

CIVIL SERVICES EXAMINATION focus

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logical. simple . targeted
analysis & explanation
of relevant news

DATA

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summaries for
Prelims

EXAM-ORIENTED NOTES

Examination-
oriented and
clear

MAY
2026



**RAU'S IAS
STUDY CIRCLE**

Since 1953

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HISTORY GEOGRAPHY

GS PAPER 1

EL NIÑO AND MONSOON DEFICIT IN INDIA



- IMD uses it as the benchmark for assessing monsoon performance.
- Rainfall below **90% of LPA** is classified as “deficient”.

WHAT IS EL NIÑO?

ENSO=El Niño + La Niña
ENSO = El Niño + La Niña
ENSO = El Niño + La Niña

El Niño is a climatic phenomenon marked by abnormal warming of sea surface temperatures in the eastern and central Pacific Ocean.

It forms one phase of the El Niño Southern Oscillation (ENSO), a global ocean-atmosphere interaction influencing weather patterns worldwide.

Mechanism

- Weakening of trade winds allows warm Pacific waters to shift eastward.
- This disrupts the normal Walker Circulation.
- As a result, convection and rainfall over the Indian region weaken.

CLIMATIC DRIVERS OF INDIAN MONSOON

- **ENSO Effect:** El Niño generally weakens the Indian monsoon, whereas La Niña strengthens it.
- **Indian Ocean Dipole (IOD):** A positive Indian Ocean Dipole enhances monsoon rainfall and may partially offset El Niño effects.
- **Snow Cover:** Lower Eurasian snow cover supports stronger monsoon circulation.
- **Walker Circulation:** Changes in east-west atmospheric circulation influence moisture transport towards India.
- **Jet Streams:** The position and intensity of subtropical jet streams affect monsoon onset and distribution.
- **Global Warming:** Climate change increases monsoon variability and extreme rainfall events.

IMPACTS OF BELOW-NORMAL MONSOON

- **Agricultural Stress:** Nearly 60% of Indian farmers depend on monsoon rainfall, making Kharif agriculture highly vulnerable.
- **Rural Income Shock:** Poor rainfall reduces agricultural output and rural consumption demand.
- **Water Scarcity:** Deficient rainfall lowers groundwater recharge and drinking water availability.

CONTEXT

The India Meteorological Department (IMD) has forecast “below-normal” southwest monsoon rainfall at **92% of the Long Period Average (LPA)** for 2026, indicating a possible weakening of the monsoon due to the emergence of El Niño conditions.

LONG PERIOD AVERAGE (LPA)

LPA=87 cm

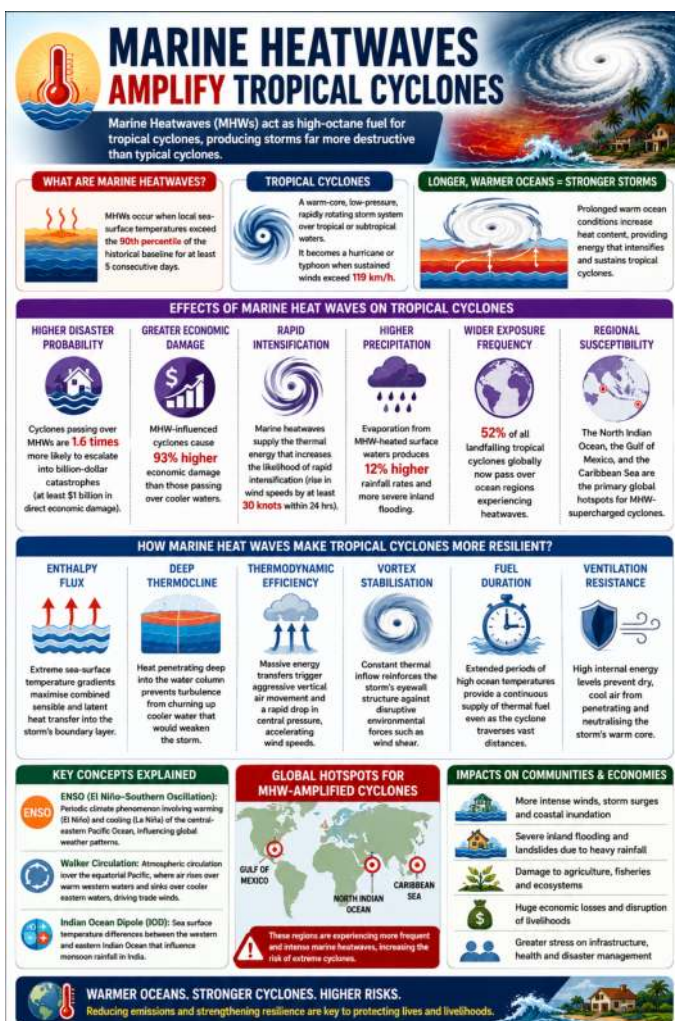
The Long Period Average (LPA) is the average monsoon rainfall calculated over a long-term period (1971–2020 for India).

- **Energy Impact:** Reduced reservoir levels negatively affect hydropower generation.
- **Food Inflation:** Lower crop production can increase food prices and inflationary pressure.

CONCLUSION

The forecast of a below-normal monsoon highlights the increasing vulnerability of India's climate-sensitive economy to global climatic phenomena such as El Niño. Strengthening climate resilience, improving water management, and promoting climate-smart agriculture are essential for mitigating the socio-economic impacts of monsoon variability.

MARINE HEATWAVES AMPLIFY TROPICAL CYCLONES



CONTEXT

Recent studies highlight that Marine Heatwaves (MHWs) are intensifying tropical cyclones by acting as “high-octane fuel,” making storms more destructive, long-lasting, and economically damaging.

WHAT ARE MARINE HEATWAVES?

SST > 90th percentile for ≥5 consecutive days MHW = SST > 90th percentile for ≥5 consecutive days

Marine Heatwaves occur when sea surface temperatures remain significantly above the historical average for at least five consecutive days.

These prolonged warm ocean conditions increase oceanic heat content and influence atmospheric circulation.

TROPICAL CYCLONES

Tropical Cyclone refers to a rapidly rotating low-pressure storm system formed over warm tropical oceans.

It is termed:

- Hurricane in the Atlantic,
- Typhoon in the Western Pacific,
- Cyclone in the Indian Ocean.

Cyclones become severe when sustained wind speeds exceed **119 km/h**.

