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MINISTRY OF
SCIENCE AND
TECHNOLOGY



MK Yadav Sir

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84,119 Children rescued by RPF under 'Operation Nanhe Farishtey' in last seven years

Context: Under Operation 'Nanhe Farishte', the Railway Protection Force (RPF) has rescued over 84,119 children. This initiative highlights their ongoing efforts in child safety and protection.

Operation 'Nanhe Farishtey'

- **About:** A dedicated child-rescue initiative by the Railway Protection Force (RPF) across the country.
 - It also identifies and prevent the inflow of children who are illegally brought to the city, mainly to work as child labourers
- **Aim:** To work towards ending Human Trafficking through Railways.
- **Dedicated authority:** Railway Protection Force (RPF)
- **Nodal ministry:** Ministry of Railways.
- **Railway Protection Force (RPF):** An armed railway police force of the Union under railway ministry.

Railway Ministry Other Initiatives

- **Operation Jeevan Raksha:** The RPF's vigilant and swift action saved the lives of 233 passengers who had accidentally fallen while de-boarding or boarding moving trains, narrowly avoiding being caught under the wheels, at platforms and railway tracks in the month of January 2024, under Operation 'Jeevan Raksha.'
- **Meri Saheli" Initiative:** RPF takes the security of women passengers seriously and launched the "Meri Saheli" initiative. Providing security to women passengers.
- **Operation "Uplabdh":** In the fight against touts, RPF arrested 379 individuals in the month of January 2024 and took legal action against them as per the law. Additionally, they seized future reserved railway tickets, valued at Rs. 44.46 lakhs.
- **Operation Sanraksha:** In a resolute effort to maintain passenger safety and protect railway services, RPF arrested 53 individuals involved in the perilous act of stone pelting on running trains in January 2024.
- **Operation Seva:** With a humanitarian approach, RPF provided assistance to 227 elderly, sick or injured passengers during their rail travels in the month of January 2024.

What is the role of the Finance Commission?

How is horizontal devolution of taxes between States decided? For how long do the recommendations of the Commission last? Why do States complain that the Centre does not give them an ample share of the tax revenue? From where do States get their funds?

EXPLAINER

The story so far: The sixteenth Finance Commission headed by former Niti Aayog Vice-Chairman Arvind Panagariya has begun its work by inviting suggestions from the public on the mandate set for it by the Centre. The latest Finance Commission, which consists of five members including the chairman, was constituted in December last year and is expected to submit its recommendations by October, 2025. Its recommendations will be valid for five years starting from April 1, 2026.

What is the Finance Commission? The Finance Commission is a constitutional body that recommends how tax revenues collected by the Central government should be distributed among the Centre and various States in the country. The Centre, however, is not legally bound to implement the suggestions made by the Finance Commission. The Commission is reconstituted typically every five years and usually takes a couple of years to make its recommendations to the Centre.

How does the Commission decide? The Finance Commission decides what proportion of the Centre's net tax revenue goes to the States overall (vertical devolution) and how this share for the States is distributed among various States (horizontal devolution). The horizontal devolution of funds between States is usually decided based on a formula created by the Commission that takes into account a State's population, fertility level, income level, geography, etc. The vertical devolution of funds, however, is not based on any such objective formula. Nevertheless, the last few Finance Commissions have recommended greater vertical devolution of tax revenues to States. The 13th, 14th and 15th Finance



GSTV IMAGES

Commissions recommended that the Centre share 22%, 42% and 41% of funds, respectively, from the divisible pool with States. It should be noted that the Centre may also aid States through additional grants for certain schemes that are jointly funded by the Centre and the States.

The 14th Finance Commission is also expected to recommend ways to augment the revenues of local bodies such as panchayats and municipalities. It should be noted that, as of 2015, only about 3% of public spending in India happened at the local body level, as compared to other countries such as China where over half of public spending happened at the level of the local bodies.

Why is there friction between the Centre and States? The Centre and the States have been at loggerheads over the issue of sharing tax

revenues for a while now. The Centre collects major taxes such as the income tax, the corporate tax, and the goods and services tax (GST) while the States primarily rely on taxes collected from the sale of goods such as liquor and funds that are beyond the ambit of GST. The States, however, are responsible for the delivery of many services to citizens, including education, healthcare and the police. This has led to complaints that the Centre has reduced the power of the States to collect taxes and that it does not give enough funds to the States to match with the scale of their responsibilities.

