



India Becomes Net Importer of Maize

For Prelims: [Ethanol Production](#), [Minimum Support Price](#), [White Revolution](#), [Ethanol Blended Petrol](#), [Sugar for Ethanol Production](#)

For Mains: Impact of Ethanol Blending on Agricultural Commodities, Food Security, Agricultural Resources

[Source: TH](#)

Why in News?

Recently, India's push towards increasing [ethanol production](#), particularly [Corn \(Maize\)](#) -based ethanol, has transformed the country from Asia's top maize exporter to a net importer.

- This significant shift is impacting local industries and altering global maize supply chains.

What are the Key Facts About Maize?

- **About:** Maize (*Zea mays L.*) is a highly versatile crop known as the "**queen of cereals**" due to its high genetic yield potential.
 - Globally, maize contributes significantly to grain production, with the **USA being the largest producer** and having the highest productivity.
 - In India, maize is the **third most important food crop**, contributing around 9% to the national food basket and adding more than Rs. 100 billion to the agricultural GDP.
 - The crop is used in various sectors including **food, animal feed, and industrial products**.
- **Growing Conditions:** Maize thrives in a range of soils from **loamy sand to clay loam**, with optimal conditions being **well-drained soils with high organic matter and neutral pH**.
 - Avoiding fields with **poor drainage and high salinity** is crucial for maintaining productivity.
 - **Rainfall:** 50-100 cm.
- **Seasonal Cultivation:** In India, Maize can be grown in Kharif, Rabi, and Spring seasons.
 - Kharif maize has lower productivity **due to rainfed conditions and biotic/abiotic stresses**, compared to rabi maize.
- **Global Ranking:** India is the 5th Largest producer (as of December 2023) and 14th Largest exporter of Maize in the world (2022).
 - India's strategic advantages for maize supply include year-round production, a robust seed network, and accessible seaports. However, high domestic demand limits its current export significance.
- **Major Producing States:** Karnataka, Madhya Pradesh, Bihar, Tamil Nadu, Telangana, Maharashtra, Andhra Pradesh.
- **Initiatives:**
 - [National Food Security Mission \(NFSM\)](#)
 - [Waxy Maize Hybrid](#)
 - **All India Coordinated Maize Improvement Project (AICMIP)**
 - **India Maize Summit 2022**

Why has India Become a Net Maize Importer?

- **Ethanol Blending Goals:** India's push to increase the ethanol content in gasoline **20% by 2025-26** has driven up the demand for maize-based ethanol.
 - **National Policy on Biofuels (NPB) 2018** permits blending of maize and grain-based ethanol, boosting ethanol production capacities to meet the rising demand.
- **Shift from Sugarcane to Maize:** Due to a drought, the government **curbed the use of sugarcane for fuel**, prompting **ethanol distilleries to turn to maize** as an alternative.
 - **India produced 34.6 million tonnes (mt) of maize in 2023-24**, with plans to double production to bridge the supply-demand gap.
- **Impact on Domestic Supply:** The shift to using maize for ethanol has caused a shortfall in the poultry and starch industries, leading to the **country's first maize imports in decades**.

How is Excess Import of Maize Impacting Local Industries?

- **Competition for Maize:** Traditionally, **India's poultry and starch industries have been the primary consumers** of the country's maize production. However, with ethanol distilleries entering the market, these industries now face stiff competition for supplies.
- **Soaring Maize Prices:** The increased demand for maize has **pushed local prices far above global benchmarks**, squeezing poultry producers who are heavily dependent on maize for feed.
- **Poultry Industry at Risk:** Rising feed costs, which account for **three-fourths of production expenses**, have driven poultry growers into financial distress.
 - The **All India Poultry Breeders Association** has called for the **removal of import duties** and the approval of **Genetically Modified (GM) maize for feed**.
 - With production costs outpacing the selling price of poultry, the industry is at risk of unsustainable losses. Small-scale Poultry farmers are resorting to alternative feed sources, such as **broken rice and wheat stalk waste, to cut costs**.
- **Incentives for Corn Cultivation:** High maize prices are **encouraging farmers to increase their maize acreage**, with the area under summer-sown maize rising by 7% from 2023.
 - Farmers are benefitting from the current high prices, **but small poultry farmers are forced to scale back production** until prices stabilise with the new season's supply.