EFFECTS OF MARINE HEATWAVES ON TROPICAL CYCLONES

Rapid Intensification

Marine heatwaves provide enormous thermal energy, increasing the likelihood of rapid intensification:

- Wind speed rise of at least 30 knots within 24 hours.

Higher Disaster Probability

Cyclones crossing MHW regions are:

- **1.6 times** more likely to become billion-dollar disasters.

Greater Economic Damage

MHW-influenced cyclones cause approximately:

- **93% higher economic losses** compared to storms over cooler waters.

Increased Rainfall

Warmer waters increase evaporation, producing:

- Around **12% higher rainfall rates**,
- More inland flooding.

Wider Exposure

Nearly **52%** of global landfalling cyclones now pass through marine heatwave zones.

Vulnerable Regions

Major hotspots include:

- North Indian Ocean,
- Gulf of Mexico,
- Caribbean Sea.

HOW MARINE HEATWAVES STRENGTHEN CYCLONES

Enhanced Enthalpy Flux

Extreme ocean warmth increases latent and sensible heat transfer into storms.

Deep Thermocline

Heat extending deep into the ocean prevents colder water from weakening the cyclone.

Thermodynamic Efficiency

Strong heat transfer causes:

- Rapid pressure fall,
- Aggressive upward air movement,
- Faster wind acceleration.

Vortex Stabilisation

Continuous heat inflow strengthens the cyclone eyewall against wind shear.

Longer Fuel Supply

Persistent warm waters sustain cyclones over longer distances and durations.

Resistance to Ventilation

High internal heat prevents cool, dry air from disrupting the cyclone core.

CONCLUSION

Marine heatwaves demonstrate how rising ocean temperatures are intensifying tropical cyclones under climate change. Strengthening early warning systems, resilient infrastructure, and climate adaptation strategies is crucial to reducing disaster risks in vulnerable coastal regions.

PIPRAHWA RELICS TO ARRIVE IN LADAKH

PIPRAHWA RELICS TO ARRIVE IN LADAKH
"THE LIGHT & THE LOTUS" EXPOSITION

A historic moment in India's Buddhist heritage and cultural diplomacy

ABOUT PIPRAHWA RELICS

- Bone fragments
- Crystal casket
- Steatite casket
- Gold ornaments & gemstones

A Brahmi inscription confirmed the relics belonged to Lord Buddha of the Shakya clan.

JOURNEY OF THE RELICS

DISCOVERY – 1898
Excavated by William Claxton Peppé at Piprahwa, Siddharthnagar (U.P.), identified as ancient Kapilavastu.

TRANSFER
Part of the relics was presented by Lord Elgin to King Rama V of Siam (Thailand), while another portion remained with Peppé.

REPATRIATION – 2025
Ministry of Culture stopped a Hong Kong auction and secured the return of the Peppé family collection to India.

SIGNIFICANCE OF THE EXPOSITION

- Strengthens India's 'Buddhist diplomacy'.
- Reaffirms India as the birthplace of Dharma and a spiritual centre.
- Deepens cultural ties with Buddhist-majority countries across Asia.

LADAKH'S SIGNIFICANCE IN BUDDHISM

CROSSROADS OF THE ANCIENT SILK ROAD
Ladakh linked Kashmir-Gandhara Buddhism with Central Asian centres like Khotan and the Tarim Basin.

PRESERVES EARLY BUDDHIST HERITAGE
Home to ancient stupas, rock carvings, monasteries and the famous Mulbekh Maitreya statue.

CANONICAL PRESERVATION
Ladakhi monasteries preserve Kangyur (teachings of Buddha) and Tengyur (commentaries), sustaining ancient Indian knowledge systems as living museums.

From Kapilavastu to the Himalayas – a journey of faith, heritage and enduring legacy.
PIPRAHWA RELICS: A SYMBOL OF INDIA'S SPIRITUAL HERITAGE

CONTEXT

The sacred Piprahwa relics of Lord Buddha are set to arrive in Ladakh as part of "The Light & the Lotus" exposition, marking a major event in India's Buddhist heritage and cultural diplomacy.

ABOUT THE PIPRAHWA RELICS

The Piprahwa relics consist of:

- Bone fragments believed to belong to Lord Buddha,
- Crystal and steatite caskets,
- Gold ornaments and gemstones.

A Brahmi inscription discovered with the relics confirmed their association with Lord Buddha of the Shakya clan.

Discovery

The relics were excavated in 1898 by William Claxton Peppé at Piprahwa in Siddharthnagar district of Uttar Pradesh. The site is identified with ancient Kapilavastu, the capital of the Shakya republic and the childhood home of Buddha.

Transfer and Repatriation

Part of the relics was gifted by Lord Elgin to King Rama V, while another portion remained with the Peppé family. In 2025, the Ministry of Culture prevented the auction of these relics in Hong Kong and secured their return to India, reflecting the growing importance of heritage repatriation.

SIGNIFICANCE OF THE EXPOSITION

Cultural Diplomacy

The exhibition reinforces India's Buddhist diplomacy by projecting the country as:

- The birthplace of Buddhism,
- A centre of spiritual heritage,
- A custodian of Buddhist relics and traditions.

Civilisational Connection

The event deepens India's cultural ties with Buddhist-majority nations such as Thailand, Sri Lanka, Mongolia, Japan, and Bhutan.

LADAKH'S IMPORTANCE IN BUDDHISM

Ladakh has historically served as a major centre of Himalayan Buddhism.

Silk Road Link

Ladakh connected Kashmir-Gandhara Buddhism with Central Asian regions such as Khotan and the Tarim Basin through the Ancient Silk Road.

Preservation of Buddhist Heritage

The region preserves:

- Ancient stupas,
- Rock carvings,
- Monasteries,
- The famous Mulbekh Maitreya statue.

Canonical Preservation

Ladakhi monasteries safeguard Buddhist scriptures such as:

- Kangyur (teachings of Buddha),
 - Tengyur (commentaries by scholars),
- thus preserving ancient Indian knowledge traditions.

CONCLUSION

The arrival of the Piprahwa relics in Ladakh symbolises the revival of India's Buddhist civilisational heritage. It strengthens cultural diplomacy, promotes spiritual tourism, and reaffirms India's historic role as the cradle of Buddhism.

STRAIT OF HORMUZ: HISTORICAL EVOLUTION OF A GLOBAL STRATEGIC CHOKEPOINT

STRAIT OF HORMUZ
A CHOKEPOINT AT THE HEART OF HISTORY
From Imperial Rivalries to Global Energy Lifeline

STRATEGIC LOCATION
The Strait of Hormuz connects the Persian Gulf to the Gulf of Oman. It is a narrow waterway through which nearly one-fifth of the world's oil and LNG passes, making it a critical geopolitical chokepoint.