What are the disagreements? The States and Centre often disagree on what percentage of the total tax proceeds should go to the States and about the actual delivery of these funds. States argue that they should receive

more funds than what is recommended by the Finance Commission as they have greater responsibilities to fulfil than the Centre. They also point out that the Centre does not even share the amount of funds recommended by the Finance Commission, which they believe is already too low. For example, according to analysts, the Centre has devolved an average of only 38% of funds from the divisible pool to the States under the current Fifteenth Finance Commission as against the Commission's actual recommendation of 41%.

Further, States have complaints about what portion of the Centre's overall tax revenues should be considered as part of the divisible pool out of which the States are funded. It is believed that cesses and surcharges, which do not come under the divisible pool and hence not shared with the States, can constitute as much as 28% of the Centre's overall tax revenues in some years, causing significant revenue loss for States. So, the two recommendations of funds from the divisible pool, as recommended by successive Finance Commissions, may be offset by rising cess and surcharge collections. In fact, it is estimated that if cesses and surcharges that go to the Centre are also taken into account, the share of States in the Centre's overall tax revenues may fall to as low as 32% under the 16th Finance Commission.

More developed States such as Karnataka and Tamil Nadu have also complained that they receive less money from the Centre than what they contribute as taxes. Tamil Nadu, for example, received only 29 paise for each rupee that the State contributed to the Centre's exchequer while Bihar gets more than ₹7 for each rupee it contributes. In other words, it is argued that more developed States with better governance are being penalised by the Centre to help States with poor governance. Some critics also believe that the Finance Commission, whose members are appointed by the Centre, may not be fully independent and immune from political influence.

THE GIST

The sixteenth Finance Commission headed by former Niti Aayog Vice-Chairman Arvind Panagariya has begun its work by inviting suggestions from the public on the mandate set for it by the Centre.

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More developed States such as Karnataka and Tamil Nadu have also complained that they receive less money from the Centre than what they contribute as taxes.

FINANCE COMMISSION (Syllabus GS Paper 2 – Polity)

Context: The sixteenth Finance Commission headed by former Niti Aayog Vice-Chairman Arvind Panagariya has begun its work by inviting suggestions from the public on the mandate set for it by the Centre.

Finance Commission

- **About:** It is a constitutional body that recommends how tax revenues collected by the Central government should be distributed among the Centre and various States in the country.
- Article 280 of the Constitution of India provides for a Finance Commission as a quasi judicial body.
- **Constituted by:** President of India every fifth year or at such earlier time as he considers necessary.
- **Composition:** Chairman and four other members to be appointed by the president.
- **Tenure:** They hold office for such period as specified by the president in his order.
- **Recommendation of Commission:** The recommendations made by the Finance Commission are **only of advisory nature, not binding on the government.**
- **Fifteenth Finance Commission was constituted:** On November 27, 2017
- **Function:**
 - **Grants-in-aid:** The principles which should govern the grants-in-aid of the revenues of the States out of the Consolidated Fund of India.
 - **Consolidated Fund of a State:** The measures needed to augment the Consolidated Fund of a State to supplement the resources of the Panchayats in the State on the basis of the recommendations made by the Finance Commission of the State.
 - **President reference:** Any other matter referred to the Commission by the President in the interests of sound finance.

Govt wants its big banks to help their rival—the country's youngest infra lender

Context: The government wants to increase the capital base of the National Bank for Financing Infrastructure and Development, or NaBFID, to 1 trillion through support from banks.

National Bank for Financing Infrastructure and Development (NaBFID)