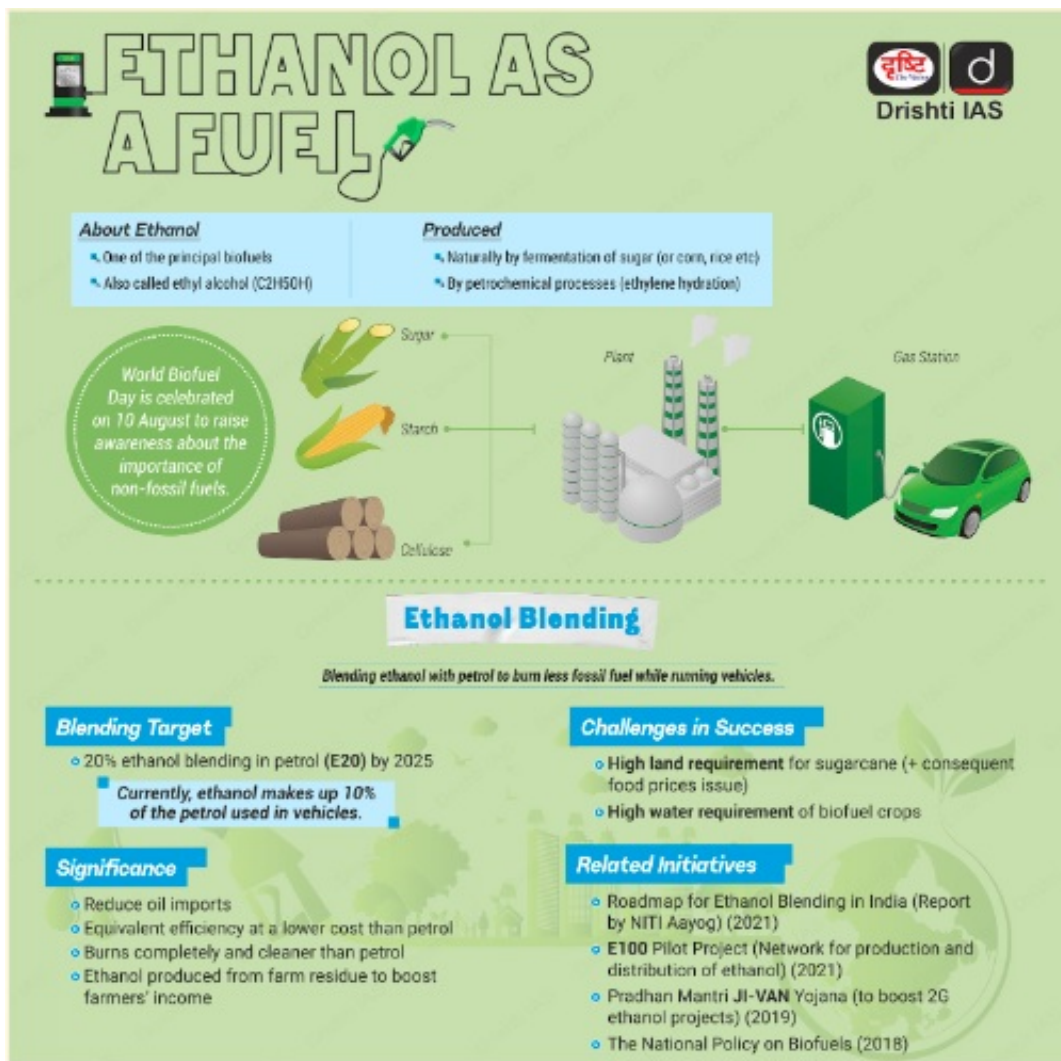
What are the Global Implications due to India's Excess Import of Maize?

- **Shift in Trade Dynamics:** India, once Asia's top maize exporter, is now importing maize, primarily from **Myanmar and Ukraine**. This has had a significant impact on global maize prices, which were previously trading at near four-year lows.
- **Increased Prices in Exporting Countries:** The surge in Indian demand has lifted maize prices in Myanmar from USD 220 to around USD 270 per metric ton, encouraging farmers there to plant more corn.
 - However, the rising costs are challenging domestic industries that have traditionally relied on affordable maize supplies.
- **Supply Chain Adjustments:** Traditional buyers of Indian maize, such as Vietnam, Bangladesh, Nepal, and Malaysia, are now turning to **South America and the United States** for their supplies, as Indian maize has become too expensive.
- **Permanent Importer Status:** **NITI Aayog** projects that India's ethanol production capacity needs to expand to meet the expected demand of **1,016 crore litres for Ethanol Blended Petrol (EBP) by 2024-25**.
 - This will require significant contributions from corn-based ethanol, positioning maize as a critical resource for India's biofuel industry. Experts predict that **India will continue to import corn annually** due to the rapid rise in demand that outpaces domestic production capabilities.

What Steps are Needed to Enhance Maize Production in India?

- **Technological Adoption:** India's diverse agro-ecological conditions require tailored technological solutions to increase maize productivity across different regions and seasons.
 - By adopting **biotech traits**, particularly those resistant to pests like **fall armyworm (FAW)**, and increasing the area under **high-yielding single-cross hybrids**, India can potentially double its maize productivity.
 - The US has achieved record maize yields with **100% coverage of biotech traits**, harvesting over **11 tonnes per hectare**, while **India** despite having 110 lakh hectares under maize cultivation, India's average yield is only 3.3-3.8 tonnes per hectare, nearly half the global average.
- **Diversification and Intensification:** Maize offers a future-focused solution as **continuous cultivation of rice cultivation depletes water tables** in the Indo-Gangetic plain.
 - Switching to maize in **irrigated areas like Punjab, Haryana, and Western UP** can conserve resources and increase the production, as **maize needs up to 90% less power and 70% less water than rice**.
 - Maize cultivation with long duration single cross **hybrid in less than 1,200 mm rainfall areas** with existing irrigation systems can offer high returns and save government subsidies on power and water.
- **Government Support:** The E20 blending target demands a significant amount of maize 165 lakh tonnes, almost half of India's current production.
 - To meet this demand without diverting existing maize supplies, India needs to increase production **from 346 lakh tonnes to 420-430 lakh tonnes by 2024-25 and further to 640-650 lakh tonnes by 2029-30**.
 - Offering a reasonable **Minimum Support Price (MSP)**, procurement assurances, and transportation concessions can incentivize farmers to boost maize cultivation.
 - Engaging **mega cooperatives in the maize value chain** with assured procurement could spark a **cooperative revolution** similar to that in the **milk (White Revolution)** sector.
- **Poultry and Animal Feed:** Maize can help achieve targets by being used more as a multigrain cereal, supporting the **growing demand for poultry and animal feed**.
 - By producing high-protein **distiller's dried grains with soluble (DDGS)** from ethanol, maize can also meet the **E20 ethanol requirement**, contributing to sustainable food, feed, and fuel security.
 - **DDGS is the major byproduct of ethanol production**, and is a good protein and energy feed for cattle.