Why in News?
Recent tensions in West Asia have once again put the Strait of Hormuz in the global spotlight. Nearly one-fifth of the world's oil and LNG passes through this narrow waterway, making it a critical geopolitical chokepoint.

~20% of global oil trade
Vital route for energy security & global commerce
One of the world's most important maritime chokepoints

HISTORICAL JOURNEY OF CONTROL OVER THE STRAIT OF HORMUZ

16th Century (1515)	Early 17th Century (1622)	17th-18th Century	18th Century (Late)	19th Century	Treaty System (19th-20th Centuries)
Portuguese Conquest and Control	End of Portuguese Dominance	Anglo-Dutch Rivalry	British Ascendancy	British Hegemony	Indirect Control & Trucial States
<ul style="list-style-type: none"> • The Portuguese seized Hormuz Island in 1515. • Built fortresses and imposed taxes on trade. • Dominated spice and silk trade routes throughout the 16th century. 	<ul style="list-style-type: none"> • Anglo-Dutch alliance with Safavid ruler Shah Abbas I defeated the Portuguese. • Ended nearly a century of Iberian control over the strait. 	<ul style="list-style-type: none"> • Dutch East India Company dominated in the 17th century from Bandar Abbas. • Strong navy and aggressive trade practices controlled the spice trade. • By 18th century, Dutch power declined due to corruption, high costs and wars. 	<ul style="list-style-type: none"> • Dutch collapse after the Fourth Anglo-Dutch War. • Power vacuum allowed Britain to expand influence in the Persian Gulf. 	<ul style="list-style-type: none"> • Naval campaigns (1809, 1819) against Al Qawasim confederation. • Ensured safe passage to Bombay and British India. 	<ul style="list-style-type: none"> • Britain signed treaties with local rulers. • Controlled foreign relations, defence and trade. • Region known as Trucial States, later became UAE.

20th Century Shift to Oil
Oil and Strategic Control

- 1901: William Knox D'Arcy obtained oil rights in Persia.
- 1908: Oil discovered at Majed Soleyman.

1909-1914
Anglo-Persian Oil Company

- Company formed in 1909.
- In 1914, British government took 51% stake.

20th Century Onwards
Energy Lifeline of the World

- Strait transformed from a trade route to a vital energy corridor.
- Oil from the Gulf powers the world.
- British influence continued until 1971.

MODELS OF CONTROL

- Portuguese Model (Direct Control)**
 - Military occupation
 - Forts and naval power
 - High cost, unsustainable
- British Model (Indirect Control)**
 - Naval power + Diplomacy
 - Treaties with local rulers
 - Internal autonomy allowed
 - Cost-effective & long-term dominance

WHY THE STRAIT OF HORMUZ MATTERS TODAY

- Critical for Global Energy Security**: ~20% of global oil and LNG passes through it.
- Key Maritime Chokepoint**: Connects Persian Gulf to the Arabian Sea and beyond.
- Geopolitical Sensitivity**: Tensions can disrupt global markets and fuel prices.
- Impact on Global Economy**: Disruptions affect trade, inflation and supply chains worldwide.

IN A NUTSHELL
For over five centuries, the Strait of Hormuz has been a prize of empire-builders, a lifeline of trade, and today, the energy artery of the modern world.
Whoever controls the Strait, influences the world.

WHY IN NEWS?

The Strait of Hormuz has once again become a major geopolitical flashpoint amid escalating tensions in West Asia. Iran's restrictions on maritime passage following US-Israeli strikes and the resulting military responses have highlighted the strategic importance of this narrow waterway, through which a significant share of global oil and gas supplies pass.

However, the significance of the Strait of Hormuz is deeply historical. For centuries, imperial powers competed to dominate this maritime chokepoint due to its control over trade, energy flows, and access to Asia.

GEOGRAPHICAL IMPORTANCE OF THE STRAIT OF HORMUZ

The Strait of Hormuz connects the Persian Gulf with the Gulf of Oman and the Arabian Sea. It lies between Iran to the north and Oman and the United Arab Emirates to the south.

Its strategic importance arises from:

- Acting as the gateway for West Asian oil exports
- Linking trade routes between Asia, Africa, and Europe
- Serving as a critical maritime chokepoint for global commerce and energy security

Today, nearly one-fifth of global petroleum trade passes through the strait, making it one of the world's most sensitive strategic waterways.

PORTUGUESE CONTROL IN THE 16TH CENTURY

Originally, the Strait of Hormuz was controlled by the wealthy Kingdom of Hormuz, which emerged as a major commercial hub connecting:

- India
- Persia
- Arabia
- East Africa

In 1515, the Portuguese Empire captured Hormuz Island under the leadership of Afonso de Albuquerque. The Portuguese transformed the island into a fortified naval base and imposed taxes on passing ships.

Portuguese Strategy

The Portuguese relied on:

- Direct military occupation
- Naval superiority
- Fortified coastal infrastructure

The construction of the **Castelo de Nossa Senhora da Conceição** symbolised this militarised model of imperial control.

Through this system, Portugal dominated lucrative spice and silk trade routes during much of the 16th century.

DECLINE OF PORTUGUESE DOMINANCE

By the early 17th century, Portugal faced increasing competition from emerging European trading powers.

In 1622, a combined alliance involving:

- The English East India Company
- The Dutch East India Company (VOC)
- Safavid ruler Shah Abbas I

successfully expelled the Portuguese from Hormuz.

This marked the end of nearly a century of Portuguese dominance over the strait and opened the region to Anglo-Dutch rivalry.

ANGLO-DUTCH COMPETITION IN THE 17TH-18TH CENTURIES

After the Portuguese withdrawal, the Strait of Hormuz became a contested zone between the British and Dutch East India Companies.

Dutch Dominance

The Dutch East India Company operated as a quasi-sovereign commercial empire possessing:

- Military authority
- Naval fleets
- Independent diplomatic powers

Using Bandar Abbas as a strategic base, the Dutch controlled much of the spice trade during the 17th century through aggressive commercial practices and maritime strength.

Decline of the Dutch

By the 18th century, the Dutch East India Company weakened due to:

- Administrative corruption
 - Financial overextension
 - Rising military costs
 - Defeats during the Fourth Anglo-Dutch War
- Its eventual collapse created a power vacuum that enabled Britain to establish regional dominance.

RISE OF BRITISH HEGEMONY

The United Kingdom viewed control over the Strait of Hormuz as essential for protecting maritime routes to British India, especially Bombay.