- **Established in:** NaBFID was founded by The National Bank for Financing Infrastructure and Development Act, 2021.
- **Objective:** Focuses on filling gaps in long-term non-recourse finance for infrastructure.
 - Strengthening Bond Markets: Aims to bolster the development of bonds and derivatives markets in India.
- Boosting the Economy: Intends to sustainably enhance the country's economy.
- **Mission:** To be the leading enabler for infrastructure financing with a focus on innovation, environmental sustainability, and overall sustainability.
- **Vision:** To achieve global recognition as a strong impact investor, driving transformative infrastructure funding in India.
- **Funding:** NaBFID may borrow money from: (i) central government, (ii) Reserve Bank of India (RBI), (iii) scheduled commercial banks, (iii) mutual funds, and (iv) multilateral institutions such as World Bank and Asian Development Bank.
- **Functions:**
 - **Financial Objectives:** Includes lending, investing, or attracting investments for infrastructure projects within or partially in India.
 - **Developmental Objectives:** Focuses on developing markets for bonds, loans, and derivatives for infrastructure.
 - **Loan and Advance Extensions:** Provides loans and advances for infrastructure projects.
 - Refinancing Existing Loans: Takes over or refinances existing infrastructure loans.
 - **Attracting Investments:** Seeks investments from both private and institutional investors.
 - **Facilitating Foreign Participation:** Organizes and promotes foreign involvement in infrastructure projects.
 - **Dispute Resolution:** Assists in negotiations with government authorities to resolve disputes in infrastructure financing.



The Indira Gandhi govt nationalised 14 largest commercial banks on this day in 1969

THE 14 NATIONALISED BANKS

- Allahabad Bank
- Bank of Baroda
- Bank of India
- Bank of Maharashtra
- Canara Bank
- Central Bank of India
- Dena Bank
- Indian Bank
- Punjab & Sind Bank
- Syndicate Bank
- Indian Overseas Bank
- UCO Bank
- Punjab National Bank
- United Bank of India

Context: On this day in 1969, the Indira Gandhi government nationalized the 14 largest commercial banks, transforming India's banking sector.

Nationalization of Banks

- **Enactment of the SBI Act, 1955:** The Government of India, with the enactment of the SBI Act, 1955, partially nationalized the three Imperial Banks.
- **Creation of State Bank of India:** These Imperial Banks, mainly operating in the three Presidencies of the past with their 466 branches, were renamed the State Bank of India, making it the first public sector bank in India.
- **Banking Nationalisation Act, 1969:** With the help of the Banking Nationalisation Act, 1969, the Government nationalized a total of 20 private banks in two phases.
 - **First Phase:** Fourteen banks with deposits of at least Rs 50 crore each were nationalised on the midnight of July 19, 1969, hours after Prime Minister Indira Gandhi's address to the nation regarding this.
 - **Second Phase:** A second round of nationalisation of six more commercial banks — with deposits of more than Rs 200 crore each — followed in 1980.

Impact

- Due to the nationalization of banks, the efficiency of the banking system in India improved.
- The nationalization of banks also boosted the confidence of the public in banks.
- The sectors that were lagging behind, like small-scale industries and agriculture, got a boost.
- Increased funds to these sectors led to an increase in the economic growth of India.
- The nationalization of banks also increased the penetration of banks, particularly in rural areas of India.

Union Minister Dr. Jitendra Singh inaugurates Asia's first health research related "Pre-clinical Network facility" under Coalition of Epidemic Preparedness Innovations (CEPI)

Context: Union Minister for Science & Technology recently inaugurated Asia's first health research "Pre-clinical Network Facility" under CEPI in Faridabad.

Coalition of Epidemic Preparedness Innovation (CEPI)

- **About:** It was founded in Davos, Switzerland, by the governments of Norway and India, the Bill & Melinda Gates Foundation, the Wellcome Trust, and the World Economic Forum.
- **Launch and Partnership:** CEPI was launched in 2017 as an innovative partnership among public, private, philanthropic, and civil organizations.
- **Mission:** CEPI's mission is to accelerate the development of vaccines and other biologic countermeasures against epidemic and pandemic threats to ensure accessibility for all people in need.
- **Vaccine Development Support:** CEPI has supported the development of over 50 vaccine candidates or platform technologies targeting multiple high-risk pathogens or potential future threats, known as Disease X.
- **Five-Year Plan:** CEPI's five-year plan for 2022-2026 includes the '100 Days Mission,' aiming to reduce the time required to develop safe, effective, and globally accessible vaccines against new threats to just 100 days.

CEPI and India Collaboration

- **Ind-CEPI Mission:** The Department of Biotechnology, Ministry of Science and Technology, Government of India, supports the implementation of the Ind-CEPI Mission, focusing on rapid vaccine development for epidemic preparedness.
- **Program Management:** The initiative is managed through a dedicated Program Management Unit (PMU) at the Biotechnology Industry Research Assistance Council (BIRAC).