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Drishti Mains Question:

Q. Evaluate the impact of India's ethanol blending targets on its maize production and import dynamics.

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Prelims

Q. Given below are the names of four energy crops. Which one of them can be cultivated for ethanol? (2010)

- (a) Jatropha
- (b) Maize
- (c) Pongamia
- (d) Sunflower

Ans: (b)

Q. According to India's National Policy on Biofuels, which of the following can be used as raw materials for the production of biofuels? (2020)

1. Cassava
2. Damaged wheat grains
3. Groundnut seeds

4. Horse gram
5. Rotten potatoes
6. Sugar beet

Select the correct answer using the code given below:

- (a) 1, 2, 5 and 6 only
(b) 1, 3, 4 and 6 only
(c) 2, 3, 4 and 5 only
(d) 1, 2, 3, 4, 5 and 6

Ans: (a)

India Plans USD 15 Billion for Chipmaking

For Prelims: [Semiconductors](#), [Microscopic switches](#), [Ministry of Electronics and IT \(MeitY\)](#)

For Mains: Significance and Challenges of India's semiconductor Chip sector.

[Source:IE](#)

Why in News?

India is set to **invest USD 15 billion** for the second phase of **chip manufacturing incentive policy (under [India Semiconductor Mission](#))**. It had previously committed USD 10 billion for the first phase of the scheme.

- The government has also approved three assembly and testing plants, referred to as **Assembly, Testing, Marking, and Packaging (ATMP)** and **Outsourced Semiconductor Assembly and Test (OSAT)** in chip parlance, which are less complex than fabrication plants.

What are Semiconductor Chips?

- A Semiconductor Chip is a tiny electronic device made of semiconductor material (usually silicon or germanium) which serves as the **basic building block** of most electronic circuits.
 - These chips can contain billions of [microscopic switches](#) on a chip smaller than a fingernail.
- The basic component of a semiconductor chip is a **silicon wafer** etched with tiny transistors that control the flow of electricity according to various computational instructions.
 - It performs various functions, such as **processing data**, storing information, or controlling electronic devices.
- **Fabrication Technology:** It refers to the **process of creating semiconductor devices** like chips and transistors and involves several key steps, including **wafer preparation**, photolithography, etching, doping, and packaging.

SEMICONDUCTORS

Semiconductors are materials having conductivity between conductors and insulators

EXAMPLES

- **Pure Elements:** Silicon and Germanium
- **Compounds:** Gallium Arsenide and Cadmium selenide

SIGNIFICANCE

- Essential to almost all sectors of the economy - **aerospace, automobiles, communications, clean energy, information technology** and **medical devices** etc.

SEMICONDUCTORS AND INDIA

- **India Imports from:** China, Taiwan, USA and Japan
- **Indian Semiconductor Market:** Expected to reach **USD 55 bn** by 2026

SCHEMES

- ↳ **Production-Linked Incentive (PLI) scheme**
- ↳ **Design Linked Incentive (DLI) Scheme**
- ↳ Scheme for Promotion of Manufacturing of Electronic Components and Semi-conductors (SPECES)

OBJECTIVES

- ↳ Encourage semiconductor and display manufacturing in the country.
- ↳ Nurture >20 domestic companies in semiconductor design. Achieve a turnover of > Rs.1500 crore in next 5 years
- ↳ Manufacture electronics components and semiconductors

INDIA'S SEMICONDUCTOR MISSION (ISM)

VISION

- Build a **vibrant semiconductor and display design and innovation ecosystem**

LAUNCHED

- 2021

NODAL MINISTRY

- Ministry of Electronics and Information Technology (MeitY)

TOTAL FINANCIAL OUTLAY

- Rs 76,000 crore

COMPONENTS

- Scheme for setting up of Semiconductor Fabs
- Scheme for setting up of Display Fabs
- Scheme for setting up of Compound Semiconductors/Silicon Photonics/Sensors (including MEMS) Fabs/ Discrete Semiconductors Fab and Semiconductor ATMP/OSAT
- DLI Scheme



What is the State of the Semiconductor Chips Industry?

- Globally, **Taiwan and the US** dominate the market of the **Semiconductor Chips Industry**.
 - The **US** has implemented a **semiconductor incentive scheme** with an allocation of approximately USD 50 billion.
 - Similarly, the **European Union** has also **announced an incentive program** of comparable scale to that of the US.
- **India presently has an almost negligible presence** in the semiconductor chip manufacturing sector.
 - **Need for Developing India's Chipmaking Industry:**
 - **Domestic fabrication plants are critical for bolstering India's economic and strategic interests**, given that chips are used in practically all downstream industries from rockets to power steering in cars to kitchen toasters.
 - The US and China are two of the most pivotal nations in the global technology value chain. Amidst **escalating geopolitical tensions on the global stage, India seeks to capitalise on emerging opportunities** to strengthen its domestic industry through government-funded initiatives.

Recent Developments in India Regarding Chipmaking

- India recently signed a chip deal with Singapore, which has expertise in memory chips and logic processors. These are used in many electronic devices and automobiles.
- Tata is collaborating with **Taiwan's Powerchip Semiconductor Manufacturing Corporation (PSMC)** to build **India's first commercial fabrication plant**.
- Earlier in 2023, US-based Company - Micron Technology signed a **Memorandum of Understanding (MoU)** with the state government of **Gujarat** to establish a [Semiconductor Unit worth Rs 22,500 crore near Ahmedabad](#).
 - The project aims to contribute to India's [Self-Reliance](#) in memory chip manufacturing.

