

**India**
**Overweight** *(Initiating coverage)*
**Highlighted Companies**
**Balrampur Chini Mills Ltd**
**ADD, TP Rs443, Rs316 close**

We believe that addition of new distilleries at a rapid pace with an eye on segment leadership will result in steady topline and bottomline growth for the company.

**Triveni Engineering and Industries Ltd**
**ADD, TP Rs394, Rs251 close**

TEIL had been investing and growing its other businesses apart from the sugar business, the divestment of which makes its balance sheet the healthiest in the sector.

**Summary Valuation Metrics**

P/E (x)	Mar22-F	Mar23-F	Mar24-F
Balrampur Chini Mills Ltd	15.98	16.43	9.28
Triveni Engineering and Industries Ltd	16.07	2.95	9.43

P/BV (x)	Mar22-F	Mar23-F	Mar24-F
Balrampur Chini Mills Ltd	2.34	2.06	1.7
Triveni Engineering and Industries Ltd	3.18	1.53	1.33

Dividend Yield	Mar22-F	Mar23-F	Mar24-F
Balrampur Chini Mills Ltd	0%	0.3%	0.54%
Triveni Engineering and Industries Ltd	0%	0.17%	0.53%

**Analyst(s)**

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# Agribusiness

## Sugar sector's quantum leap via ethanol

- The boom-and-bust cycle of the sugar sector is over with its leap into ethanol, thus evolving from its usage as a sweetener to an energy component.
- In our view, sugar production is set to fall in the 2022-23F season by at least ~4.5mt, which will lead to a shortage of 5.6mt in the global market.
- We initiate coverage on the sugar sector with a positive view and ADD rating on Balrampur Chini Mills, and Triveni Engineering & Industries.

**India sugar story so far**

Our thesis is based solely on a one-line argument: "Sugarcane and beet are highly water-consuming crops, and so they are planted in high rainfall areas of every country. A drought means less rainfall in these areas and hence, will lead to lower sugar production." In this context, we forecast a decline in sugar production by 1.5mt in Europe and, at best, flat production in Brazil, and close to 1mt production decline in USA and China. Pakistan, which faced unprecedented floods after the drought in Sindh, accounts for ~26% of the nation's sugar production. We expect ~1.5mt sugar production decline in that country. Overall sugar production decline is estimated to be at least 4.5mt which leads to a shortage of 5.6mt and hence, the stock-to-consumption ratio, in our view, will decline to a six-year low of 51.2%.

**India ethanol story so far**

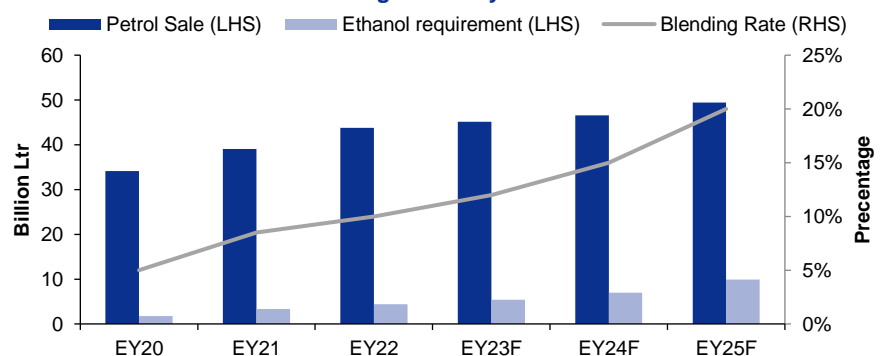
The National Policy on Biofuels (NPB) was framed by the Ministry of New and Renewable Energy in 2009. The NPB was approved by the Union Cabinet in May 2018. For the first time during 2018, differential prices of ethanol based on raw material utilized for production was announced by the government. These decisions have significantly improved the supply of ethanol and thus, ethanol procurement by public sector oil marketing companies or OMCs increased from ~380mL in Ethanol Supply Year (ESY) 2013-14 to over ~1,950mL in ESY 2019-20.

**Quantum leap via foray into ethanol**

Sugar prices are on an upward trajectory, but increased manufacturing of ethanol limits the market impact of excess sugar production. The boom-and-bust cycle of the sugar industry is over with its leap into the ethanol space – evolving from its usage as a sweetener to an energy component as well.

**Initiating coverage on sugar sector with positive view**

We initiate coverage on the sugar sector with an ADD rating on Balrampur Chini Mills, and Triveni Engineering & Industries. Downside risks are of two types - climatic and regulatory. 1) Climatic risk - Rainfall plays the most important role as without water there will be no cultivation of the key raw material, which is sugarcane. 2) Regulatory risk: Purchase price of key raw material sugarcane is regulated by the government in the form of SAP (state advisory price) and FRP (fixed remunerative price). Prices of key by-products like ethanol, ENA, electricity, and molasses are also regulated by the government.

**Figure 1: Ethanol demand for blending with petrol - the growth will be at a CAGR of ~31% over SY21-25F with the blending rate likely to touch 20% in SY25F**


SOURCE: INCRED RESEARCH, COMPANY REPORTS

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# Sugar sector's quantum leap via ethanol

## The sugar story - basics

### What is SY ▶

SY stands for Sugar Year (Oct to Sep).

### Global sugar sector overview ▶

As per International Sugar Organization or ISO, in Feb 2022, global sugar production for the marketing year 2021-22 was estimated at 170.5mt, a marginal rise of 1.5mt over the previous season. There was a reduction in sugar production in Brazil, which was expected to counter-balance the rise in the European Union or EU, India, Russia, and Thailand.

Global consumption of sugar was estimated at 172.4mt in CY21-22, up marginally from 171.3mt in CY20-21, following consumption growth in China, India, and Russia. Sugar exports were expected to remain flat; a steep rise in India and Thailand trade to be offset by lower shipments from Brazil. Global sugar exports were estimated at ~58mt in CY21-22 compared to 62mt in the previous year. Sugar stocks were expected to remain low on account of production decline in China, Indonesia and Thailand.

Production and exports were seen rising to record levels in India. Higher production and exports from India could counter the lower production and exports from Brazil. The small estimated global deficit could turn into a small surplus. A spurt in crude oil prices strengthened sugar prices as Brazil went for increased ethanol output in its production matrix.

A clear picture can emerge only after the Indian sugar season ends even as the country emerged as a key global sugar trade player; sugar prices could retreat in case of supply from Brazil easing.

The principal driver of the global sugar market is the geopolitical turmoil because of the ongoing Russia-Ukraine war. After a severe impact on energy prices, production cost and potential land diversion from beet to grain, the conflict indirectly aids sugar realization. Global sugar production/consumption witnessed two successive deficit years (relatively small) that moderated sugar stocks at the origin and the destination.

Realization strengthened across several countries as import parity emerged. Raw sugar shipment in 1Q of 2022 hit a record, around 30% higher than the average of previous five years.

Going ahead, a range of geopolitical factors could influence global sugar realization. These factors could comprise changes in realization of agricultural commodities like wheat, land diversion from beet to wheat cultivation in Europe, lower corn ethanol production in Brazil, higher ethanol exports from Brazil, higher energy cum fertilizer cost and capacity to sow beet in Ukraine for the 2022-23F crop.

These factors can also strengthen realization and influence consumption, moderating demand from one perspective and enhancing stocking on the other to counter market uncertainty.

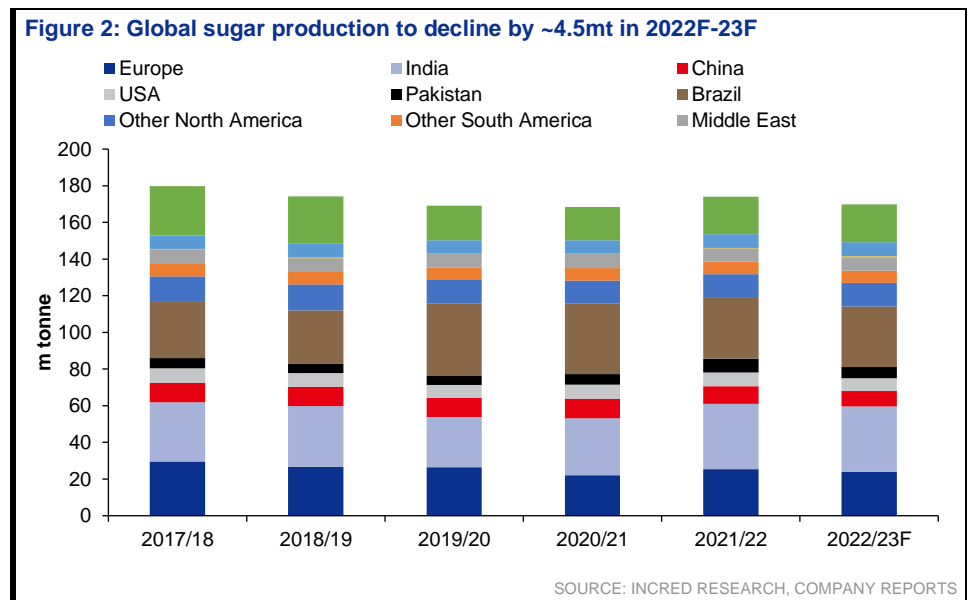
## **Key sugar producers and their estimated production, as per the US Department of Agriculture or USDA's May 2022 review ➤**