Naval Campaigns Against Al Qawasim

In 1809 and 1819, Britain launched naval expeditions against the Al Qawasim confederation, accusing them of piracy and threatening British shipping interests.

The Al Qawasim were a powerful Sunni maritime confederation based in the southern Gulf region.

Britain destroyed much of their naval capacity and established its authority over Gulf waters.

TREATY SYSTEM AND THE TRUCIAL STATES

Unlike the Portuguese model of direct occupation, Britain adopted an indirect system of control through treaties with local rulers.

FEATURES OF THE BRITISH MODEL

Britain:

- Controlled foreign relations and defence
- Allowed internal autonomy to local rulers
- Protected trade and maritime security
- Avoided expensive direct administration

The treaty-bound Gulf Sheikdoms became known as the **Trucial States**, which later evolved into the modern-day United Arab Emirates (UAE).

This system enabled Britain to dominate the Strait of Hormuz efficiently for nearly two centuries.

SHIFT FROM TRADE TO OIL IN THE 20TH CENTURY

By the early 20th century, Britain's focus shifted from protecting trade routes to securing energy supplies.

Discovery of Oil

In 1901, British financier William Knox D'Arcy obtained oil exploration rights in Persia.

In 1908, George Bernard Reynolds discovered oil at Masjed Soleyman, marking the first major commercial oil strike in the region.

Anglo-Persian Oil Company

In 1909, the Anglo-Persian Oil Company was established. Recognising the strategic importance of petroleum, the British government acquired a 51% stake in the company in 1914.

This decision was influenced by Winston Churchill's move to convert the British navy from coal-powered ships to oil-powered fleets.

TRANSFORMATION INTO AN ENERGY CHOKEPOINT

The Strait of Hormuz gradually evolved from a commercial trade route into a critical global energy corridor.

Its importance increased because:

- West Asian oil became central to industrial economies
- Global naval powers depended on uninterrupted oil flows
- Petroleum emerged as a strategic resource during the World Wars

Britain maintained influence in the Gulf through treaty systems until its formal military withdrawal in 1971.

CONTEMPORARY RELEVANCE

Today, the Strait of Hormuz remains central to global geopolitics due to:

- Dependence of global energy markets on Gulf oil exports
- Iran-US strategic rivalry
- Presence of major naval forces in the region
- Vulnerability of global supply chains to disruptions

Any instability in the strait can trigger:


- Rising oil prices
- Supply chain disruptions
- Inflationary pressures worldwide
- Increased military tensions in West Asia

CONCLUSION

The history of the Strait of Hormuz reflects the broader evolution of global power politics—from spice trade competition and colonial naval rivalry to modern energy geopolitics. Control over the strait has historically provided economic and strategic leverage to dominant powers.

Even today, the Strait of Hormuz remains one of the world's most critical maritime chokepoints, where regional conflicts and global strategic interests intersect, shaping international trade, energy security, and geopolitical stability.

YANGTZE RIVER LATEST NEWS



Yangtze River Latest News

China has completed an 11.18-km-long high-speed underwater tunnel beneath the Yangtze River, allowing bullet trains to operate at speeds of up to 350 km/h.

About Yangtze River

- ▶ Also known as Chang Jiang or Yangzi.
- ▶ Longest river in China and Asia, third-longest in the world after the Nile and Amazon rivers.
- ▶ Longest river in the world to flow entirely within one country (approximately 6,300 kilometers long)
- ▶ Central to Chinese civilization, economy & culture.

Course of the River

- ▶ Originates in the Tibetan Plateau in Tibet.
- ▶ Flows through mountainous terrain in its upper and mid-course.
- ▶ In its lower course, it enters fertile plains.
- ▶ Empties into the East China Sea near Shanghai.
- ▶ More than 700 tributaries feed into the Yangtze.

Economic & Geographical Significance

- ▶ Major transportation route since the 13th century.
- ▶ Connects major inland & coastal cities like Chongqing, Wuhan, Nanjing & Shanghai.
- ▶ Yangtze basin produces nearly half of China's total agricultural output and is the nation's 'great granary'.
- ▶ Accounts for about 40% of China's total economic output: Supports a large fishing industry; the basin provides nearly half of fish consumed in China.
- ▶ Yangtze River basin is home to around 400 million people, one third of China's population.

China has recently completed an 11.18-km-long high-speed underwater tunnel beneath the Yangtze River, enabling bullet trains to operate at speeds of up to 350 kmph. This engineering feat represents a major milestone in transport infrastructure, improving connectivity between key economic regions and reducing travel time significantly. It reflects China's focus on integrating advanced technology with large-scale infrastructure to boost economic growth and regional development.

ABOUT YANGTZE RIVER

- The Yangtze River, also known as Chang Jiang or Yangzi, is the longest river in China and Asia, and the third-longest river in the world after the Nile River and the Amazon River.
- It is the longest river in the world to flow entirely within a single country.
- The river is approximately 6,300 kilometers long.
- It has historically played a central role in shaping Chinese civilization, economy, and culture.

COURSE OF THE RIVER

- The Yangtze originates in the Tibetan Plateau in Tibet.
- It flows through rugged mountainous terrain for much of its upper and middle course.
- In its lower course, it enters wide and fertile plains, supporting dense populations and intensive agriculture.
- The river drains into the East China Sea near Shanghai.
- The Yangtze River system is extensive, with more than 700 tributaries contributing to its flow.

TRIBUTARIES

- The Yangtze has eight principal tributaries that significantly contribute to its volume and basin economy:
 - **Left bank tributaries:** Yalung, Min, Jialing, and Han rivers
 - **Right bank tributaries:** Wu, Yuan, Xiang, and Gan rivers
- These tributaries enhance irrigation, transportation, and regional connectivity across central China.

ECONOMIC AND GEOGRAPHICAL SIGNIFICANCE

- The Yangtze River has served as a major transportation artery since the 13th century, facilitating trade and movement of goods.

- It links major inland cities such as Chongqing and Wuhan with coastal hubs like Shanghai and Nanjing.
- The Yangtze basin is regarded as China's "great granary," producing nearly half of the country's total agricultural output, including rice and other staple crops.
- The basin contributes approximately 40% of China's total economic output, making it the country's most economically significant region.
- It supports a vast fishing industry, providing nearly half of the fish consumed in China.
- Around 400 million people—nearly one-third of China's population—reside in the Yangtze River basin.
- The river also plays a crucial role in hydropower generation, including major projects like the Three Gorges Dam, which contributes significantly to China's energy needs.