What are the Challenges of India Semiconductor Chipmaking Industry?

- **High Capital Requirements:** Semiconductor fabrication plants, or fabs, require substantial capital investments. The **high cost of setting up and maintaining these facilities** deters domestic players and limits the industry's expansion.
- **Technology and Expertise Deficit:** The semiconductor industry demands cutting-edge technology and a highly skilled workforce. **India currently lags behind in advanced semiconductor research, design, and fabrication capabilities, leading to a dependence on foreign technology.**
- **Inadequate Infrastructure:** The absence of robust infrastructure, including reliable power supply, water resources, and logistics, hampers the establishment and smooth functioning of semiconductor fabs. Additionally, the lack of specialised industrial zones for electronics manufacturing poses a significant hurdle.
- **High Barrier Entry:** The **high barriers to entry in chip manufacturing** are evident, as **technology** for producing cutting-edge chips is still underdeveloped in India, and competitors like **Taiwan Semiconductor Manufacturing Company Ltd (TSMC)** hold a significant advantage.

Way Forward

- **Global Collaborations and Strategic Alliances:** Bilateral and multilateral collaborations can help in technology transfer, joint ventures, and R&D partnerships.
 - India's collaboration with the US and Taiwan are steps in the right direction that aligns with the government's goal of promoting domestic manufacturing and is expected to bolster India's position as a global semiconductor manufacturer.
 - Similarly, India should leverage its diplomatic ties with South Korea to enhance its capabilities in the semiconductor chip manufacturing industry.
- **Incentivizing Startups and SMEs:** The government should create a **favourable ecosystem for startups and SMEs in the semiconductor space** by offering funding, incubation, and mentorship programs.
- **Sustainability and Green Manufacturing:** Emphasising **sustainable practices in semiconductor manufacturing**, such as reducing energy and water consumption, will be critical. Investing in green technologies and ensuring environmental regulations are aligned with industry growth will enhance the sector's long-term viability.

Drishti Mains Question:

Q. Critically analyse the current state of India's semiconductor industry and discuss the strategic steps required to overcome these challenges and achieve self-reliance in semiconductor technology?

Deepening India-Brazil Relations

For Prelims: [India-Brazil Relations](#), [WTO](#), [Sugar Subsidy Issues](#)

For Mains: Area of Cooperation and Engagement between India and Brazil, Challenges to India-Brazil Relations, Way Forward

[Source:TH](#)

Why in News?

- The **India-Brazil strategic partnership** has **deepened and diversified over the years**, spanning a wide range of domains including **defence, space, security, technology and people-to-people relations**.
- In another development, **India** and **Brazil**, two key players in global sugar production, have resolved their [World Trade Organization \(WTO\) trade dispute over sugar subsidies](#). This resolution coincides with their **growing collaboration in ethanol** technology and addresses global sugar surplus issues, which affect prices.



What is India-Brazil Sugar Subsidies Issue?

- **Background:**
 - In 2019, Brazil, along with Australia and Guatemala, challenged India's sugar subsidy measures at the **WTO**, claiming they were inconsistent with various articles of the WTO's [Agreement on Agriculture](#).
 - The US and Australia also highlighted a crucial absence in India's reporting claiming that India hadn't included sugarcane or its derivatives in any domestic support notifications

since the marketing year 1995-96.

▪ **India's Stand:**

- India defended its position by stating that sugarcane procurement is managed by private mills, not the government, thereby aligning with fair trade practices.
- India pointed out the error and said that US-Australia analysis uses the entire sugarcane production in India in a given year for calculating the subsidies, regardless of whether or not the sugarcane was actually delivered to sugar mills for crushing under the **Sugarcane (Control) Order**.

What are the Major Areas of Cooperation Between India and Brazil?

- **Institutional Level Engagements:** India and Brazil have a very close and multifaceted relationship, both bilaterally and in various multilateral forums such as [BRICS](#), [IBSA](#), [G4](#), [G20](#), [BASIC](#), [International Solar Alliance \(ISA\)](#), WTO, [UNESCO](#), and WIPO. Bilateral engagements include:
- **Strategic Dialogue**, led by [National Security Advisors](#) (NSA), addresses key regional and global issues of mutual interest.
 - **India-Brazil Business Leaders Forum**, focuses on trade, investment, and economic cooperation opportunities.
 - **Trade Monitoring Mechanism (TMM)**, tracks and resolves issues in bilateral trade.
 - **Economic and Financial Dialogue**, covers cooperation on investment, trade, and monetary policy.
 - **Joint Defence Commission**, facilitates defence cooperation, including joint exercises, equipment procurement, and intelligence sharing.
 - **Joint Committee on Science & Technology**, fosters cooperation in research, development, and knowledge exchange.
- **Trade and Investment:**
- India became Brazil's **5th largest trading partner in 2021**, with bilateral trade increasing from USD 7.05 billion in 2020 to USD 11.53 billion.
 - It grew further to USD 15.2 billion in 2022 and saw India's exports to Brazil at USD 6.9 billion and imports at USD 4.7 billion in 2023.
 - **Major Indian exports to Brazil:** Agrochemicals, synthetic yarns, auto components and parts, and imports include crude oil, gold, vegetable oil, sugar, and bulk mineral and ores.
 - India and Brazil have witnessed investments in various sectors such as automobiles, IT, mining, energy, biofuels, and footwear.
 - India also signed a Preferential Trade Agreement (PTA) with **MERCOSUR (Brazil, Argentina, Uruguay, Paraguay)** in 2004.
 - Defence & Security Cooperation: India and Brazil signed a defence cooperation agreement in **2003**, with **Joint Defence Committee (JDC)** meetings institutionalising this collaboration.
 - In 2006, they established a strategic dialogue led by India's National Security Advisors (NSA) to address regional and global issues.
 - Additionally, an MoU on Cyber Security between CERT-In and its Brazilian counterpart was signed during the Brazilian President's visit in January 2020.
- **Cooperation in Science and Technology:**
- India and Brazil's 2004 agreement on space led to collaboration in data sharing and satellite tracking.
 - The Brazilian Minister visited India in 2021 to witness the launch of the [Amazonia-1 satellite](#).
 - [Ayurveda and Yoga](#) are also recognised in Brazil's health policy. An MoU on Traditional Medicine and Homeopathy was signed in January 2020.
- **Energy Security:**
- Signed an MoU in January 2020 between **Indian Oil Corporation and Brazil's CNPEM** to establish a research institution in India for bioenergy.
 - The two countries, along with the US, jointly launched the [Global Biofuel Alliance \(GBA\) during the G20 summit](#) in India in 2023 to enhance biofuel output and demand.
 - **Ethanol Blending Programme:** Brazil, a pioneer in ethanol production since 1975, has