- US production is estimated to decline by 2 percent to 8.2mt in CY22F-23F on lower forecast of sugar beet yield relative to CY21-22. Imports are set to decline by 13 percent to 2.7mt based on projected quota programs set at minimum levels, consistent with the World Trade Organization and the Free Trade Agreement obligations and on projected imports from Mexico, imports for re-exports, and high-tier tariff imports. Consumption to remain unchanged while stocks to decline with the drop in production and imports.
- Brazil's production is estimated to go up by 1.0mt to 36.4mt as higher sugarcane yield from a favourable weather is likely to result in additional sugarcane being made available for crushing. Harvested area is lower as marginal sugarcane areas switch to soybean and corn. The sugar/ethanol production mix is expected to remain unchanged relative to the previous season at 45 percent sugar and 55 percent ethanol. The ongoing war in Ukraine has no significant impact on the current sugarcane crop, given that fertilizer purchases and consumption have already taken place. Consumption is unchanged and stocks are down, while exports are projected to rise with higher exportable supplies.
- India's production is forecast to decline by 3 percent to 35.8mt as less cane is processed for sugar. Consumption is anticipated at a record high with the expectation of continued favourable retail and institutional sugar demand. Imports to remain unchanged while exports are expected to decline by over 40 percent, given the expected return to normal trade volume. Record exports are estimated in CY21-22F following global supply shortfall. On 24 May 2022, the Ministry of Commerce and Industry, through the Directorate General of Foreign Trade, announced an amendment to its sugar export policy. Amid overseas sales, India issued a notification curbing the export of sugar to check domestic inflation and to channel more sugarcane into ethanol production. According to the amendment, exports of raw, refined, and white sugar have been placed under the 'restricted' category. Exports occurring after 1 Jun 2022 will require a special permission from the Directorate of Sugar, under the Department of Food and Public Distribution. However, sugar exports destined for the US and the EU under tariff rate quota and Schedule CXL quota, respectively, are exempted from this directive. This was the first restriction on sugar exports in six years. Sugar stocks are up almost 15 percent with likely lower exports.
- European Union or EU's sugar production is forecast to decline by 2,50,000t to 16.3mt as farmers reduce sugar beet planting in favour of more profitable crops like corn. Consumption and exports to remain unchanged. Imports to decline as the EU food industry works to reduce sugar content in food products. Sugar stocks are down due to lower production and imports.
- China's production to rise by 400,000t to 10mt with rising cane sugar and beet sugar production. This is on the assumption of a favourable weather and that beet mill incentives are successful at keeping farmers to lay their bets on planting sugar beet. Consumption is expected to rise on the assumption that Covid-related restrictions will ease, including stay-at-home orders which currently limit sugar consumption. Imports and stocks to decline as high global sugar prices encourage stock drawdown.
- Pakistan's sugar production is forecast to rise marginally to 7.2mt due to a slight increase in acreage and sugarcane yield. Consumption is set to grow with the population and demand from the expanding food processing sector. Exports are forecast to double on expectations of larger exportable supplies. Despite higher production, stocks are projected to be up only slightly amid surging exports.
- Mexico's sugar production is estimated to go down slightly to 6.4mt. Consumption is expected to be flat, while stocks to remain unchanged and exports are projected to be higher. Exports to the US will be limited by the level of US needs, as defined in the amended Suspension Agreements.

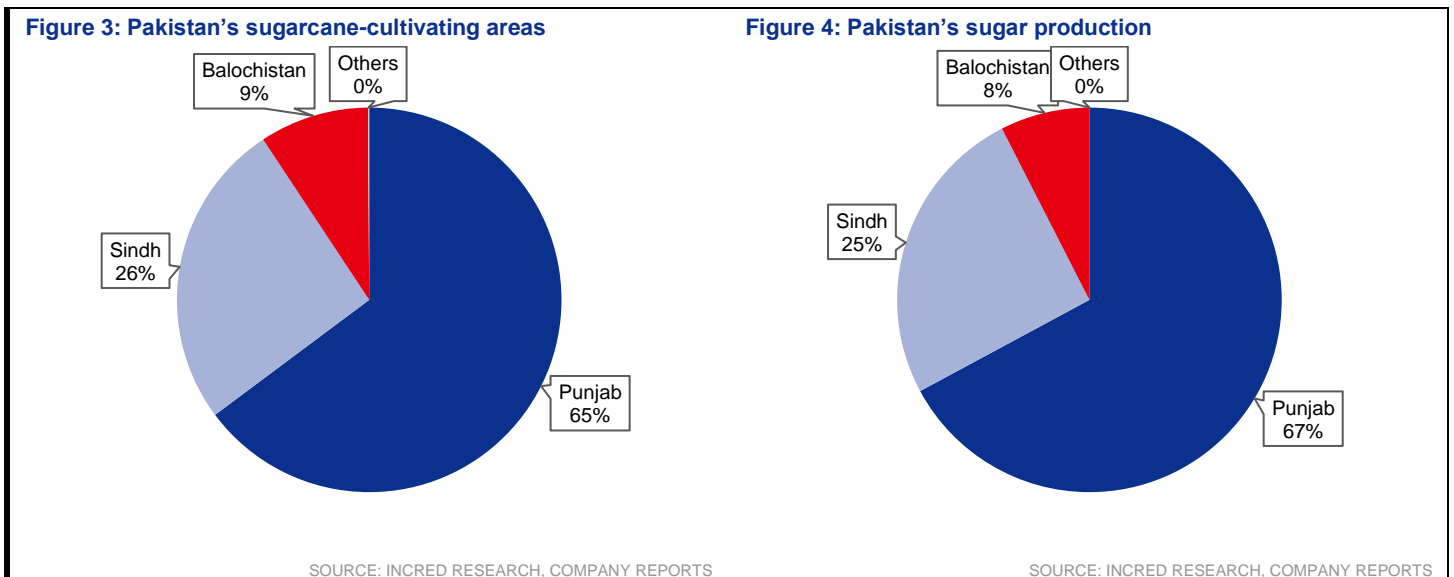
- Australia's sugar production is estimated to rise by 330,000t to 4.5mt due to an expected rise in sugarcane crushing. The increase in production to be driven by anticipated improvement in sugar cane yield, mainly in the northern tropical regions of Queensland which have witnessed improved crop growth conditions for the first nine months of the season. Consumption, exports, and stocks are all set to be higher with a rise in production. Around 80 percent of Australian sugar is exported, with around 90 percent expected to go to Indonesia, Japan, and South Korea.
- Egypt's sugar production is set to go up by 70,000t to 2.9mt on higher sugarbeet acreage. The rise in acreage is attributed to the establishment of new sugarbeet processing plants. Consumption is set to go up with population growth and expansion of the confectionary food products sector. Imports are expected to remain unchanged as the demand is met from higher output.
- Guatemala's sugar production is forecast to remain flat at 2.6mt. Consumption and exports to be up slightly while stocks are likely to decline because of higher consumption and exports.
- Indonesia's sugar production is forecast to rise by 4 percent to 2.4mt because of favourable rainfall and higher acreage as well as sugarcane yield. Consumption is expected to be up mainly due to higher sugar demand from the growing food and beverage industry and population growth. Imports to rise, despite higher production, in order to meet consumption needs while stocks are expected to decline.
- Turkey's production is forecast to rise by 300,000t to 3.1mt because of a favourable weather and slightly higher acreage. Consumption to remain flat, while exports and stocks to rise with higher available supply.
- Colombia's sugar production, consumption, and imports are likely to remain unchanged with production at 2.3mt. Exports to be up slightly, drawing down stocks.
- Russia's sugar production is projected to rise by 500,000t to 6.5mt with an expected higher yield. Consumption, exports, and stocks to be up amid higher supply.
- Ukraine's sugar production is forecast to decline by 23 percent to 1.1mt because of sub-optimal conditions in the crop-growing regions before and during the period when sugar beets are planted. Production to be also affected by reduced acreage because of current/past military activity, including labour availability, unexploded munitions, and minefields. Consumption to be up based on assumptions on population growth, refugees, and economic activity. Sugar exports and stocks are expected to drop because of lower available supply.
- Revisions from Nov 2021 forecast:
  - Global sugar production to be up slightly at 181.2mt. India's production to be up by 2.1 mt to 8.4mt because of favourable weather and higher yield.
    - Pakistan's production to be up by 465,000t to 7.1mt on higher acreage.
    - Russia's production to be down by 550,000t to 6mt because of poor yield and extraction rate.
    - Brazil's production to decline by 650,000t to 35.4mt because of unfavourable dry weather and a freeze lowering sugarcane yield.
    - China's production to decline by 700,000t to 9.6mt because of unfavourable weather, lower yield, and competition with other crops such as corn.
  - Global sugar imports to be down by 2mt to 56.3mt.
    - Ethiopia to nearly quadruple its imports to 1.7mt on a trade data source change.
    - Indonesia's imports to rise by 15 percent to 5.5mt on revised trade data.
    - US imports to rise by 385,000t on higher imports from Mexico and TRQ reallocation.

- China's imports to decline by 500,000t because of higher global prices and Covid-related logistics problems.
  - Global sugar exports to be down by 1.1mt to 64.3mt.
    - India's exports to rise by 1.8mt to 8.8mt because of global supply shortfall and competitive prices.
    - Brazil's exports to decline by 350,000t to 25.7mt on reduced exportable supplies.
  - Global sugar closing stock to be up by 3.2mt to 48.9mt.
    - Indonesia's closing stock to rise by 1.2mt to 2.5mt as revised import data for the previous year raises opening stock.
    - Pakistan's closing stock to be up by 922,000t to 3.5mt on higher production from greater acreage.
    - Thailand's closing stock to rise by 571,000t to 6.9mt on increased production and higher opening stock.
    - EU's closing stock to increase by 412,000t to 1.8mt as production and imports revised higher for the previous year.
    - China's closing stock to decline by 339,000t to 3.9mt on lower production and imports.

**Key sugar production pattern, as per our estimates >**



**Punjab & Sindh are major sugar-producing areas in Pakistan >**



**Sindh, which witnessed a major drought earlier, faces floods ➤**

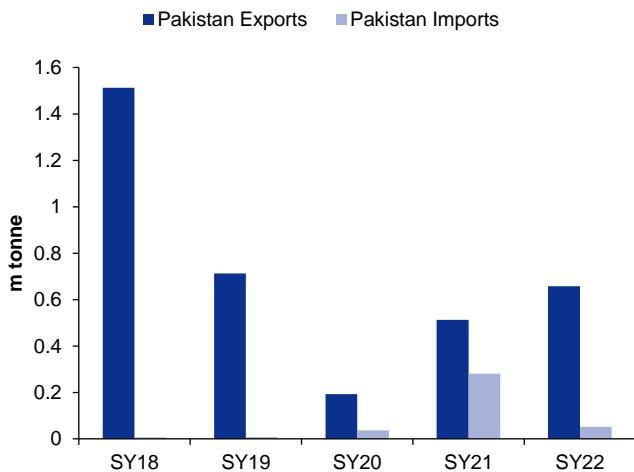
It may seem counter-intuitive, but Pakistan has been hit by drought and floods almost simultaneously. Sindh, which is one of the most prominent sugar cane-producing areas of Pakistan, has been hit by floods after the drought. Water is so scarce in the region that it was blaming the neighbouring state of Punjab for the drought. However, after that Sindh was inundated by floods.