CONCLUSION

The completion of the high-speed underwater tunnel beneath the Yangtze River underscores China's advancements in infrastructure and engineering capabilities. Given the river's immense economic, demographic, and ecological importance, such developments enhance connectivity and economic integration. However, they also highlight the need for balancing rapid development with environmental sustainability, as large-scale interventions in river systems can have long-term ecological impacts.

BAUXITE MINING CONFLICT IN ODISHA

SIJIMALI BAUXITE MINING PROJECT

The Sijimali bauxite block is located in the Rayagada and Kalahandi districts of Odisha. In 2023, the project was allotted to Vedanta Limited to supply raw material to its Lanjigarh alumina refinery.

However, the project has generated strong opposition from local tribal communities due to concerns regarding:

- Loss of traditional livelihoods
- Displacement and land alienation
- Cultural and religious disruption
- Environmental degradation
- Alleged fraudulent consent processes

The project area falls within Scheduled (Fifth Schedule) Areas, where tribal rights receive constitutional protection. Under the Forest Rights Act, 2006 and Panchayats (Extension to Scheduled Areas) Act, 1996 (PESA), Gram Sabha consent is mandatory before undertaking such projects.

Concerns have also been raised regarding the principle of Free, Prior and Informed Consent (FPIC), which requires affected indigenous communities to be adequately informed and voluntarily consulted before project approval.

ECOLOGICAL CONCERNS

The Sijimali region lies in an ecologically sensitive zone within the Eastern Ghats. The proposed mining area includes:

- Elephant habitats
- Biodiverse forest ecosystems
- Erosion-prone hilly terrain

Large-scale mining in such regions can lead to:

- Deforestation
- Biodiversity loss
- Soil erosion
- Water contamination
- Habitat fragmentation

These environmental risks threaten both ecological sustainability and local livelihoods dependent on forests and natural resources.

IMPORTANCE OF ODISHA'S BAUXITE DEPOSITS

Odisha is India's most mineral-rich state and plays a central role in the country's aluminium industry.

BAUXITE MINING CONFLICT IN ODISHA

CONTEXT
Violent clashes erupted between police and tribal villagers in Rayagada, Odisha over a road linked to the Sijimali bauxite mining project.

SIJIMALI BAUXITE MINING PROJECT

- Location:** Sijimali bauxite block is in Rayagada and Kalahandi districts of Odisha.
- Local Opposition:** Strong resistance from tribal communities over livelihood loss, cultural impact, and alleged fraudulent consent.
- Tribal Rights:** Falls under the Scheduled (Fifth Schedule) areas, requiring Gram Sabha consent under the Forest Rights Act, 2006.
- Policy Issues:** Concerns over Free, Prior and Informed Consent (FPIC) and implementation of FRA & PESA.
- Economic Significance:** Key project for India's aluminium sector and Vedanta's raw material supply.

PROJECT LOCATION MAP
Map of Odisha showing Kalahandi and Rayagada districts.

SIGNIFICANCE OF ODISHA'S BAUXITE DEPOSITS

- Odisha accounts for ~41% of India's bauxite resources and ~73% of bauxite production.
- Mineral Rich State: Odisha's overall mineral wealth contributes ~17% of India's total mineral reserves.
- Strategic Location: Deposits in Eastern Ghats are located near refineries (e.g., Lanjigarh), reducing transportation costs and improving efficiency.
- Environmental Concerns: Mining in forested and hilly regions raises issues of deforestation, biodiversity loss, and land degradation.
- Social Impact: Located in tribal regions, leading to conflicts over land rights, livelihoods, and implementation of the FRA & PESA laws.

SEALED TREASURE: WHY BAUXITE MATTERS

Bauxite (Ore) → Alumina (Refining) → Aluminium (End Use)

Used in: Transport, Construction, Aerospace, Packaging, Power & Electrical.

Critical for India's industrial growth and atmanirbharta in the aluminium sector.

ECOLOGICAL CONCERNS

- Elephant habitat and wildlife corridor
- Deforestation and biodiversity loss
- Soil erosion and land degradation
- Water contamination and siltation
- Risk to livelihoods of local communities

NIYAMGIRI CASE: A LANDMARK PRECEDENT

- Issue:** Proposed bauxite mining in the Niyamgiri Hills faced strong opposition from the tribals over cultural and livelihood concerns.
- Indigenous Dongria Kondh (PVTG) opposed mining due to cultural and religious ties with the hills (worship of Niyam Raja).**
- Supreme Court Ruling:** The SC (2013) ruled that Gram Sabha consent is mandatory under the tribal rights framework for mining in scheduled areas.
- Outcome:** All 12 Gram Sabhas rejected the mining project, leading to cancellation and a landmark victory for tribal and environmental rights.

WAY FORWARD: BALANCING DEVELOPMENT & RIGHTS

- Ensure Genuine Consent:** Strengthen Gram Sabha process, ensure Free, Prior and Informed Consent (FPIC).
- Sustainable Mining:** Adopt scientific mining, ecological restoration and strict environmental safeguards.
- Protect Livelihoods & Culture:** Prioritize livelihood security, fair rehabilitation and preservation of tribal culture.
- Transparent Governance:** Improve transparency in clearances, land acquisition and benefit-sharing mechanisms.
- Strengthen Laws:** Strict implementation of FRA, PESA and other environmental regulations.
- Research & Innovation:** Promote research on alternative materials, value addition and eco-friendly mining technologies.

CONCLUSION
Odisha's bauxite wealth is vital for India's development, but it must not come at the cost of environmental sustainability and tribal rights. Inclusive governance, respect for community rights and scientific resource use are key to a just, equitable and sustainable future.

The recent violent clashes between police and tribal villagers in Odisha over the Sijimali bauxite mining project have once again highlighted the growing conflict between economic development, environmental protection, and tribal rights in India. The dispute reflects broader concerns regarding mining activities in ecologically sensitive and tribal-dominated regions.

Bauxite is the primary raw material used for producing alumina and aluminium, which are essential for sectors such as transport, construction, energy, and aerospace. Consequently, securing bauxite resources is strategically important for India's industrial growth.

MAJOR SIGNIFICANCE

- Odisha accounts for nearly 41% of India's bauxite resources.
- It contributes around 73% of national bauxite production.
- The state possesses nearly 17% of India's total mineral reserves.

The proximity of bauxite deposits in the Eastern Ghats to alumina refineries such as Lanjigarh reduces transportation costs and improves industrial efficiency. Thus, projects like Sijimali are economically significant for ensuring raw material security for India's aluminium sector.