provided technological support to India with the aim to facilitate technology transfer and boost India's biofuel production.

- **Brazil has achieved a 27% ethanol blending in gasoline**, with 84% of its vehicles equipped with flexible-fuel engines capable of running on varying proportions of gasoline and ethanol.
- As of July 2024, India has achieved a **15.83% ethanol blending rate in petrol**, with a **goal of reaching 20% by the 2025-26 supply year**.

What are the Challenges in India-Brazil Relations?

- **Trade Deficit and Competitions:** India has consistently maintained a **trade deficit** with **Brazil** due to Brazil's dominance in agricultural products and India's reliance on imports of commodities like soybeans and sugar.
 - Both countries have implemented **protectionist measures**, such as tariffs and subsidies, to **protect domestic industries, creating trade frictions and hindering the growth of bilateral trade**.
- **Diverging Interests in International Forums:** India and Brazil have **differing priorities on climate change** and within multilateral institutions.
 - India focuses on reducing emissions intensity, economic development and energy access while Brazil prioritises Amazon deforestation reduction to combat climate change.
 - Similarly, their priorities diverge in organisations like the **UN** and the **World Trade Organization**.
- **Limited People-to-People Contact:** India and Brazil have relatively few people-to-people interactions, including in business, cultural, and educational exchanges.
- **Role of China:** Additionally, concerns exist that China's status as Brazil's largest trading partner could influence the relationship between India and Brazil.

Way Forward

- **Economic Cooperation:** India and Brazil should **diversify trade** by including **value-added products, services, and technology**. They need to create a **favourable investment environment** and promote bilateral trade through **agreements and joint ventures**. Additionally, **investing in infrastructure projects** like transportation and logistics can boost trade and improve connectivity.
- **People-to-People Exchanges:** Enhancing **cultural diplomacy and student exchanges** can build trust between India and Brazil, while promoting tourism can boost both people-to-people contacts and economic benefits.
- **Strategic Cooperation:** India and Brazil should enhance **defence collaboration** through **joint exercises and technology sharing** while also working together in global forums like the **UN** and **G20** to advance their shared interests.
- **Technology and Innovation:** India and Brazil should **collaborate on R&D in renewable energy, biotechnology, and IT** to drive innovation and economic growth. Additionally, investing in **skill development and training** can boost workforce competitiveness in both countries.

Drishti Mains Question:

Discuss the current state of India-Brazil relations, highlighting key opportunities for collaboration and the challenges encountered. Also suggest the strategies to strengthen cooperation in areas such as trade, technology, and sustainable development.

Read More: [Ethanol Production, India Sugarcane Subsidy under WTO Scrutiny.](#)

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. With reference to the current trends in the cultivation of sugarcane in India, consider the

following statements: (2020)

1. A substantial saving in seed material is made when 'bud chip settlings' are raised in a nurse, and transplanted in the main field.
2. When direct planting of setts is done, the germination percentage is better with single budded setts as compared to setts with many buds.
3. If bad weather conditions prevail when setts are directly planted, single-budded setts have better survival as compared to large setts
4. Sugarcane can be cultivated using settlings prepared from tissue culture.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 3 only
- (c) 1 and 4 only
- (d) 2, 3 and 4 only

Ans: (c)

Q. In the context of which of the following do you sometimes find the terms 'amber box, blue box and green box' in the news? (2016)

- (a) WTO affairs
- (b) SAARC affairs
- (c) UNFCCC affairs
- (d) India-EU negotiations on FTA

Ans: (a)

Q. The Fair and Remunerative Price (FRP) of sugarcane is approved by the (2015)

- (a) Cabinet Committee on Economic Affairs
- (b) Commission for Agricultural Costs and Prices
- (c) Directorate of Marketing and Inspection, Ministry of Agriculture
- (d) Agricultural Produce Market Committee

Ans: (a)

Mains:

Q1. What are the key areas of reform if the WTO has to survive in the present context of 'Trade War', especially keeping in mind the interest of India? **(2018)**

Q2. "The broader aims and objectives of WTO are to manage and promote international trade in the era of globalisation. But the Doha round of negotiations seem doomed due to differences between the developed and the developing countries." Discuss in the Indian perspective. **(2016)**

Q3. WTO is an important international institution where decisions taken affect countries in a profound manner. What is the mandate of WTO and how binding are their decisions? Critically analyse India's stand on the latest round of talks on Food security. **(2014)**

DAC Granted Acceptance of Necessity for Defence Acquisition Proposals

[Source: IE](#)

Why in News?