1. <https://www.indianarrative.com/world-news/sindh-blames-pakistans-punjab-for-looming-drought-in-the-province-35684.html>
2. <https://www.bbc.com/news/world-asia-62707436>

While the humanitarian crisis is unimaginable, it will have a significant impact on overall sugar production in the country.

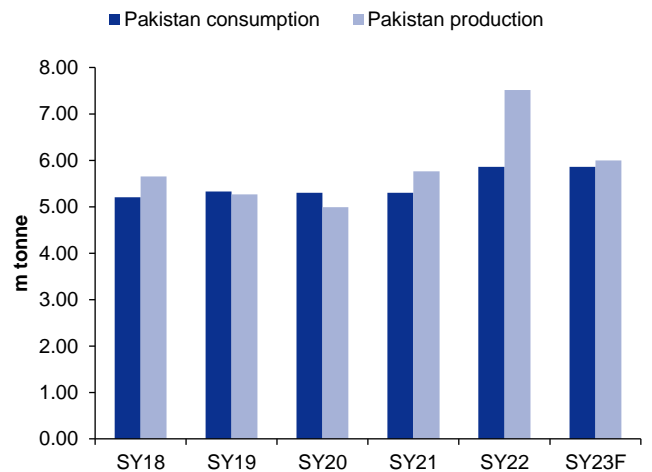
**Floods and drought may result in a production loss of 20% and nil sugar exports from Pakistan ➤**

**Figure 5: Pakistan exported ~0.6mt sugar in the 2021-22 sugar season**



SOURCE: COMPANY REPORTS, INCRED RESEARCH  
\*SY= SUGAR YEAR. SY22= 2021/22

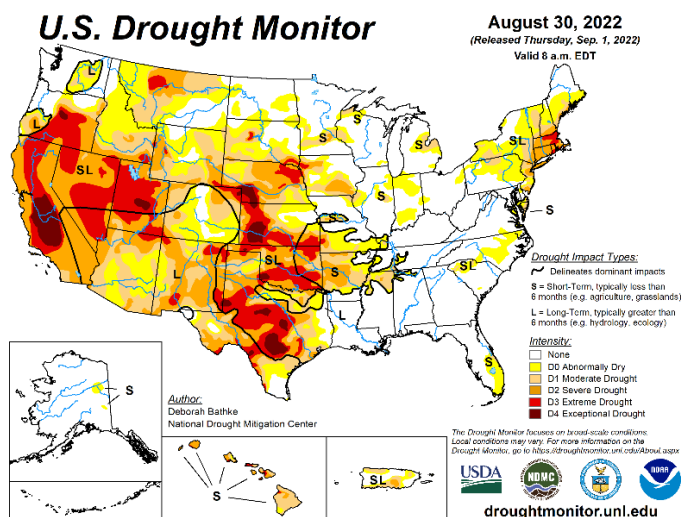
**Figure 6: However, its exports will dwindle to zero in the sugar season 2022-23F**



SOURCE: COMPANY REPORTS, INCRED RESEARCH  
\*SY= SUGAR YEAR. SY22= 2021/22

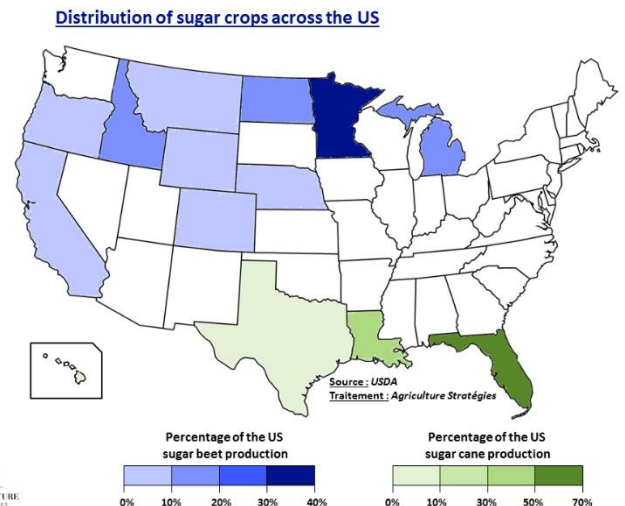
**USA is also facing drought conditions which resulted in lower beet acreage ➤**

**Figure 7: USA is suffering from major drought conditions**



SOURCE: INCRED RESEARCH, [HTTPS://DROUGHTMONITOR.UNL.EDU/](https://droughtmonitor.unl.edu/)

**Figure 8: Drought conditions have impacted both sugarcane and beet-producing states of the country**

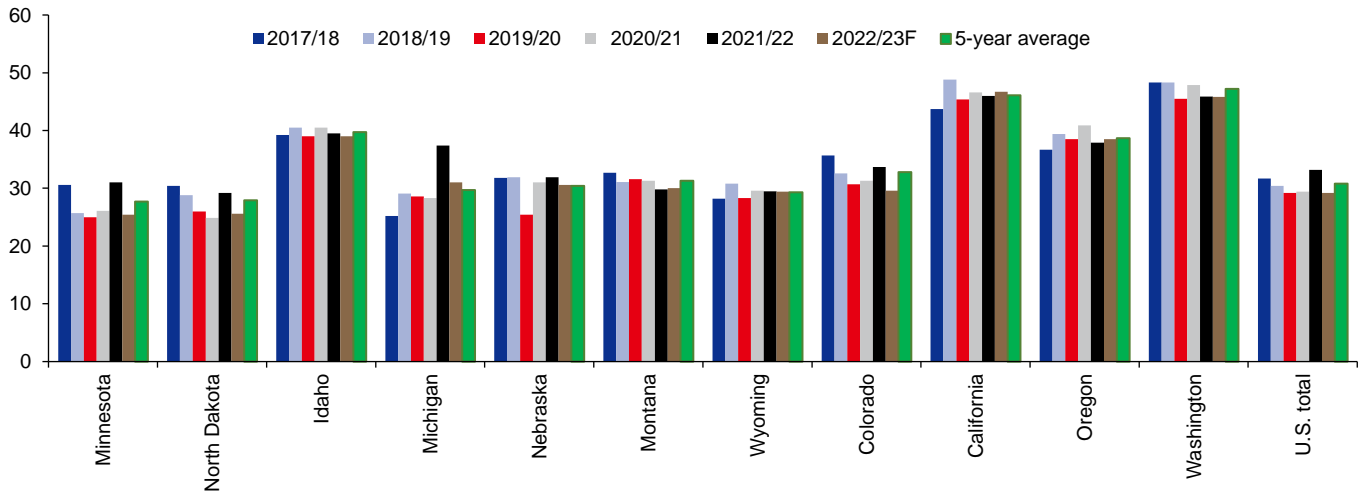


SOURCE: INCRED RESEARCH, [HTTPS://WWW.AGRICULTURE-STRATEGIES.EU/EN/2018/10/THE-SUGAR-POLICY-IN-THE-UNITED-STATES-A-CONTINUOUS-MANAGEMENT-OF-THE-INTERNAL-MARKET/](https://www.agriculture-strategies.eu/en/2018/10/the-sugar-policy-in-the-united-states-a-continuous-management-of-the-internal-market/)

**In the above context, the US Department of Agriculture’s forecasts are set to be cut ➤**

1. In its Aug 2022 forecast ([link here](#)), USA projects nearly unchanged production of beet sugar as it expects a higher acreage despite lower yield.
2. However, because of deteriorating drought conditions, it seems likely that yield assumptions are misplaced.

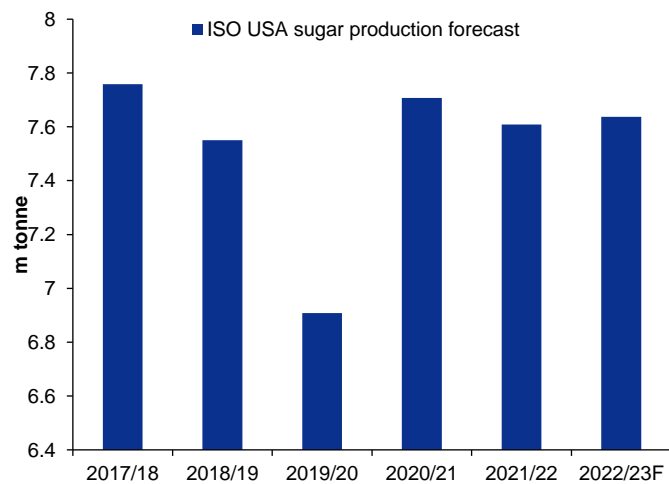
**Figure 9: Yield assumptions, while they are lower than five years’ average, still appear to be high (given drought conditions)**



SOURCE: INCRED RESEARCH, COMPANY REPORTS

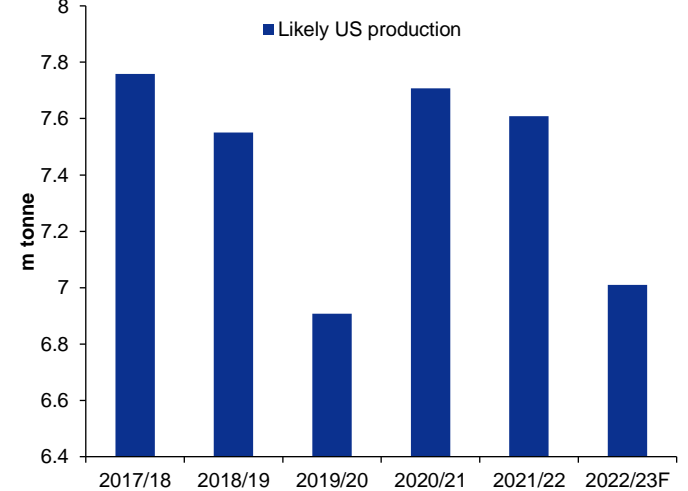
**ISO’s (International Sugar Organization) forecast on USA sugar production also appears to be higher ➤**

