: Import Gap/Exportable Surplus for each Production Scenario 2030 (mln tonnes)

	Current	Scenario 1 Area Increase	Scenario 2 Yield Increase	Scenario 3 Combination
Sugar Production	2.35	5.2	4.7	10.4
Consumption	7.3	8.6	8.6	8.6
Import Gap/Exportable Surplus	-4.95*	-3.4	-3.9	+1.8

*2022/23 imports estimated at 5.1 mln tonnes

An alternative scenario that can put these import/exportable surplus projections in a broader context is to assume a baseline under which Indonesia's sugar production does not expand significantly to 2030. Such a scenario is plausible given the huge land expansion and improvements in yields together with investment in milling capacity that are needed to underpin each of the production growth scenarios. Furthermore, the record of limited or no progress towards self-sufficiency agendas set in the past does not auger well for a rapid ramp up in production. On the basis of 2022 policy, the OECD for instance, projects sugar production to rise modestly from 2.2 mln tonnes in 2022 to 2.56 mln tonnes, in 2030 – a gain of 16%. Under such a production outcome and given the ISO's consumption projection of 8.6 mln tonnes, the projected import gap in 2030 would be 6.04mln tonnes, ensuring Indonesia remains a key global importer.

CONCLUSIONS

Indonesia's sugar market is characterized by strongly growing consumption, static local production and consequent rising imports, making the nation one of the globe's major raw sugar importers. Continued growth in sugar consumption is likely over the remainder of this decade – rising from 7.25 mln tonnes in 2022 to a projected figure of 8.6 mln tonnes in 2030, making the government's long harbored ambition to be self-sufficient in sugar more challenging to achieve. The recent Presidential commitment to achieve self-sufficiency in sugar by 2030 can only be achieved by a combination of area expansion, productivity gains and massive investment in sugar mill efficiency and field operations to boost both sugar yields and crushing capacity.

Indonesia obviously would remain one of the world's largest raw sugar importers without any sustained rise in local sugar production, possibly importing around 6 mln tonnes in 2030. But any gains towards self-sufficiency could have far-reaching effects on the world sugar market as Indonesia's raw sugar imports would contract.

Under a scenario approach, area expansion alone (to 1 mln ha area), without any productivity gains would see production rise to 5.2 mln tonnes from 2.35 mln tonnes, with imports contracting to 3.4 mln tonnes in 2030/31. Under scenario 2, cane and sugar yields are assumed higher, but area is unchanged. Sugar production increases to 4.7 mln tonnes and imports ease to 3.9 mln tonnes. The much more powerful combination of area expansion and productivity gains sees Indonesia reaching self-sufficiency in 2028/29 and achieving an exportable surplus in 2030/31.

Whilst a scenario approach - under which local production increases according to different assumptions regarding area expansion and productivity gains, and underpinned by the necessary investment in milling capacities - can illustrate potential implications for the world sugar market, it says nothing about the likelihood of such outcomes being achieved. Can a massive revitalization of Indonesia's sector be achieved over the remainder of this decade?

The scale of the task is monumental, especially against a background of growth in the milling sector having been slow and sucrose yields remaining poor. Indonesia's cane yields are low by international standards, but the potential productivity gains through better land management, cane varieties, field inputs, farming practices and harvest scheduling are significant. Land extensification is key, with an additional 700,000 ha targeted under the government's self-sufficiency ambition. A sugar agroindustry needs to be developed outside of Java, given the rapid growth in population and population density on the main island.

Finally, mills also require investment with obsolete machinery and equipment, inefficient mill performance, and low milling capacity. Importantly, development of a downstream industry is key to revitalising mills in the longer term. Currently, diversification of sugarcane products is lacking, so developing a downstream sugar industry would grow new income sources that will strengthen the sugar industry. Sugar mills can be reoriented to produce several products. Beside crystal sugar, sugar mills, with the investment in new processing technology, can produce liquid sugar, brown sugar, and other speciality sugars plus fermentation substrates. The government's Sugarcane Bioethanol Programme for Energy Security, also announced in early November 2022, targets production of sugarcane bioethanol at 1.2 bln litres in 2030, but this again hinges on the success of sugar industry revitalisation and expansion. Cogeneration potential is significant but relies on investment in high pressure boilers in mills and the provision of an incentivising legislative environment for independent electricity generators.

In conclusion, given the potential far-reaching effects on the sugar market, the extent to which the President's self-sufficiency agenda gains traction and realises gains in cane and sugar production over the coming few years will be closely watched by current key suppliers – Thailand, Brazil and Australia –with a view to understanding the extent to which one of their key markets for raw sugar can diminish or even disappear.