MASHCO PIRO

The largest uncontacted tribe in the world, who live in the Amazon rainforest of southeastern Peru

INDIGENOUS RIGHTS NGO Survival International has released rare pictures of the Mashco Piro tribespeople in southeastern Peru, one of the world's 100-odd uncontacted tribes.

The pictures taken in late June show more than 50 tribespeople on the bank of a river, close to where logging companies have been granted concessions.

"These incredible images show that very large numbers of uncontacted Mashco Piro people are living just a few miles from where loggers are poised to start operations. This is a humanitarian disaster in the making," Caroline Pearce, director of Survival International, said.



Mashco Piro are seen near the Yine village of Monte Salvado in Peru. Survival International

The uncontacted tribe

Almost all uncontacted tribes live in the jungles of the Amazon and Southeast Asia. The Mashco Piro, possibly numbering more than 750, are believed to be the largest of such tribes. These nomadic hunter-gatherers live in the Amazon jungles of the Madre de Dios Region, close to Peru's border with Brazil and Bolivia.

Peru's government has forbidden all contact with the Mashco Piro, fearing the spread of a disease among the population to which it has no immunity. The tribe is very reclusive, only occasionally contacting the native but contacted Yine people. Much of what is known about the Mashco Piro comes from Yine accounts.

Logging in the forest

In 2002, the Madre de Dios Territorial Reserve was created to protect the territory of the Mashco Piro. But large parts of their traditional ground lie outside the reserve. Swatches of land have since been sold off as logging concessions, giving companies the right to fell the evergreen forests for timber and other produce.

The most prominent logging company, Canales Tahuamanu, has been allotted 53,000 hectares to extract cedar and mahogany by Peru's Forest

Stewardship Council (FSC). "Since there have been logging concessions, they [the Mashco Piro] feel increasingly pressured and upset because the companies have assaulted them," a Yine person told Survival International.

Tribe has nowhere to go

During Peru's rubber boom in the 1880s, the Mashco Piro were among the tribes who were forcibly displaced from their land, enslaved, and killed en masse. The survivors moved further upstream on the Manu river, where the Mashco Piro have lived in isolation ever since.

Now, as logging companies encroach into their territories, experts say they have nowhere left to go. That is why the number of sightings has risen in recent years, with the Mashco Piro coming out of their forested havens not only to find food and supplies, but also to "flee" the outsiders.

They have even been sighted across the border in Brazil. "They flee from loggers on the Peruvian side... They are a people with no peace, restless, because they are always on the run," Rosa Padilla, of the Brazilian Catholic bishops' Indigenous Missionary Council, told Reuters.

ARJUN SENGUPTA

Context: Indigenous rights NGO Survival International has released rare pictures of the Mashco Piro tribespeople, one of the world's 100-odd uncontacted tribes.

Mashco Piro (Uncontacted Tribes)

- **Habitat:** Almost all of them live in the jungles of Amazon and Southeast Asia.
- **Largest Tribe:** The Mashco Piro, possibly numbering more than 750, are believed to be the largest of such tribes.
- **Location:** These nomadic hunter-gatherers live in the Amazon jungles of the Madre de Dios Region, close to Peru's border with Brazil and Bolivia.
- **Prohibition of Contact:** Peru's government has forbidden all contact with the Mashco Piro, fearing the spread of a disease among the population to which it has no immunity.
- **Reclusiveness:** The tribe is very reclusive, only occasionally contacting the native but contacted Yine people.
- **Territorial Reserve:** In 2002, the Peru government created the Madre de Dios Territorial Reserve to protect the territory of the Mashco Piro.
- **Outside the Reserve:** Large parts of their traditional ground lie outside the reserve.
- **Logging Concessions:** Swatches of land have since been sold off as logging concessions, giving companies the right to fell the evergreen forests for timber and other produce.
- **Canales Tahuamanu:** The most prominent logging company, Canales Tahuamanu, has been allotted an area of 53,000 hectares in the forests of Madre de Dios to extract cedar and mahogany by Peru's Forest Stewardship Council (FSC).
- **Defense of Rights:** Canales Tahuamanu has aggressively defended its logging rights, and clamped down on critical voices in courts.