**Figure 10: ISO’s sugar production forecast for USA appears to be higher at 7.6mt**



SOURCE: INCRED RESEARCH, COMPANY REPORTS

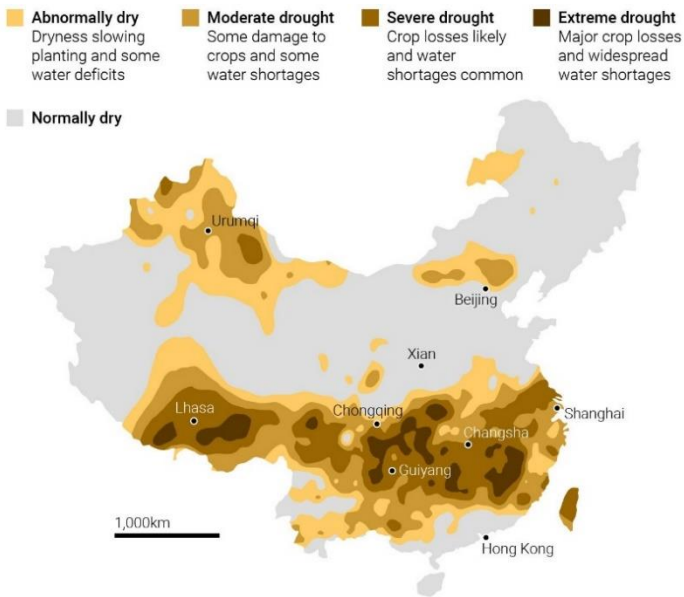
**Figure 11: We expect sugar production in USA to be not more than 7mt**



SOURCE: INCRED RESEARCH, COMPANY REPORTS

**China is also suffering from drought conditions ➤**

**Figure 12: China is facing one of its worst droughts**



SOURCE: INCRED RESEARCH, [HTTPS://MULTIMEDIA.SCMP.COM/INFOGRAPHICS/NEWS/CHINA/ARTICLE/3190803/CHINA-DROUGHT/INDEX.HTML](https://multimedia.scmp.com/infographics/news/china/article/3190803/china-drought/index.html)

**Figure 13: This year's drought has highly hit sugarcane-producing areas in China**



Source: China Ministry of Agriculture 2015, blank map from [http://www.d-maps.com/carte.php?num\\_car=11570&lang=en](http://www.d-maps.com/carte.php?num_car=11570&lang=en)

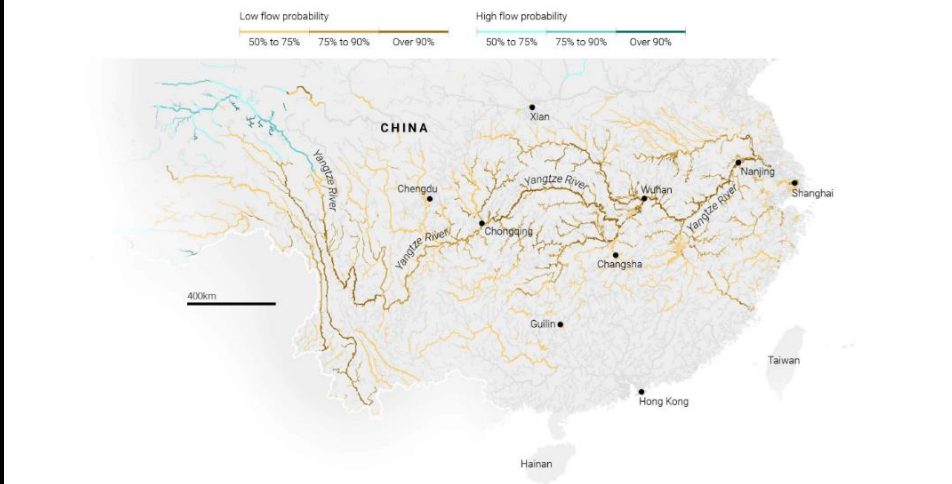
**Legend:**  
 = 63% or more of total Chinese production (Guangxi)  
 = 10 to 20% (Yunnan, Guangdong)  
 = 2% to 3% (Hainan)

SOURCE: INCRED RESEARCH, [HTTPS://WWW.INTECHOPEN.COM/CHAPTERS/59391](https://www.intechopen.com/chapters/59391)

**River water levels extremely low in China ➤**

Please note that sugarcane consumes the highest amount of water among all crops and hence, drought conditions will impact the yield massively.

**Figure 14: Water is extremely critical for sugarcane production, which is running very low in multiple Chinese rivers**

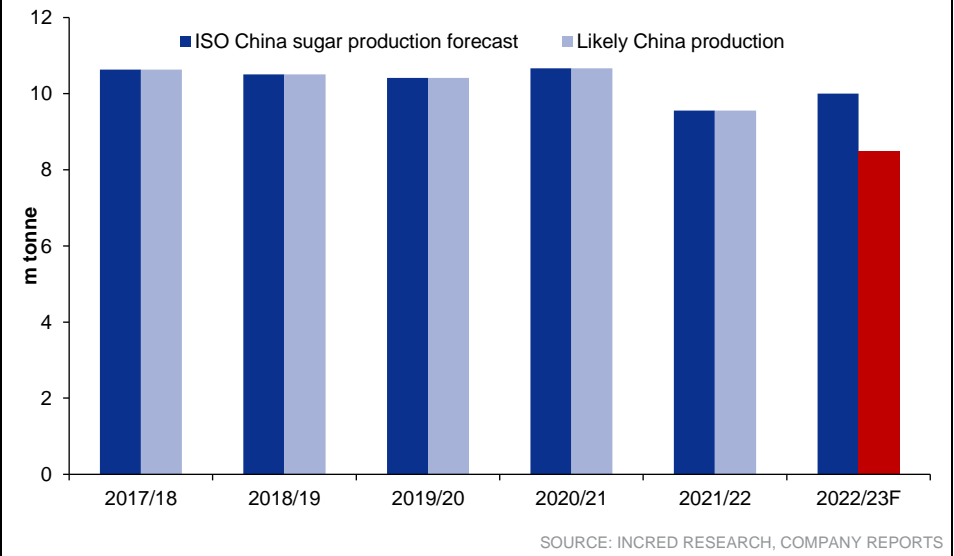


SOURCE: INCRED RESEARCH, [HTTPS://MULTIMEDIA.SCMP.COM/INFOGRAPHICS/NEWS/CHINA/ARTICLE/3190803/CHINA-DROUGHT/INDEX.HTML](https://multimedia.scmp.com/infographics/news/china/article/3190803/china-drought/index.html)



### International Sugar Organization’s 2022F-23F production forecast for China is highly optimistic ➤

Figure 15: Sugar production in China is likely to be much lower than the 2021-22 season; we estimate a production of 8.5mt in the sugar season 2022-23F



### Europe’s heatwave conditions are the worst since many millennia ➤

Europe is experiencing its **worst drought in at least 500 years**, with hot and dry conditions fuelling wildfires, cutting crop yield and reducing electricity generation, according to a preliminary analysis by the EU’s Joint Research Centre.

Figure 16: European Union’s drought conditions are extremely bad

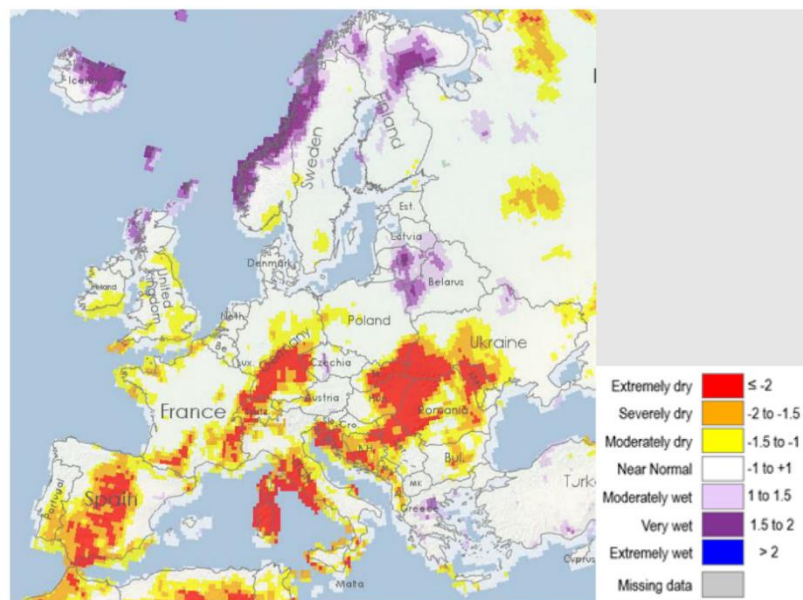
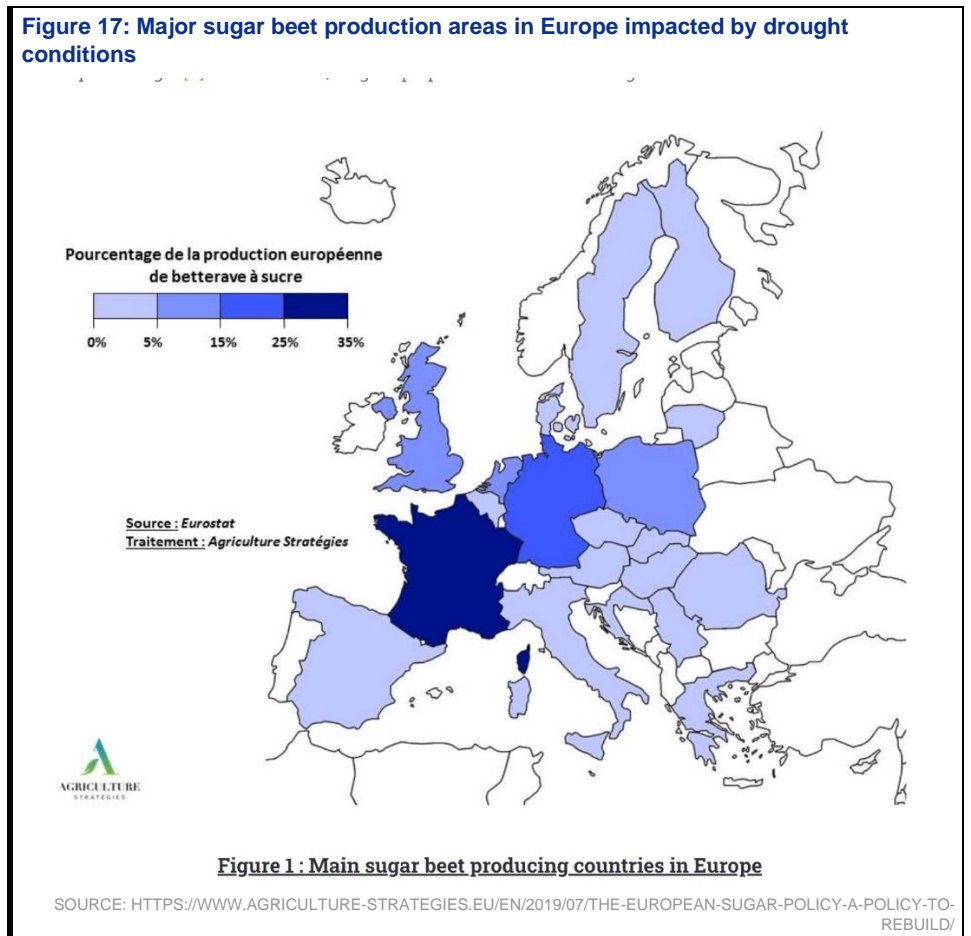