TRIBAL RIGHTS AND GOVERNANCE ISSUES

Mining conflicts in Odisha highlight persistent governance challenges in balancing industrialisation with constitutional safeguards for tribal communities.

Key issues include:

- Weak implementation of FRA and PESA provisions
- Inadequate Gram Sabha consultations
- Displacement and livelihood insecurity
- Lack of transparency in land acquisition processes

The conflict also raises questions regarding sustainable development and environmental justice in tribal regions.

THE NIYAMGIRI PRECEDENT

The Sijimali dispute draws comparisons with the landmark Niyamgiri Hills case.

In the Niyamgiri mining dispute, the indigenous Dongria Kondh tribe strongly opposed bauxite mining due to their deep cultural and religious connection with the hills, which they worship as Niyam Raja.

In 2013, the Supreme Court of India ruled that Gram Sabha consent was mandatory for mining projects in Scheduled Areas involving tribal rights.

Subsequently, all 12 Gram Sabhas rejected the proposed mining project, leading to its cancellation. The judgment became a landmark victory for tribal rights, environmental protection, and decentralised governance.

WAY FORWARD

A balanced approach is necessary to reconcile economic development with ecological sustainability and tribal welfare.

Strengthen Tribal Consent Mechanisms

Ensure genuine implementation of Gram Sabha consent under FRA and PESA through transparent and participatory processes.

Sustainable Mining Practices

Adopt scientific mining methods, ecological restoration, and strict environmental safeguards in sensitive areas.

Protect Livelihoods and Culture

Rehabilitation and compensation policies should prioritise livelihood security, cultural preservation, and community participation.

Improve Governance

Enhance transparency, environmental monitoring, and accountability in mining approvals and land acquisition processes.

CONCLUSION

The Odisha bauxite mining conflict reflects the complex challenge of balancing industrial growth with environmental sustainability and tribal rights. While bauxite remains strategically important for India's development, long-term progress requires inclusive governance, ecological responsibility, and respect for constitutional protections granted to indigenous communities.

IMPACT OF RISING ENERGY COSTS ON MIGRANT LABOURERS

IMPACT OF RISING ENERGY COSTS ON MIGRANT LABOURERS
Rising LPG prices and shortages in cities are forcing migrant workers to rethink urban livelihoods and return to villages temporarily.

IMPACTS ON MIGRANT LABOURERS

- INFLATIONARY PRESSURE:** Rising fuel costs increase food & daily expenses, worsening the cost of living.
- UNCERTAINTY & STRESS:** Economic insecurity and fear of future crises influence decisions to leave cities.
- FOOD INSECURITY:** High cooking costs force households to skip meals or shift to cheaper options.
- UNSAFE ALTERNATIVES:** More reliance on firewood or waste fuels, leading to health risks and unsafe living conditions.

INTERNAL MIGRANT TRENDS IN INDIA

- Scale of Migration:** 4.1 crore interstate migrants (Census 2011)
- Migration Rate:** 28.9% (26.5% from rural areas)
- Employment-driven Migration:** ~10-11% of migrants move for employment, mainly to urban areas.
- Informal Workforce:** Over 28 crore workers registered on e-Shram portal.

ISSUES FACED BY MIGRANT LABOURERS

- JOB INSECURITY:** Large proportion in informal sector without contracts or security; about 122 million job losses during COVID-19.
- POOR LIVING CONDITIONS:** Overcrowded, unhygienic settlements with limited access to sanitation, healthcare and services.
- WAGES EXPLOITATION:** Wage discrimination, delayed payments and exploitation by contractors; earn less than local workers.
- LACK OF SOCIAL SECURITY:** Interstate mobility excludes many from welfare schemes, despite efforts like POS portability.
- DATA DEFICIENCY:** Absence of reliable, real-time data hampers effective policymaking and crisis response.

MEASURES TO ADDRESS ISSUES

- UNIVERSAL SOCIAL SECURITY:** Expand and effectively implement schemes like e-Shram Portal for portable benefits – insurance, pensions and welfare support.
- PORTABILITY OF WELFARE BENEFITS:** Strengthen One Nation One Ration Card to ensure migrants receive subsidised food anywhere in India.
- IMPROVED LIVING & WORKING CONDITIONS:** Enforce labour laws and mandate employer responsibility for safe housing, sanitation and occupational safety.
- DATA & REGISTRATION:** Develop a comprehensive, real-time migrant worker database through inter-state coordination for targeted interventions.
- SKILL DEVELOPMENT:** Promote upskilling and integration into formal employment via schemes like PM Kaushal Vikas Yojana to enhance wages and job security.

KEY INITIATIVES FOR MIGRANT LABOURERS

- e-Shram:** National database of unorganised workers with one-stop platform to access multiple welfare schemes.
- SVANidhi:** Collateral-free working capital loans to street vendors to support livelihood recovery and self-employment.
- PM SHRAM YOGI MAANDHAN YOJANA:** Ensures ₹3,000 monthly pension after 60 years for unorganised workers earning below ₹15,000/month.
- AYUSHMAN BHARAT PM-JAY:** Provides ₹5 lakh health coverage with portability across India.
- ONE NATION ONE RATION CARD:** Enables migrants to access subsidised food anywhere in India using the same ration card.
- PMKAY:** Pradhan Mantri Anna Yojana provides free food grains and support to poor households, including migrants.

WHY IT MATTERS: Migrant labourers are the backbone of India's urban economy. Ensuring affordable energy, social protection and dignified living is key to inclusive development.

SECURE LIVELIHOODS, SAFE LIVING. STRONGER INDIA

CONTEXT

Rising LPG prices and fuel shortages in urban areas are increasing the financial burden on migrant labourers, forcing many workers to temporarily return to villages and reconsider urban livelihoods.

IMPACT OF RISING ENERGY COSTS ON MIGRANTS

Inflationary Pressure

Increasing fuel prices raise cooking, transportation, and food expenses, worsening the cost of living for low-income migrant households.

Food Insecurity

High LPG costs compel families to:

- Skip meals,
- Reduce nutritional intake,
- Shift towards cheaper and less nutritious food options.

Economic Uncertainty

Irregular incomes, coupled with rising expenses, create stress and insecurity among migrant workers, especially those employed in informal sectors.

Unsafe Fuel Alternatives

Many migrants increasingly rely on:

- Firewood,
- Coal,
- Waste materials,

which expose them to respiratory diseases, fire hazards, and unhealthy living conditions.