Over 800 elephants died in Kerala in 8 years

Sarath Babu George
THIRUVANANTHAPURAM

Kerala's forests recorded 845 elephant deaths between 2015 and 2023, with studies indicating an increasing trend in the death rate over time.

The findings were given in the report of an elephant population estimation undertaken in the State's four elephant reserves.

An analysis also highlights a stark trend: younger elephants, particularly those under 10 years of age, face the highest risk of mortality, with an alarming rate of approximately 40%. This increase in deaths among calves has been attributed to elephant Endotheliotropic Herpesviruses - Haemorrhagic Disease (EEHV-HD),



Alarming note: The report said that calves faced a higher risk of death from Haemorrhagic Disease, a viral infection. PTI

that coexists with elephants.

Immunity in herds

The Forest Department has cited a recent study in Sri Lanka that shed light on the potential mitigating factors. Calves in larger herds exhibit better survival

the need to restore natural habitats and check the fragmentation of elephant herds to prevent EEHV-HD from becoming a major threat to the survival of Asian elephants in the region. Elephant herd sizes are found to shrink significantly in sub-optimal habitats where fodder availability is severely constrained.

Current threats

The document observes that elephants have been facing increasing vulnerability due to shrinking habitats and rising fragmentation exacerbated by climate change. Key factors contributing to their susceptibility include declining population sizes, sensitivity to high temperatures, competition from invasive plant species disrupting their food

sources, and heightened sensitivity to diseases.

It also reports that several critical variables influencing elephant distribution patterns, including land-use changes, water balance in the climate, temperature fluctuations, and disturbances are induced by human activities.

Recognising the need for a systematic approach to understand and mitigate elephant deaths, the study has recommended a structured protocol akin to Tamil Nadu's Elephant Death Audit Framework (EDAF). The proposed framework would facilitate comprehensive investigations into the causes of elephant deaths, that would help to identify patterns, assess threats, and implement targeted conservation measures effectively.

Context: According to WHO-UNICEF, India had the highest number of unvaccinated children for measles in 2023, totaling 1.6 million cases.

- Additionally, a rise in calf deaths linked to Elephant Endotheliotropic Herpesviruses – Haemorrhagic Disease (EEHV-HD) has been reported.

EEHV-HD

(Syllabus: GS Paper 3 – Env and Eco)

Elephant Endotheliotropic Herpesviruses – Haemorrhagic Disease (EEHV-HD)

- **About:** It is responsible for one of the most devastating viral infectious diseases in elephants worldwide, particularly affecting young Asian elephants.
- **Classification:** EEHV is classified in the family Herpesviridae.
- **Prevalence in Captive Elephants:** The prevalence of EEHV in captive Asian elephants in North America and Europe has been well documented.
- **First Incidence Reported in India:** The incidence of EEHV-HD was first reported in India in 1997, with 9 of 15 potential cases confirmed from Southern India, including wild free-ranging calves in Kerala, Karnataka, Tamil Nadu forest reserves, and Madras Zoo.
- **Transmission Pathways:**
 - Saliva
 - Breast milk
 - Nasal secretions
 - Vaginal secretions
 - Trunk-to-trunk contacts
 - Host Specificity
- **The disease exclusively affects elephants and is not infectious to humans or other animals.**
- **Symptoms of EEHV-HD:** Lethargy, Selective appetite to complete anorexia, Pyrexia, Edema of the head, trunk, and limbs, Reduced trunk movement, Lacrimation (sometimes) etc.
- **Diagnosis:** Encephalomyocarditis virus, Clostridial Enterotoxaemia, Anthrax, Pasteurellosis, Salmonellosis, and Hypovitaminosis E.
- **Diagnostic Testing:** Detection of EEHV and its subtypes is confirmed through Polymerase Chain Reaction (PCR) assays.

India logs third highest number of children not vaccinated against measles after Nigeria and Congo

Context: According to WHO-UNICEF, India reported the highest number of unvaccinated children for measles in 2023, with 1.6 million cases. This underscores a critical public health challenge in the country.