Figure 2: Standardized Precipitation Index SPI-3, three months ending 10<sup>th</sup> of August 2022.

SOURCE: INCRED RESEARCH, COMPANY REPORTS

**Sugar beet-producing areas coincide with extreme drought-hit regions ➤**

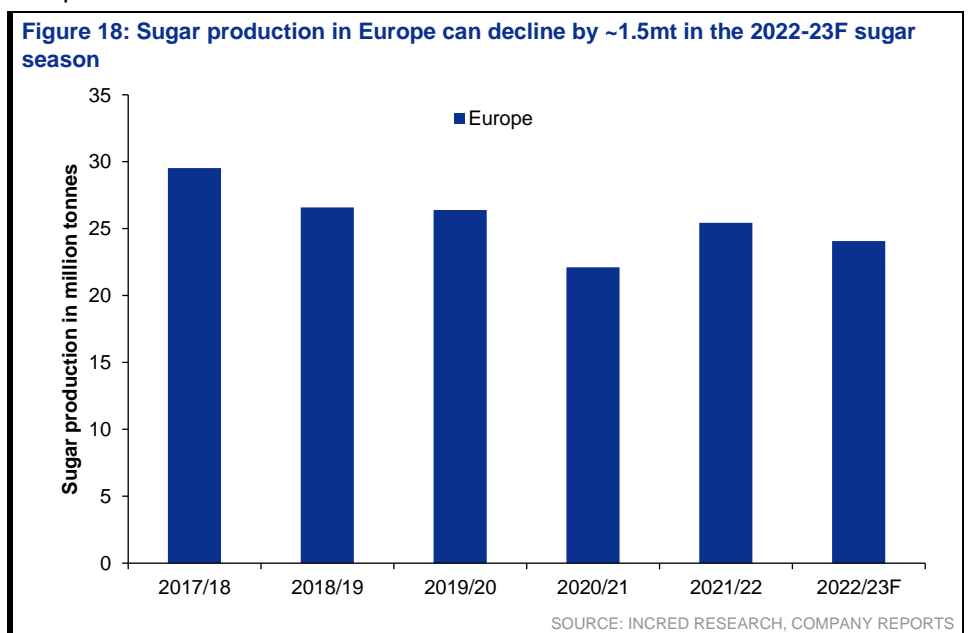
**Figure 17: Major sugar beet production areas in Europe impacted by drought conditions**



**Hence, sugarcane production will be negatively impacted, but the extent is debatable ➤**

It is certain that production in Europe will be negatively impacted by drought conditions. In fact, European agencies are already forecasting a production decline of more than 1mt. We forecast close to 1.1mt sugar production decline in Europe.

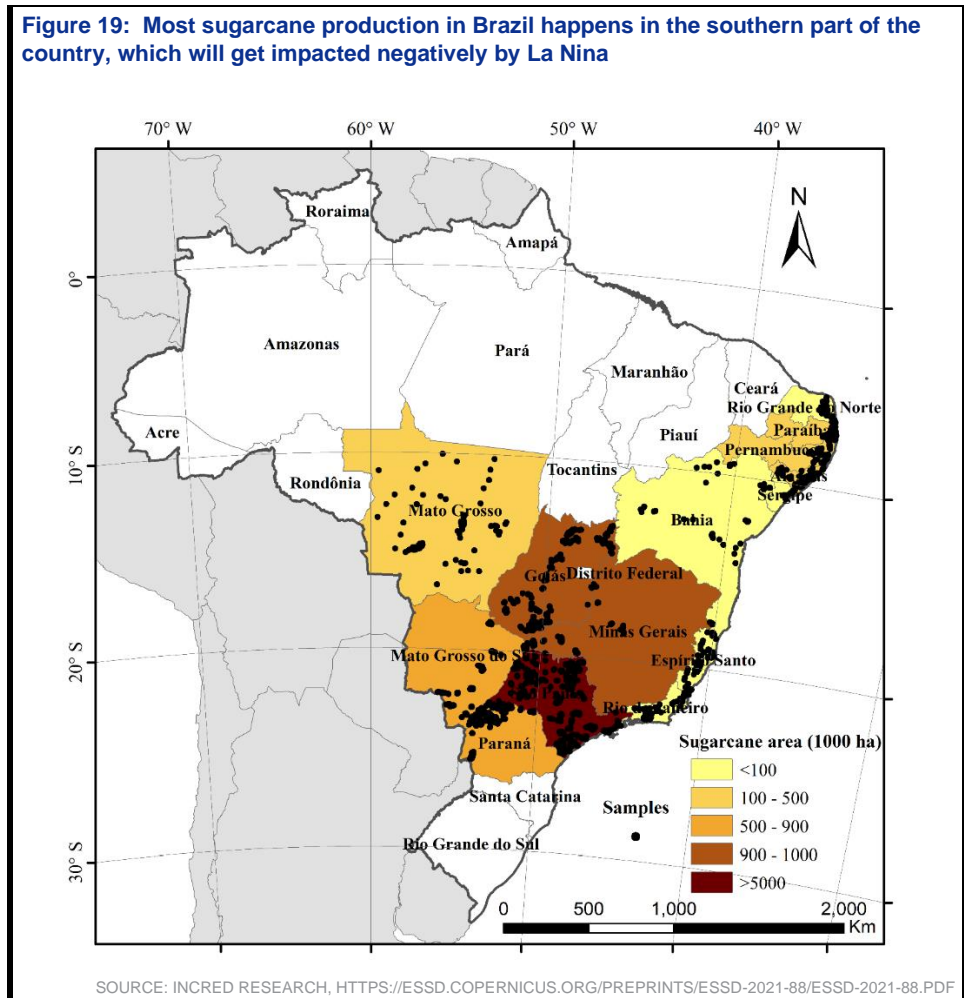
**Figure 18: Sugar production in Europe can decline by ~1.5mt in the 2022-23F sugar season**



**The Brazilian conundrum – whether sugar production in 2022-23F will be lower than in 2021-22? We believe it will be lower ▶**

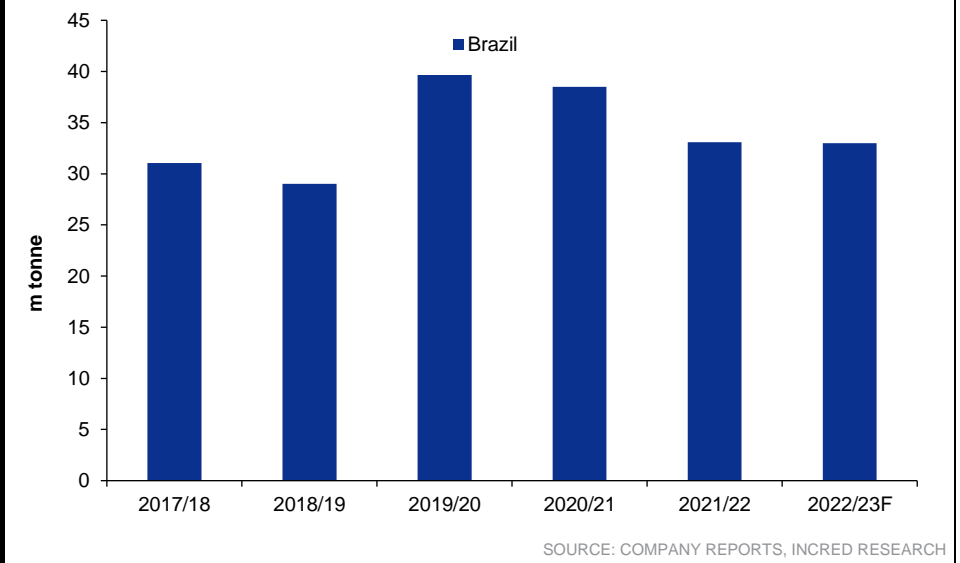
1. Conab (Companhia Nacional de Abastecimento) has cut its estimate for the 2022-23F Brazil sugar crop to 33.9mmt from its Apr 2022 forecast of 40.3mmt, citing lower planting and falling sugar cane yield for the smaller output.
2. La Nina is impacting Brazil. La Nina event results in increased rainfall across northern Brazil and decreased rainfall in southern Brazil. Such has been the case this year that southern Brazil faced a severe drought.