Internal Migration Trends in India

Indicator	Data
Interstate Migrants	4.1 crore (Census 2011)
Migration Rate	28.9%
Rural Migration Share	26.5%
Employment-driven Migration	~10–11%
Workers on e-Shram Portal	28+ crore

Migration in India is largely driven by employment opportunities in urban informal sectors such as construction, manufacturing, transport, and domestic work.

MAJOR ISSUES FACED BY MIGRANT LABOURERS

Job Insecurity

Most migrant workers are employed informally without contracts, social protection, or stable wages.

Poor Living Conditions

They often live in overcrowded settlements lacking sanitation, healthcare, and safe drinking water.

Wage Exploitation

Migrants frequently face delayed wages, wage discrimination, and exploitation by contractors.

Lack of Social Security

Interstate mobility restricts access to welfare schemes due to documentation and portability challenges.

Data Deficiency

The absence of real-time migrant worker data hampers targeted policy interventions during crises.

GOVERNMENT MEASURES & INITIATIVES

Universal Social Security

The e-Shram Portal provides a national database for unorganised workers and access to welfare schemes.

Portability of Welfare Benefits

One Nation One Ration Card enables migrants to access subsidised food across India.

Livelihood Support

PM SVANidhi provides collateral-free loans to street vendors and urban informal workers.

Health & Pension Security

- Ayushman Bharat PM-JAY offers portable health coverage.
- Pradhan Mantri Shram Yogi Maandhan Yojana ensures pension support for unorganised workers.

Skill Development

Schemes like Pradhan Mantri Kaushal Vikas Yojana promote upskilling and formal employment integration.

CONCLUSION

Rising energy costs have exposed the economic vulnerability of migrant labourers in India's urban economy. Ensuring social security portability, affordable energy access, and dignified living conditions is essential for inclusive urban development and labour welfare.

LAND INEQUALITY IN RURAL INDIA

LAND INEQUALITY IN RURAL INDIA
A World Inequality Lab Report

Data Coverage
Based on Socio-Economic Caste Census (2011)
650 million individuals across 2.7 lakh villages

Measure of Inequality
Gini Coefficient
Statistical measure of inequality in the distribution of assets.
0 = Perfect Equality 1 = Maximum Inequality

WORLD INEQUALITY LAB
• International research centre studying income & wealth inequality worldwide.
• Headquarters: Paris School of Economics, France
• World Inequality Database: Open-access inequality data across countries.
• Major Publications: World Inequality Report, Climate Inequality Report.

KEY FINDINGS OF THE REPORT

- HIGH LAND CONCENTRATION:** Top 1% own 18% of land, Top 5% own 32% of land, Top 10% own 44% of total land. Land is concentrated in a small section of households.
- LANDLESSNESS:** 46% of rural households are landless. Indicates exclusion from productive assets.
- DOMINANCE OF LARGE LANDHOLDERS:** In many villages, single large landowners control a significant share of land, sometimes over 50%.
- STATE-LEVEL VARIATIONS:** High Inequality States: Bihar, Kerala, Punjab, Tamil Nadu. Landlessness Patterns: Punjab has the highest landlessness (73%), Bihar & Madhya Pradesh also show high levels.
- IMPACT ON RURAL ECONOMY & SOCIETY:** Affects income distribution and agricultural productivity. Reinforces poverty and caste disparities. Leads to unequal access to resources and opportunities.

CAUSES OF LAND INEQUALITY

- Historical Factors:** Regions with the zamindari system show higher inequality, while erstwhile princely states show lower inequality.
- Socio-Economic Factors:** Higher inequality is linked to caste composition (SC population) and unequal access to land.
- Market & Geography:** Better agricultural suitability and proximity to markets often correlate with higher land concentration.
- Weak Land Reforms:** Ineffective implementation of land reforms and tenancy laws has failed to ensure equitable distribution.

MEASURES TO ADDRESS LAND INEQUALITY

- Land Reforms:** Ensure strict implementation of land ceiling & tenancy laws to redistribute surplus land.
- Digitise Land Records:** Promote modern land records (Digital India Land Records Modernisation Programme) for transparency and ownership security.
- Support Small Farmers:** Provide credit, irrigation, technology, & market access to improve productivity.
- Land Leasing Reforms:** Legalise and regulate land leasing to protect tenant farmers and improve land use efficiency.
- Inclusive Rural Development:** Promote non-farm employment, skill development, and diversification to reduce dependence on land.

KEY INITIATIVES FOR MIGRANT & RURAL WORKERS

- e-Shram:** National database of unorganised workers; one-stop platform to access multiple welfare schemes.
- PM SVANIDHI:** Cultural-free working capital loans to street vendors for livelihood recovery and self-employment.
- PM SHRAM YOGI MAANDHAN Yojana:** Ensures ₹3,000 monthly pension after 60 years for unorganised workers earning < ₹15,000/month.
- AYUSHMAN BHARAT PM-JAY:** Provides ₹5 lakh health coverage with portability across India.
- ONE NATION ONE RATION CARD:** Enables migrants to access subsidised food anywhere in India.
- PMKAY:** Provides free food grains and support to poor households, including migrant workers.

WHY IT MATTERS
Land inequality is a major structural barrier to inclusive growth, social justice and sustainable rural development.

EQUITABLE LAND DISTRIBUTION
→ EMPOWERED RURAL INDIA

KEY FINDINGS OF THE REPORT

High Land Concentration

- Top 10% rural households own **44%** of total land.
- Top 5% own **32%** of land.
- Top 1% alone control **18%** of land.

Large-scale Landlessness

Nearly **46%** of rural households are landless, indicating exclusion from productive assets and agrarian opportunities.

State-Level Variations

High Inequality States

Bihar, Punjab, Kerala, and Tamil Nadu exhibit high land concentration.

Landlessness Patterns

Punjab records the highest landlessness at around 73%, while Bihar and Madhya Pradesh also show high levels.

Impact on Rural Society

Land inequality:

- Deepens poverty,
- Reinforces caste disparities,
- Reduces agricultural productivity,
- Weakens rural livelihoods and economic mobility.

CAUSES OF LAND INEQUALITY

Historical Legacy

Areas formerly under the zamindari system continue to show higher land concentration.

Socio-economic Factors

Caste-based exclusion and unequal access to resources contribute significantly to inequality.

Market and Geographic Factors

Regions with fertile land and better market connectivity often witness greater land concentration.

Weak Land Reforms

Poor implementation of land ceiling laws and tenancy reforms has limited equitable redistribution.