Measles

- **About:** A highly contagious, vaccine-preventable infectious disease caused by measles virus.
- **Spreads:**
 - An airborne disease which spreads easily from one person to the next through the coughs and sneezes of infected people.
 - Measles infects the respiratory tract and then spreads throughout the body.
 - It may also be spread through direct contact with mouth or nasal secretions.
- **Affect:** Measles can affect anyone but is most common in children.
- **Symptoms:**
 - Usually develop 10–12 days after exposure to an infected person and last 7–10 days.
 - A high fever, cough, runny nose and a rash all over the body.
 - **Complications can include:** blindness, encephalitis (an infection causing brain swelling and potentially brain damage), Severe diarrhoea and related dehydration, ear infections, severe breathing problems including pneumonia
- **Measles virus:** Belongs to the paramyxovirus family and it is normally passed through direct contact and through the air.
- **Vaccine:** Measles vaccine. And Measles-mumps-rubella (MMR) vaccine.

Recent Findings from WHO-UNICEF

- In 2023, India was among the top 10 countries where 55% of children were not vaccinated against measles, despite 90-94% vaccination coverage.
- The number of 'measles zero dose' children in India increased in 2023 compared to 2022.
- India has the third highest number of unvaccinated children against measles, following Nigeria and Congo.

Green revolution in maize

Maize production in India has more than tripled over the last two decades, making it a private sector driven green revolution story. Maize has now gone from being a feed crop to a fuel crop



HARISH DAMODARAN

THE GREEN Revolution saw India become self-sufficient, if not surplus, in wheat and rice. This was thanks to high-yielding varieties bred by institutions such as the Mexico-based CIMMYT (International Maize and Wheat Improvement Center) and New Delhi's Indian Agricultural Research Institute (IARI), under the leadership of scientists like Norman Borlaug and M.S. Swaminathan.

Another revolution, albeit less celebrated, has also taken place in India — in maize. Between 1999-2000 and 2023-24, its annual output has more than tripled, from 11.5 to over 35 million tonnes (mt), with average per-hectare yields rising from 1.8 to 3.1 tonnes.

Food and feed to fuel

Unlike rice and wheat, hardly a fifth of India's maize production is used for direct human consumption. An estimated 60% goes as feed for poultry birds and livestock. This is indirectly consumed as food — in the form of chicken, egg or milk. A market-ready breeder weighing 2-2.5 kg consumes around 4 kg of feed during its maturing cycle, effectively making the chicken a 'maize with wings'.

Breeder feed contains 55-60% maize by weight, while egg-layer feed contains 50-60%, and cattle feed 15-20%. Maize supplies carbohydrates, the principal energy source for poultry and livestock.

Food and feed apart, 14-15% of India's maize utilisation is for industrial purposes. Maize grains have 68-72% starch, and 1-3% of their single carbohydrates. Starch has applications in the textile, paper, pharmaceutical, food, and beverage industries.

New maize has emerged as a feedstock for ethanol that is used for blending with petrol. Distilleries run on sugarcane molasses and juice/yeast during the crushing season (November-April). In the off-season, when cane isn't available, they use grains. Until recently, surplus rice from the Food Corporation of India was being used for this purpose. But with the government stopping this supply on

RISE IN MAIZE PRODUCTION OVER LAST TWO DECADES



India's maize production peaked in 2022-23 at just over 38 mt, up from 11.5 mt in 1999-2000



concerns over depleting stocks and "food security", the focus has shifted to maize.

A new kind of maize

IARI has bred India's first 'waxy' maize hybrid with high amylopectin starch content, making it better suited for ethanol production.

The starch in maize is a mixture of two polymers — comprising glucose molecules bonded together in a straight chain (amylose), or bonded in branched form (amylopectin).

Normal maize starch has 30% amylose and 70% amylopectin. The starch from IARI's waxy maize hybrid has 93.5% amylopectin. Amylose starch imparts hardness in the grain, while amylopectin causes softness. That, in turn, affects starch recovery and fermentation rates. Normal maize grains have 68-72% starch, but only 58-62% is recoverable. The grains from the new Pusa Waxy Maize Hybrid-1, as it is proposed to be called, have 71-72% starch with 68-70% recovery.

"Softness ensures better grinding of the

grains fed into the mill for making flour. Grains with higher amylopectin are also easily accessible by alpha-amylase, the enzyme that hydrolyses and breaks down the starch into smaller glucose units. The glucose is then fermented into ethanol using yeast," Firoz Hossain, principal scientist at IARI, said.