Recently, the [Defence Acquisition Council \(DAC\)](#) granted **acceptance of necessity (AoN)** for 10 defence acquisition proposals worth Rs. 1,44,716 crores.

- Indigenous sources will account for 99% of the total value of the projects cleared by DAC under the [Buy \(Indian\) and Buy \(Indian-IDD\)](#) categories.

Note:

- An AoN means the government has **accepted the need** for the equipment and is the **first step** towards initiation of the **procurement process**. However, grant of an AoN does not necessarily lead to a final order.
- The [Buy \(Indian-Indigenously Designed Developed and Manufactured \(IDD\)\)](#) category is the **most important category of acquisition** for indigenisation under the defence procurement policy.

What are the Major Acquisition Proposals?

- **Future Ready Combat Vehicles (FRCVs):** Forming the centrepiece of the projects cleared by the government, it is an advanced [Main Battle Tank](#) with superior mobility, all-terrain capability, multilayered protection, precision, lethal firepower, and real-time situational awareness.
 - Its purpose is to replace ageing Soviet-origin [T-92 tanks](#).
 - The Indian Army plans to induct 1,770 FRCVs at a cost of around ₹60,000 crore.
 - Under the **Make I procedure** of [Defence Acquisition Procedure \(DAP\)](#), the **FRCVs** will be acquired in three phases.
- **Air Defence Fire Control Radars:** It can detect and track aerial targets and allocate guns for firing.
 - The current procurement follows the earlier import of **66 radars** from Israel at Rs 2,500 crore, intended to replace outdated **fly-catcher radars**.
 - The proposal has also been approved for Forward Repair Team (Tracked) which has suitable cross country mobility for carrying out in-situ repair during mechanised operations.
- **Proposals for Indian Coast Guard:**
 - **Dornier-228 Aircraft** - to enhance the [ICG](#)'s surveillance and reconnaissance capabilities.
 - **Next Generation Fast Patrol Vessels** - with high operational features for rough weather conditions
 - **Next Generation Offshore Patrol Vessels** - with enhanced long-range operations to carry out patrolling of maritime zones, search and rescue, and disaster relief operations.

What is the Defence Acquisition Council (DAC)?

- The **Defence Acquisition Council (DAC)** is the top decision-making authority in the Defence Ministry for establishing **new policies and capital acquisitions** for the Army, Navy, Air Force, and the Indian Coast Guard.
- The Council is chaired by the **Minister of Defence**.
- It was established in **2001** following the recommendations of the Group of Ministers on 'Reforming the National Security System,' in the wake of the [Kargil War 1999](#).

What are India's Efforts for Self-Reliance in Defence Manufacturing?

- Self-reliance in the defence manufacturing sector is one of the government's top priorities. India has taken a raft of measures to boost self-reliance including:
 - Phased **[bans on the import of hundreds of weapons and systems](#)**
 - Separate budget for buying locally made military hardware
 - Increasing FDI from 49% to 74% and improving ease of doing business.
- The '**Make' Categories** is another initiative to achieve the objective of **self-reliance** by involving greater participation of the Indian **industrial ecosystem** including private sector. **It Includes the Following Procedures:**
 - **Make-I (Government Funded):** It involves design and development of equipment, systems, major platforms or upgrades thereof by the industry.
 - For Projects under **Make-I sub-category**, MoD provide fund support maximum **upto 70%** of the prototype development cost, based on **viability gap funding** method.
 - **Make-II (Industry Funded):** It covers military hardware that may not be designed and developed indigenously, but can be manufactured in the country for **import substitution**.
 - No government funding is provided.
 - **Make-III (Indigenously Manufactured):** These are subsystems, components, and **ammunition** produced in India to replace imports for existing weapon systems, often through foreign partnerships or technology transfers.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q.What is “Terminal High Altitude Area Defense (THAAD)”, sometimes seen in the news? **(2018)**

- (a) An Israeli radar system
- (b) India's indigenous anti-missile programme
- (c) An American anti-missile system
- (d) A defence collaboration between Japan and South Korea.

Ans: (c)

Q.Department of Border Management is a Department of which one of the following Union Ministries? **(2008)**

- (a) Ministry of Defence
- (b) Ministry of Home Affairs
- (c) Ministry of Shipping, Road Transport and Highways
- (d) Ministry of Environment and Forests

Ans: (b)

Grading Report Highlights ITIs' Performance

[Source: BS](#)

Why in News?

The latest grading report for **Industrial Training Institutes (ITIs)** by the **Ministry of Skill Development and Entrepreneurship (MSDE)** has highlighted significant **improvements in their performance**, reflecting a positive trend in vocational education.

- This comes in the wake of the [Union Budget 2024-2025](#), which **plans to skill two million youths over the next five years** and upgrade 1,000 ITIs in [hub-and-spoke arrangements](#).

What are the Key Highlights of the Latest ITI Grading?

- **Grading Methodology:**
 - The grading uses a scale of 0-10 based on eight parameters, including admission rates, passing results, computer-based examination, and average marks obtained.
- **Key Highlights:**
 - **Improved Grading Scores:** 18.9% of the 15,000 ITIs graded in 2024 scored above 8 on a scale of 0-10, up from 12.4% in 2023. This increase indicates better overall performance among ITIs.
 - 142 ITIs received a grade of 9 and above for the academic year 2024-25.
 - **Top States in ITI Grading:** Among the top 25 ITIs, Uttar Pradesh had the most, followed by Odisha, Haryana, Andhra Pradesh, and Telangana.
 - The Government ITI for Girls (Andhra Pradesh), and the Government Industrial Training Institute (Odisha), scored the highest with a grade of 9.6 for the academic year 2024-25.