**Figure 19: Most sugarcane production in Brazil happens in the southern part of the country, which will get impacted negatively by La Nina**



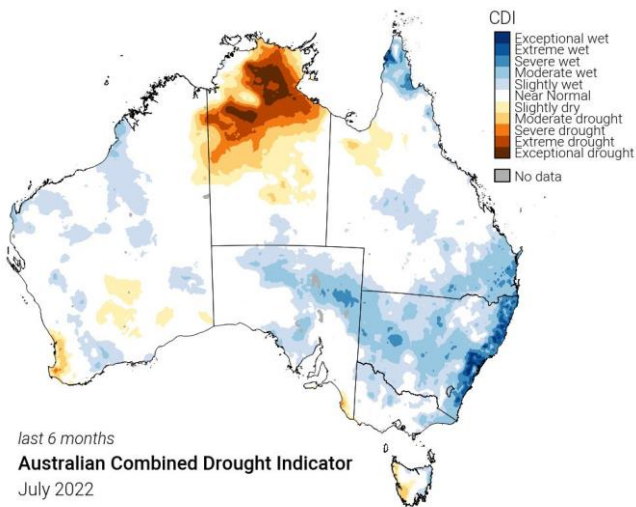
1. Meteorologists confirm that La Nina has already hit Brazil. Please click the news blog - <https://www.dtnpf.com/agriculture/web/ag/blogs/south-america-calling/blog-post/2022/09/01/la-nina-brings-likely-hot-dry-start>
2. In this regard, we expect Brazilian sugar production to be, at the most, 33mt in the 2022-23F sugar season.

**Figure 20: La Nina impact will limit Brazilian sugar production to 33mt**



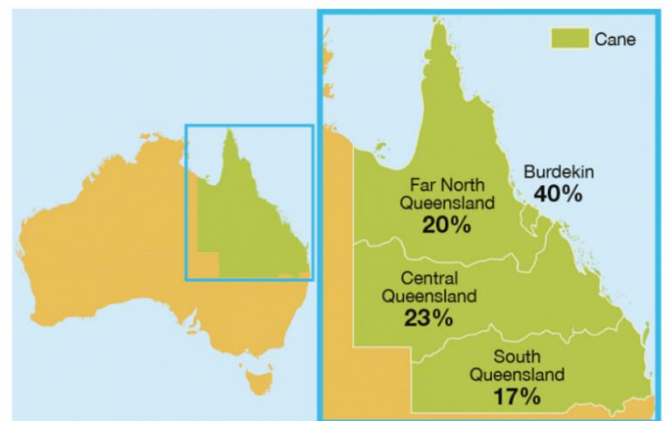
**Can Australia raise its sugar production in 2022-23F? May not be by a significant amount, but it can maintain production at last year's level ➤**

**Figure 21: While certain parts of Australia are facing a drought...**



SOURCE: [HTTPS://WWW.NACP.ORG.AU/DROUGHT\\_MONITOR](https://www.nacp.org.au/drought_monitor), INCRED RESEARCH

**Figure 22: ...major sugar-producing areas don't appear to be significantly impacted by the drought**

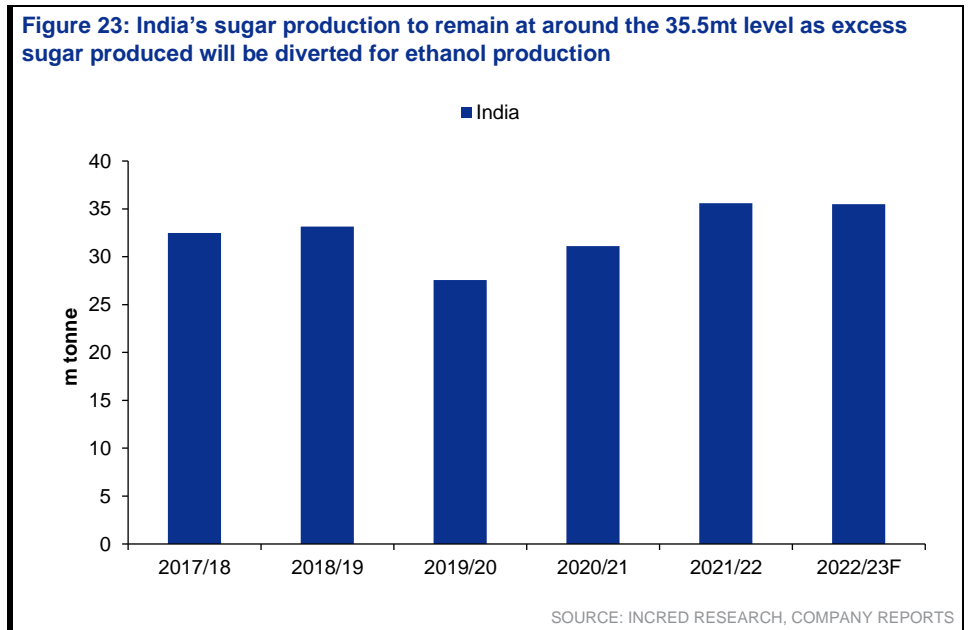


All of Australia's sugar production is in these areas.

SOURCE: [HTTPS://WWW.ABSUGAR.COM/SUGAR-MARKETS/CASE-STUDIES/AUSTRALIA](https://www.absugar.com/sugar-markets/case-studies/australia), INCRED RESEARCH

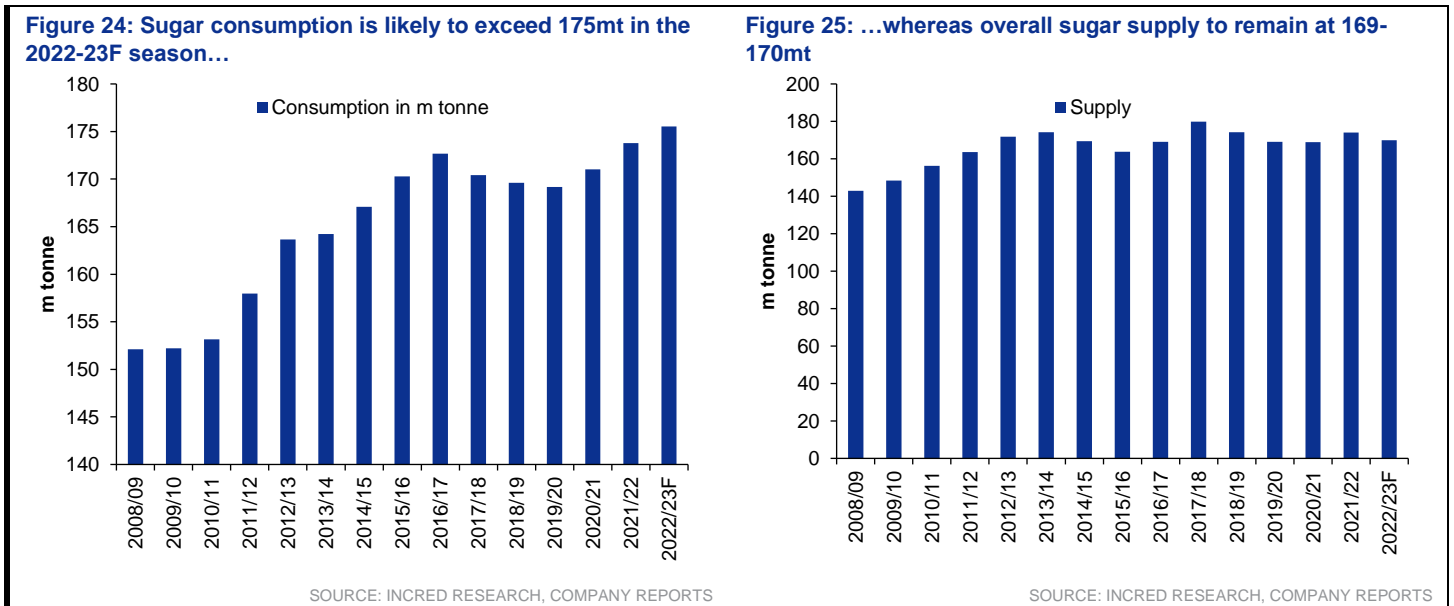
**India's sugar production likely to remain around 35.5mt ➤**

**Figure 23: India's sugar production to remain at around the 35.5mt level as excess sugar produced will be diverted for ethanol production**