The IARI-developed hybrid, having an average grain yield of 7.3 tonnes per hectare and potential of 8.8 tonnes, has been identified for release under the All-India Coordinated Research Project on Maize. "We'll soon be going to the Central Variety Release Committee. Once they approve, the hybrid will be officially released and notified for commercial cultivation," Hossain said.

IARI has signed a memorandum of understanding with the UPFertiliser's Association for field trials of its new hybrid. "We get roughly 380 litres of ethanol from one tonne of normal maize grain. The higher recoverable starch from waxy maize should take that to 415-420 litres," S.K. Shukla, business head at IARI

Cycolo Ltd's distillery in Gonda, said.

New breeding strategies

Meanwhile, CIMMYT has opened a maize doubled haploid (DH) facility at Bangal in Karnataka. Established in partnership with the University of Agricultural Sciences, Bangalore, it produces 100% homozygous (ie, having two identical copies of a single gene) and genetically pure inbred lines of maize that can be used as parents for further crossing and breeding of hybrids.

"In the conventional process, inbred lines are formerly continuous self-pollination (ie, 8 generations). DH technology enables production of completely uniform lines after just two cropping cycles. It speeds up inbred line development, thereby improving the efficiency of maize breeding and shortening the process," CIMMYT's director general Bruce Conover told the Indian Express.

The Bangal facility, set up in December 2022, produced and shared 26,022 maize (DH) lines last year. "We have many high-yielding lines tolerant to drought, heat and water logging, besides those that are nutrient-use efficient and resistant to pests and diseases such as fall armyworm and maize lethal necrosis," Conover said.

The Green Revolution in wheat and rice was a result of farmers cultivating high-yielding varieties mostly bred by CIMMYT, IARI and other public sector research organisations. Being self-pollinating plants — their flowers contain both the male and female reproductive organs — these crops are self-amenable to hybridisation. This is an agronomic trait where cross-pollinating nature (the male and female parts are located in different areas of the plant) makes hybrid breeding commercially viable.

Private sector breeders also account for over 80% of the 10 million hectares-plus area planted to maize in India. Their higher yields from crossing two genetically dissimilar inbred plants, are limited to the first generation. Farmers cannot harvest the same yields if they save the grains from these, and reuse as seed.

However, CIMMYT is sharing its improved inbred lines with both public sector institutions and 25-odd private seed companies. These include Mahyong, Shriram Bioseed, Advanta Seeds, Navneet Seeds, Kaveri Seeds, Mahindra Agri Solutions, Baid Seed and Indo-American Hybrid Seeds.

The green revolution in maize has been and continues to be, a private sector-led one

MAIZE PRODUCTION IN INDIA (Syllabus: GS Paper 3 – Agriculture)

Context: India has experienced a remarkable revolution in maize production, with annual output soaring from 11.5 million tonnes in 1999-2000 to over 35 million tonnes in 2023-24.

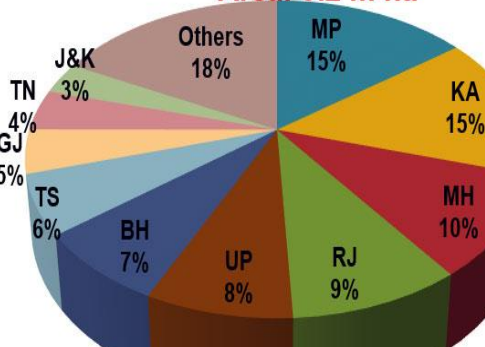
Maize Production in India

- **Ranking:** India ranks 4th in maize cultivation area and 7th in production globally, contributing around 4% of the world's maize area and 2% of its total production.
- **Global Production Leader:** The United States is the largest producer of maize, contributing nearly 36% of global production.
- **Climate Requirements**
 - **Temperature:** Between 21-27°C and requires high rainfall.
 - **Soil Type:** Maize is predominantly grown in old alluvial soil.
 - **Usage:** Maize serves as both food and fodder.
- **Growing Seasons:** In India, maize is primarily grown in two seasons: kharif (rainy) and rabi (winter). Kharif maize covers about 83% of the maize-growing area, whereas rabi maize accounts for 17%.
- **Cultivation Conditions:** Over 70% of kharif maize is cultivated under rainfed conditions, facing numerous biotic and abiotic stresses.
- **Regional Distribution:** Madhya Pradesh and Karnataka have the largest maize areas in India, each with 15%, followed by Maharashtra (10%), Rajasthan (9%), and Uttar Pradesh (8%). Bihar is a major producer after Karnataka and Madhya Pradesh, while Andhra Pradesh leads in maize productivity.