What are the Industrial Training Institutes?

- **About:** ITIs are training organisations in India that provide vocational education and training to students.
 - ITIs are under the administrative and financial control of state governments or union territories, with the **Directorate General of Training (DGT)**, under the MSDE, focusing on national-level development and coordination.
 - DGT frames overall policies, norms, and standards for vocational training, ensuring consistency and quality across ITIs.
- **Objectives:** Develop [skilled manpower for industries](#) and **enhance youth employability** through practical training. Additionally, the focus is on encouraging [self-employment](#) by equipping students with the skills to start their own businesses.
- **Initiatives to Promote ITIs:**
 - **Craftsmen Training Scheme (CTS):** Offers training in 150 trades, including courses for persons with disabilities, through both government and private ITIs.
 - **Apprenticeship Training Scheme (ATS):** Provides on-the-job training to enhance practical skills and meet industry needs.
 - **Craft Instructor Training Scheme (CITS):** Trains instructors in effective teaching methods and hands-on skills.
 - **Advanced Vocational Training Scheme (AVTS):** Offers specialised courses to upgrade the skills of existing workers.
 - **Model ITI scheme:** Envisaged the upgradation of 35 selected government ITIs into Model ITIs with financial assistance of up to Rs. 10 crore per ITI for equipment upgradation and civil works. The scheme ended on 31st March 2024.
 - **Enhancing Skill Development Infrastructure Scheme:** Funds upgrades for 22 ITIs, infrastructure support for 28 ITIs, and establishment of 34 new ITIs in the North Eastern states.
 - [Skills Strengthening for Industrial Value Enhancement \(STRIVE\)](#).

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. With reference to Pradhan Mantri Kaushal Vikas Yojana, consider the following statements: (2018)

1. It is the flagship scheme of the Ministry of Labour and Employment.
2. It, among other things, will also impart training in soft skills, entrepreneurship, and financial and digital literacy.
3. It aims to align the competencies of the unregulated workforce of the country to the National Skill Qualification Framework.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
(b) 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

Ans: (c)

INS Tabar in Maritime Partnership Exercise (MPX)

[Source: PIB](#)

Recently, the **Indian Naval Ship Tabar** conducted a **Maritime Partnership Exercise (MPX)** with the Spanish Navy ship **Atalaya** in the [Mediterranean Sea](#).

- The MPX with the Spanish navy reinforces bilateral naval ties and strengthens commitment to enhanced maritime cooperation.
- **About MPX:** The MPX involved a series of advanced exercises such as Station Keeping, Replenishment at Sea Approaches (RASAPs), Flying Exercise (FYEX), Steam Past and PHOTOEX serials.
- **INS Tabar:** The **stealth frigate is the third [Talwar-class ship](#)** built in Russia for the Indian navy, commissioned in April (2004), in **Kaliningrad**
 - It is capable of conducting **air, surface, and sub-surface missions**,
 - It can operate independently or as part of a larger naval task force.
 - It serves in the Indian navy's western fleet, based in Mumbai.
 - It is equipped with a range of weapons and sensors, including [supersonic BrahMos anti-ship cruise missiles](#), and [Barak-1 missiles](#).
 - It is the first Talwar-class frigate to carry BrahMos missiles.



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Project Strawberry

[Source: IE](#)

[OpenAI](#) is expected to release its most advanced **AI model**, codenamed **Project Strawberry**, between September and November 2024.

- This model might be integrated into the upcoming [ChatGPT-5](#), the new version of OpenAI's chatbot.
- **Project Strawberry** (Previously Project Q* (Q-star)) is aimed at creating [Artificial General Intelligence \(AGI\)](#) i.e., **AI with cognitive abilities** similar to the human brain.
- **Features and Capabilities:**
 - It has shown capabilities in solving **complex puzzles** and performing advanced cognitive tasks.
 - It is reported to **handle mathematical problems** more effectively than its predecessors.
 - It is expected to have the capability to perform **autonomous research online**.
 - It will play a crucial role in generating **high-quality synthetic data** for future models, particularly [Project Orion](#).
 - Project Orion is being designed to outperform GPT-4. It could use a combination of Project Strawberry and high-quality synthetic data that would likely reduce errors and hallucinations compared to its predecessors and other AI models.

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White Topping of Roads

[Source: TOI](#)

The Union government is **developing a policy to reinforce aging national highways using a technique known as white-topping**, aimed at extending their lifespan.

- The [National Highways Authority of India \(NHAI\)](#) has been instructed to prioritise the upgrading of national highways to address maintenance concerns.
 - **NHAI** was established under the **NHAI Act of 1988** under the **Ministry of Road Transport and Highways**.
 - It oversees the [National Highways Development Project \(NHDP\)](#) and other projects.
 - India's national highway network covers about **146,000 kilometers**.
- **Whitertopping** is the process of **applying an 100-200 mm overlay of cement concrete** (bonded or unbonded) to existing **bituminous roads** (made using a mixture of asphalt and aggregate materials) for **rehabilitation or structural strengthening**.
 - **Cement Concrete** is a construction material made by mixing **cement, water, aggregates** (like sand and gravel), and often additives for building roads, bridges and other structures due to its strength, durability, and versatility.
- The technique offers fuel savings as vehicles consume less fuel on concrete roads, **reduces carbon emissions**, mitigates the urban heat island effect, and improves safety by enhancing the reflection of vehicle lights.
 - It also **requires less energy for external lighting** due to its reflective properties.