**Sugar demand is likely to increase by ~1%, thereby leading to a shortage**

**Figure 24: Sugar consumption is likely to exceed 175mt in the 2022-23F season...**



**Figure 25: ...whereas overall sugar supply to remain at 169-170mt**

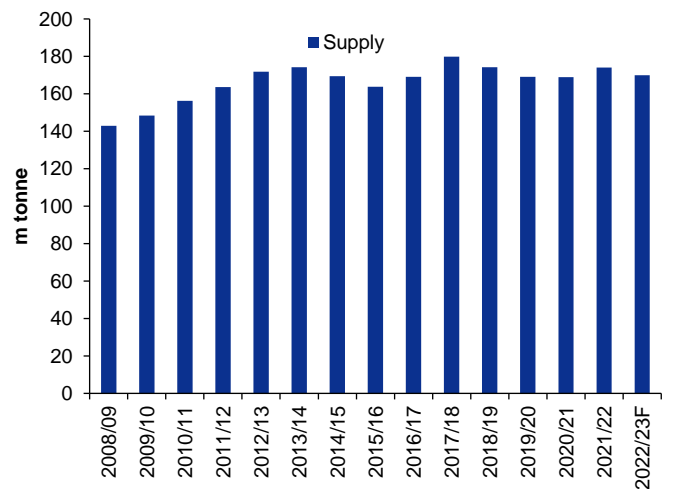
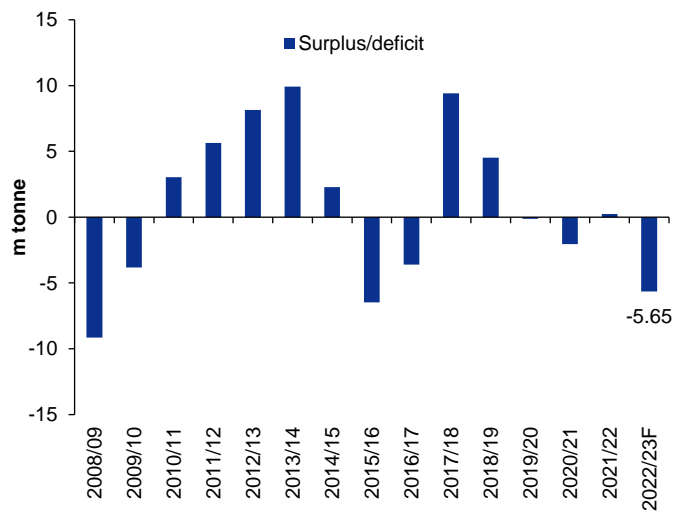
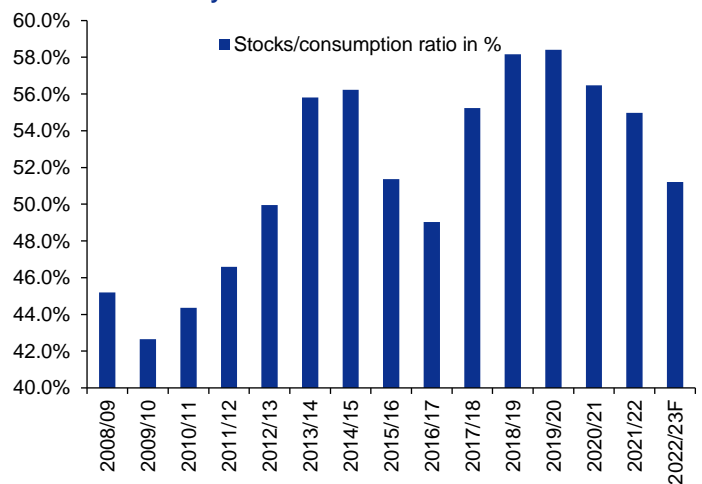


Figure 26: This will lead to a sugar shortage of ~5.6mt



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 27: The stock-to-consumption ratio will also fall to the lowest level in six years



SOURCE: INCRED RESEARCH, COMPANY REPORTS

## The ethanol story

### The basics

#### Ethanol ➤

Ethanol (also called ethyl alcohol, grain alcohol, drinking alcohol, or simply alcohol) is an organic chemical compound. It is a simple alcohol with the chemical formula  $C_2H_6O$ . Its formula can be also written as  $CH_3-CH_2-OH$  or  $C_2H_5OH$  (an ethyl group linked to a hydroxyl group), and is often abbreviated as EtOH. Ethanol is a volatile, flammable, colourless liquid with a characteristic wine-like odour and pungent taste. It is a psychoactive drug, recreational drug, and an active ingredient in alcoholic drinks.

Ethanol is naturally produced by the fermentation of sugar by yeasts or via petrochemical processes such as ethylene hydration. It has medical applications, as an antiseptic and disinfectant. It is also used as a chemical solvent and in the synthesis of organic compounds. Ethanol is also a fuel source.

#### ENA (Extra Neutral Alcohol) ➤

ENA or rectified spirit, also known as neutral spirit, rectified alcohol or ethyl alcohol of agricultural origin, is highly concentrated ethanol that has been purified by means of repeated distillation in a process called rectification. In some countries, denatured alcohol or denatured rectified spirit may commonly be available as rectified spirit.

In undiluted form, it contains at least 55% alcohol by volume or ABV (110 US proof) in the European Union. The purity of rectified spirit has a practical limit of 97.2% ABV (95.6% by mass) when produced using conventional distillation processes, as a mixture of ethanol and water becomes a minimum-boiling azeotrope at this concentration. However, rectified spirit is typically distilled in continuous multi-column stills at 96–96.5% ABV and diluted as necessary. Ethanol is a commonly used medical alcohol, and spiritus fortis is a medical term for ethanol with 95% ABV.

Neutral spirit can be produced from grains, corn, grapes, sugar beet, sugarcane, tubers, or other fermented plant materials. A large quantity of neutral alcohol is distilled from wine. Product made from grain is 'neutral grain spirit', while spirit made from grapes is called 'grape neutral spirit' or 'vinous alcohol'. These terms are commonly abbreviated as either GNS or NGS.

Neutral spirit is used in the production of several spirit drinks such as blended whisky, cut brandy, most gins, some liqueurs and some bitters. As a consumer product, it is almost always mixed with other beverages to create drinks like

alcoholic punch or Jello shots or is sometimes added to cocktails in place of vodka or rum. It is also used to make home-made liqueurs such as limoncello or cassis, and in cooking because of its high concentration of alcohol, and also acts as a solvent to extract flavours. Rectified spirits are also used for medicinal tinctures and as a household solvent. It is sometimes consumed undiluted, but as alcohol is very high proof, and overconsumption can cause poisoning quickly than more traditional distilled spirits.

### **The difference between ethanol and ENA >**

ENA is highly concentrated ethanol that has been purified by means of repeated distillation in a process called rectification.

### **What is EY >**

EY stands for Ethanol Supply Year (Dec to Nov).

## **The Ethanol Story**

### **How it began >**

The Ethanol Blended Petrol (EBP) programme was launched by the Central government in Jan 2003. The goal of EBP was to promote the use of alternative and environment-friendly fuels and reduce import dependency for energy requirements. The Ministry of Petroleum & Natural Gas (MoP&NG), vide a notification dated 20 Sep 2006, directed oil marketing companies or OMCs to sell 5% ethanol blended petrol subject to commercial viability, as per Bureau of Indian Standards' specifications, in notified 20 states and four Union Territories (UTs) with effect from 1 Nov 2006.

The National Policy on Biofuels (NPB) was framed by the Ministry of New and Renewable Energy in 2009. The policy expands the scope of raw material for ethanol production by allowing the usage of sugarcane juice, sugar containing materials like sugar beet, sweet sorghum, starch containing materials like corn, cassava, damaged food grains like wheat, broken rice, and rotten potatoes unfit for human consumption for ethanol production.

As farmers are at risk of not getting an appropriate price for their produce during the surplus production phase, the policy allows the use of surplus food grains to produce ethanol for blending with petrol, with the approval of National Biofuel Coordination Committee. The NPB was approved by the Union Cabinet in May 2018. For the first time during 2018, differential prices of ethanol based on raw material utilized for ethanol production was announced by the government. The EBP programme was extended to entire India, except Union Territories of Andaman Nicobar and Lakshadweep Islands, with effect from 1 Apr 2019.

These decisions have significantly improved the supply of ethanol and thus ethanol procurement by public sector OMCs increased from ~380mL in Ethanol Supply Year (ESY) 2013-14 to over ~1,950mL in ESY 2019-20.

The Cabinet Committee on Economic Affairs (CCEA), in Oct 2020, increased the price of ethanol, further boosting ethanol production in the country. The price of ethanol from C heavy molasses route was increased from Rs43.75/L to Rs45.69/L, the price of ethanol from B heavy molasses route was increased from Rs54.27/L to Rs57.61/L and the price of ethanol from sugarcane juice/sugar/sugar syrup route was increased from Rs59.48/L to Rs62.65/L.

The CCEA, in Nov 2021, further increased the price of ethanol. The price of ethanol from C heavy molasses route was increased from Rs45.69/L to Rs46.66/L, the price of ethanol from B heavy molasses route was increased from Rs57.61/L to Rs59.08/L and the price of ethanol from sugarcane juice/sugar/sugar syrup route was increased from Rs62.65/L to Rs63.45/L.

Additionally, Goods and Services Tax or GST and transportation charges will also be payable. OMCs have been advised to fix realistic transportation charges so

that long distance transportation of ethanol is not disincentivised in order to offer a fair opportunity to the localized industry within any state. To reduce criss-cross movement of ethanol, OMCs must decide the criteria for priority of ethanol from various sources, considering various factors like cost of transportation, availability, etc. This priority will be limited to the excisable boundaries of the state /UT for production in that state/UT. Government has reduced the GST on ethanol meant for EBP from 18% to 5% on 16 Dec 2021.

OMCs are advised to continue giving priority to ethanol produced from 1) sugarcane juice/sugar/sugar syrup, 2) B grade heavy molasses, 3) C grade heavy molasses, and 4) damaged food grains/other sources, in that order.

The CCEA, in Dec 2020, approved a modified scheme for extending interest rate subvention for those setting up grain-based distilleries along with molasses-based ethanol distilleries. The total outlay for the scheme is Rs84.6bn for increasing India's ethanol production capacity, with the scheme extended to those setting up distilleries using grain, molasses, dual feed, sugar beet, sweet sorghum, and cereals as feedstock. The government would bear interest rate subvention for five years, including a one-year moratorium against the loan availed by project proponents from banks at 6% per annum or 50% of the rate of interest charged by banks, whichever is lower.

After inviting inputs of relevant ministries and associations, analysing progressive demand-supply projections, challenges in the manufacture of E20 vehicles and infrastructure of OMCs, Niti Aayog suggested a gradual rollout of E20 ethanol in the country to achieve the target of E20 rollout by 2025F. In the meantime, the rollout plan suggests pan-India availability of E10 from Apr 2022 for use as a protection fuel to meet the demands of existing vehicles till Apr 2025F. Niti Aayog has estimated ethanol demand at ~10.16bnL based on expected growth in vehicle population. The modelling exercise on expected penetration of electric vehicles estimates ethanol demand for petrol blending in the range of ~7.22-9.21bnL in 2025F. An expert committee formed under the chairmanship of additional secretary of Niti Aayog comprising representatives from MoP&NG (Ministry of Petroleum & Natural Gas), DHI (Department of Heavy Industries), MoRT&H (Ministry of Road Transport & Highways), DFPD (Department of Food and Public Distribution), IOCL (Indian Oil Corporation Limited), and ARAI (Automotive Research Association of India) has, however, come out with its recommendations on optimistic demand for ethanol, at ~10.16bnL to ensure that the objectives of E20 are met by 2025F.