New Breeding Strategies

- **Maize Doubled Haploid Facility:** CIMMYT has inaugurated a maize doubled haploid (DH) facility at Kunigal in Karnataka.
- **Partnership for Development:** The facility was established in collaboration with the University of Agricultural Sciences, Bangalore.
- **Production of Homozygous Lines:** It produces 100% homozygous and genetically pure inbred lines of maize.
- **Use in Hybrid Breeding:** These inbred lines are used as parents for further crossing and hybrid breeding.

Area: 9.2 m ha



Speedy trial fundamental right, delay ground for bail even in heinous cases: SC

New Delhi: Holding that speedy trial is a fundamental right of an accused, an SC bench of Justice JB Pardiwala and Ujjal Bhuyan has said long incarceration with the improbability of the trial being completed in the near future is a good ground to grant bail, which cannot be denied just because the charges against the accused are very serious.

The court's ruling assumes significance in view of stringent bail conditions prescribed under different laws, including Prevention of Money Laundering Act (PMLA) and Unlawful Activities (Prevention) Act (UAPA).

It granted bail to an accused facing trial under UAPA for indulging in terrorist acts and smuggling counterfeit Indian currency as he had been behind bars for the last nine years, reports Amit Anand Choudhary.

"...the right to life and personal liberty enshrined under Article 21 is overarching and

HC questions abortion plea of teen who eloped

Gujarat HC asked on Thursday why it ought to grant permission for an abortion to a 17-year-old who was in love and eloped with a boy while being aware of the consequences. The girl's advocate claimed she was raped after she had eloped, and her parents did not want to continue the pregnancy. The lawyer said her family was not sure if the boy would marry her after the girl gave birth. THE

sacrosanct... Even in the case of interpretation of a penal statute, however stringent it may be, a constitutional court has to lean in favour of constitutionalism and the rule of law of which liberty is an intrinsic part," Justice Bhuyan, who wrote the judgment, said. "If the alleged offence is a serious one, it is all the more necessary to ensure that the trial is concluded expeditiously."

Context: An SC bench ruled that speedy trial is a fundamental right of an accused, stating that prolonged incarceration with no near-term trial completion justifies granting bail, even for serious charges.

- The court's ruling assumes significance in view of stringent bail conditions prescribed under different laws, including Prevention of Money Laundering Act (PMLA) and Unlawful Activities (Prevention) Act (UAPA).

Speedy Trial

- **Inherent in Article 21:** It guarantees the right to life and personal liberty, which inherently includes the right to a speedy trial.
- **First time mentioned in:** British Law
- **Interpretation of "Life and Liberty":** The phrase encompasses various rights essential for a free and dignified life, among which is the right to a timely judicial process.
- **Legal Protection:** Any denial of the right to speedy trial can be challenged in the Supreme Court under Article 32 or in High Courts under Article 226.
- **The Bharatiya Nagarik Suraksha Sanhita (BNSS):** The BNSS aims to expedite justice by mandating sessions courts to frame charges within 60 days of the first hearing and deliver judgments within 30 days after completing arguments (extendable to 60 days).
- Plea bargaining applications must be submitted within 30 days of charges being framed.

Landmark Cases Related to Speedy Trial

- **Babu Singh v. State of UP 1978:** The court remarked, "Our justice system even in grave cases, suffers from slow motion syndrome which is lethal to 'fair trial' whatever the ultimate decision.
- **Hussainara Khatoon & Ors. vs Home Secretary, State of Bihar 1979:** No procedure which does not ensure a reasonably quick trial can be regarded as 'reasonable, fair or just' and it would fall foul of Article 21.
- **Katar Singh vs State of Punjab:** A constitution bench of the Supreme Court unequivocally construed the right of speedy trial as a fundamental right. "The concept of speedy trial is read into Article 21 as an essential part of the fundamental right to life and liberty guaranteed and preserved under our Constitution.
- **Abdul Rehman Antulay Vs RS Nayak, (1992):** Right to speedy trial is implicit in Article 21 of the Constitution and is also reflected in Section 309 of the CrPC, 1973; that it encompasses all stages.

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