The infographic is divided into three main sections. On the left, under the heading 'WHITE-TOPPING', it defines a whitetop as a cement concrete layer placed over an existing asphalt pavement, noting it is stronger and more resistant to rutting and cracking. Below this, 'ULTRA-THIN WHITE-TOPPING' is defined as a 50mm to 100mm thick concrete overlay over distressed asphalt. In the center, a circular inset photograph shows a road construction site with a yellow machine paving a new surface. On the right, a blue box titled 'ADVANTAGES' lists three benefits: long life with low maintenance and life-cycle cost, improved safety and environmental benefits, and the ability to reduce rutting and cracking while improving the structural capacity of existing asphalt roads.

WHITE-TOPPING | A whitetop is a cement concrete layer placed over an existing asphalt pavement. It is stronger than asphalt overlay, and thus more resistant to rutting and surface initiated cracking

ULTRA-THIN WHITE-TOPPING
A type of whitetopping in which a concrete overlay of 50mm to 100mm thickness is placed over a distressed asphalt pavement

ADVANTAGES

- ▶ Long life, low maintenance and low life-cycle cost
- ▶ Improved safety and environmental benefits
- ▶ Can help reduce rutting and cracking considerably
- ▶ Improves structural capacity of existing asphalt roads

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Smart Laboratory on Clean Rivers (SLCR)

[Source: PIB](#)

Recently, the [Green Strategic Partnership](#) between **India** and **Denmark** has led to the creation of the **Smart Laboratory on Clean Rivers (SLCR) in Varanasi**.

- SLCR is a collaborative initiative involving **India** (Department of Water Resources, River Development and Ganga Rejuvenation), **Denmark** and **Indian Institute of Technology - Banaras Hindu University (IIT-BHU)**.
- **Objectives of SLCR:** It aims to rejuvenate the **Varuna River** using sustainable methods.
- **Funding Mechanism:** The SLCR secretariat will get Rs 16.8 crore from the **Jal Shakti Ministry** and an extra **Rs 5 crore from Denmark** for sustainability and development.
- **Projects Under SLCR:**
 - **Decision Support System (DSS):** Provides real-time monitoring, data visualization, and scenario simulations.
 - **Emerging Pollutants Characterization:** Detects and quantifies contaminants with advanced analysis.
 - **Hydrogeological Model:** Determines optimal recharge sites and rates for the Varuna Basin.
- **Model Of SLCR:** It features a lab model at **IIT-BHU** and an **on-field living lab** at the Varuna river for real-world testing and scaling of solutions.
 - Varuna river is a **minor tributary** of the **Ganges River** in Uttar Pradesh, India.
 - It originates at **Phulpur in the Prayagraj** district and merges into the Ganges near Sarai Mohana in the Varanasi district.

Read More: [India Denmark Cooperation](#)

New Guidelines for Waste Tyre Management

Source: [BS](#)

The **Ministry of Environment, Forest, and Climate Change (MoEFCC)** has recently approved **new Environmental Compensation (EC) guidelines** aimed at strengthening **waste tyre management** in India.

- **Key Aspects of the New Guidelines:** Manufacturers who do not meet their [Extended Producer Responsibility \(EPR\) targets](#) will face penalties of up to Rs 8.40 per kg of waste tyres.
 - Companies violating the [Hazardous and Other Waste \(Management and Transboundary Movement\) Amendment Rules, 2022](#) will be fined Rs 25,000, with repeat offenders facing fines up to Rs 1 lakh.
- **EPR Compliance:** Tyre manufacturers and importers must progressively increase their recycling responsibilities. Starting from 35% of their 2020-21 production/imports in 2022-23, increasing to 70% in 2023-24, and reaching 100% by 2024-25.
 - **New units must comply with 100% responsibility in the third year of joining** the programme.
 - Waste tyre importers must manage 100% of the tyres they imported in the previous year. Import for producing [pyrolysis oil](#) or char is explicitly banned.
- Recycling waste tyres aims to **reduce landfill use and convert tyres into valuable resources** such as reclaimed rubber, crumb rubber, and recovered carbon black.
- EPR focuses on the **environmental responsibility of the producer for the impacts of their product** from initial production to the entire lifecycle, including end-of-life management.

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UPI Based Block Mechanism

[Source: TH](#)

Recently, **Securities and Exchange Board of India (SEBI)** has proposed that [Qualified Stock Brokers \(QSBs\)](#) should offer a **UPI based Block Mechanism** for [secondary market](#) trading, similar to the [Application Supported by Blocked Amount \(ASBA\)](#) facility.

- Clients can trade using blocked funds in their bank accounts **instead of transferring the money upfront to the Trading Member (TM)**. It's optional for investors and not mandatory for TMs to provide as a service.
- **3-in-1 Trading Accounts:** SEBI proposes this as an alternative to the ASBA-like facility. The 3-in-1 accounts keep funds in the client's bank account, earning interest, and can be used for both cash and derivatives segments.
 - **Unlike the UPI block, which has restrictions, the 3-in-1 facility has no limits on the amount.**
 - SEBI introduced the **UPI block mechanism for IPOs in 2019**. A beta version for secondary market trading was launched in January, 2024, limited to the cash segment.
- ASBA is a **mechanism introduced by the SEBI to facilitate the application and allotment process for Initial Public Offerings (IPOs)**, rights issues, and other securities offerings.
 - It is designed to make the application process more efficient and investor-friendly by allowing investors to apply for shares without transferring the entire application amount upfront.

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