- Current production capacity of ethanol in India of 4.26bnL derived from molasses-based distilleries, and 2.58bnL from grain-based distilleries is proposed to be expanded to 7.60bnL and 7.40bnL, respectively (as per the Roadmap for Ethanol Blending in India 2020-25 released in Jun 2021).
- This would be sufficient to produce 10.16bnL of ethanol required for EBP and 3.34bnL for other uses.
- This requires 6mmt of sugar and 16.5mmt of grain per annum in ESY 2025F for producing ethanol, which Indian agriculture can deliver, in our view.

## **Ethanol market – growth drivers ►**

### **Alcoholic beverage market**

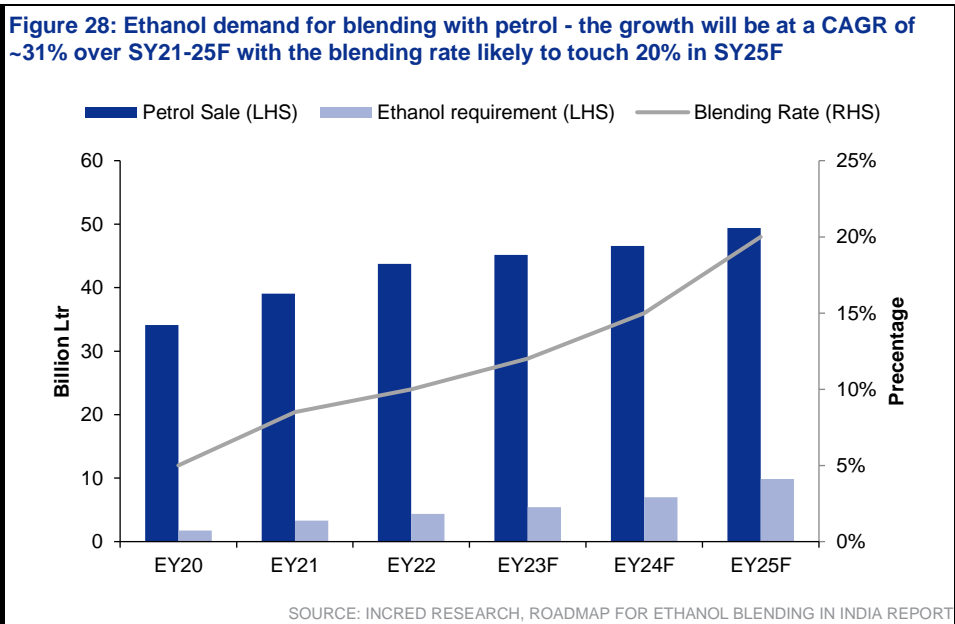
Ethanol is a prominent alcoholic input, mainly found in beer, cider, wine and spirits. Factors such as changing lifestyle along with growing adoption of western culture will drive the demand for ethanol in the country, in our view. India's alcoholic beverage industry is one of the biggest alcohol industries across the globe, only behind two major countries such as China and Russia. India's alcoholic beverage market is likely to post a CAGR of 7.4% during the period 2017-30F (according to a Goldstein Market Intelligence report). Further, the market is expected to touch US\$39.7bn by the end of forecast period as alcohol consumption is growing in urban areas of the country. Growing demand for alcoholic beverages in India is mostly attributed to the huge young population base and growing consumption of



alcohol by the young generation, as well as rising disposable income, thereby strengthening the industry’s growth.

**Ethanol-blended fuel compatible vehicles in India**

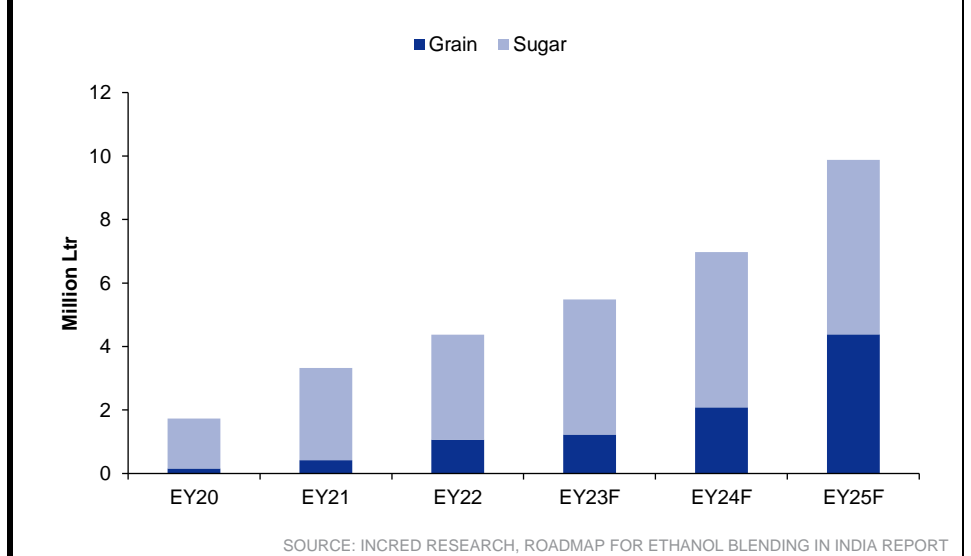
Two-wheeler and passenger vehicles currently produced in the country are designed optimally for E5 fuel, with rubber and plastic components compatible with E10 fuel, and the engine can be calibrated for E10 fuel to derive better performance. As EBP rolls out in the country, vehicles need to be produced with rubberized parts, plastic components and elastomers compatible with E20 fuel and engines optimally designed for usage of this fuel. The Society of Indian Automobile Manufacturers or SIAM has assured the expert committee that was formed under the chairmanship of additional secretary, NITI Aayog, comprising representatives from MoP&NG, DHI, MoRT&H, DFPD, IOCL, and ARAI, that once a roadmap for making E10 and E20 fuel availability in the country is notified by MoPNG, it would gear up to supply compatible vehicles in line with the roadmap.



**Steady source of raw materials in India**

- The capacity of molasses-based distilleries has touched 4.26bnL (as per the Roadmap for Ethanol Blending in India 2020-25). 39 more projects with a total capacity of 0.93bnL have been completed as at end-Mar 2022, which brings the cumulative capacity to about 5.19bnL. With a view to achieve blending target, the DFPD (Department of Food & Public Distribution) is making concerted efforts to enhance ethanol distillation capacity in the country.

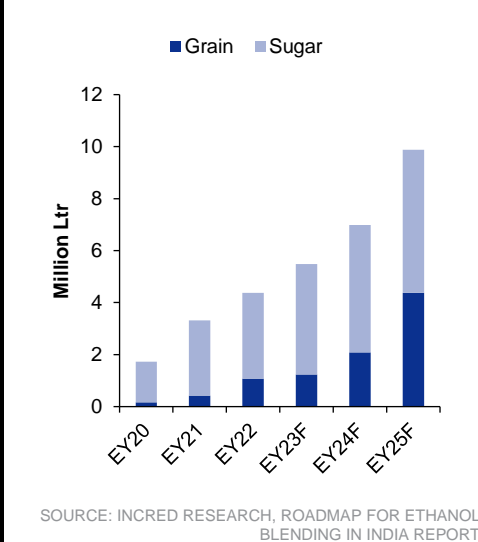
**Figure 29: Addition of ethanol capacity based on raw material - CAGR will be 28% and 13% for grain & sugar route, respectively, in our view**



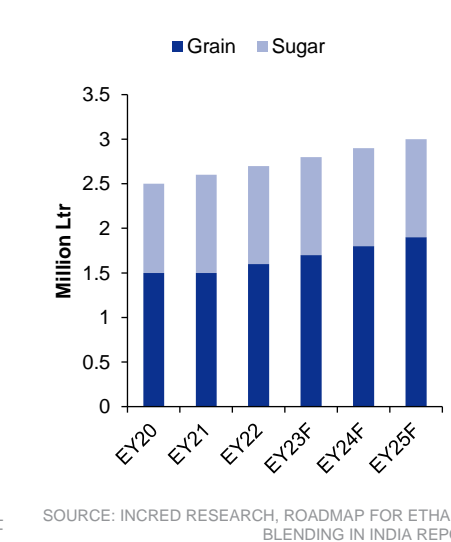
### Structural opportunities in ENA >

ENA market witnessed a massive oversupply, leading to tremendous pressure on realization, until the announcement of the ethanol policy by the government. The policy suddenly created demand for ethanol and hence, the supply began to dwindle. ENA realization, which was ~Rs43/L over FY13-18, suddenly jumped to above ~Rs50/L as the base price of ethanol was set higher by the government. The uptrend in price is structural in nature as excess supply has been permanently diverted to the ethanol blending programme.

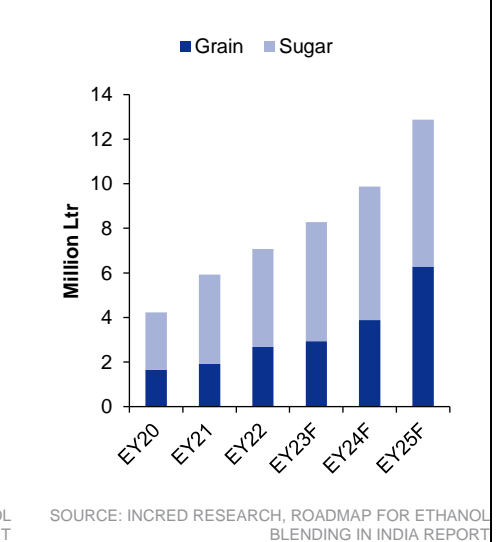
**Figure 30: Ethanol requirement for blending with petrol**



**Figure 31: Ethanol requirement for usage other than blending with petrol**



**Figure 32: Total ethanol requirement - the growth will be ~21% CAGR over SY21-25F**



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