MEASURES TO ADDRESS LAND INEQUALITY

Effective Land Reforms

Strict enforcement of land ceiling and tenancy laws is necessary for equitable land distribution.

Digitisation of Land Records

The Digital India Land Records Modernisation Programme aims to improve transparency and ownership security.

Support to Small Farmers

Providing:

- Institutional credit,

CONTEXT

A recent report titled *“Land Inequality in India: Nature, History, and Markets”* by the World Inequality Lab highlights the severe concentration of land ownership in rural India, revealing persistent socio-economic inequalities.

The report is based on the Socio-Economic Caste Census (SECC), 2011, covering nearly 650 million individuals across 2.7 lakh villages.

GINI COEFFICIENT AND LAND INEQUALITY

$0 \leq \text{Gini Coefficient} \leq 1$

The Gini Coefficient measures inequality in the distribution of income, wealth, or assets:

- **0** → Perfect Equality
- **1** → Maximum Inequality

A higher Gini value indicates greater concentration of land ownership.

- Irrigation,
 - Technology,
 - Market access,
- can improve productivity and incomes.

Land Leasing Reforms

Legal and secure leasing frameworks can protect tenant farmers and improve land-use efficiency.

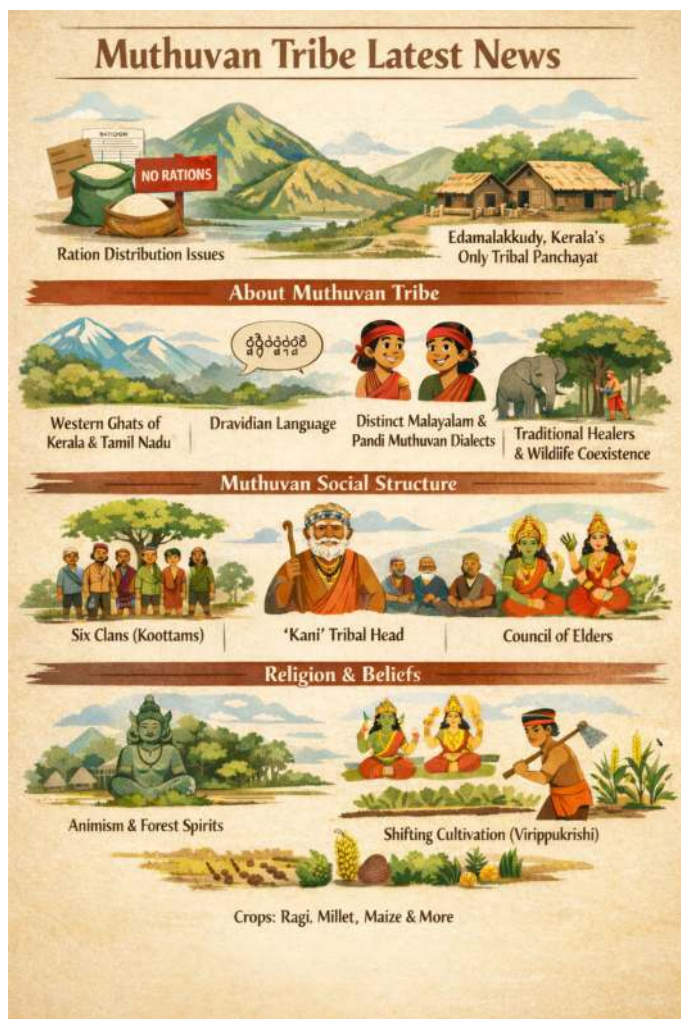
Inclusive Rural Development

Promotion of non-farm employment and skill development can reduce excessive dependence on agriculture.

CONCLUSION

Land inequality remains one of the most significant structural challenges in rural India. Addressing unequal land ownership through effective reforms, inclusive rural development, and social justice measures is essential for achieving equitable growth and sustainable agrarian transformation.

MUTHUVAN TRIBE LATEST NEWS



A recent report by the Kerala State Food Commission has highlighted significant discrepancies in the distribution of ration supplies in Edamalakkudy, Kerala's only tribal panchayat, predominantly inhabited by the Muthuvan tribe. The issue points to challenges in last-mile delivery of welfare schemes in remote tribal regions, including poor accessibility, transportation constraints, and administrative inefficiencies.

ABOUT MUTHUVAN TRIBE

- The Muthuvans, also known as Mudugars, live in the Western Ghats in the Indian states of Kerala and Tamil Nadu.
- They speak the Muthuvan language, which belongs to the Dravidian language family.
- The tribe is divided into two major groups—Malayalam Muthuvan and Pandi Muthuvan—based on dialectal variations.
- They are known for their harmonious coexistence with wildlife and deep understanding of hill ecosystems.
- The community possesses rich traditional knowledge, especially in herbal medicine, which is preserved and passed down through generations.

MUTHUVAN TRIBE SOCIAL ORGANIZATION

- The Muthuvan society is divided into six clans known as *Koottams*, which are further subdivided into sub-clans.
- These divisions regulate marriage alliances, social status, and lineage.
- The tribe follows community endogamy and clan exogamy.
- They follow a traditional governance system known as the **Kani System**.
- The Kani (headman), selected by elders, leads the council responsible for maintaining law and order.
- The council enforces customary laws and prescribes penalties for violations of social norms.

MUTHUVAN TRIBE RELIGION AND BELIEFS

- The Muthuvans are primarily animists and spirit worshippers.
- They worship forest deities and believe in the spiritual presence of their ancestors.
- Ancestors are regarded as the earliest settlers of the hill forests.
- Over time, elements of Hindu religion have also been adopted due to cultural interaction with mainstream society.

MUTHUVAN TRIBE OCCUPATION

- Their primary occupation is *virippukrishi* (shifting cultivation).
- Agriculture is subsistence-based, aimed at self-consumption rather than commercial purposes.
- Major crops include:
 - Ragi (Little Millet)
 - Maize (Sorghum)
 - Thina (Italian Millet)
 - Varagu and Chama rice
 - Vegetables such as tomato, carrot, potato, and sweet potato

- Their farming practices are eco-friendly and adapted to hilly terrain.

CONCLUSION

The recent findings in Edamalakkudy highlight systemic gaps in welfare delivery to remote tribal populations. Addressing infrastructure issues, improving administrative accountability, and ensuring inclusion of indigenous communities like the Muthuvans in policy implementation are essential for achieving equitable development while preserving their cultural identity.

POLITY, GOVERNANCE & SOCIAL JUSTICE

GS PAPER 2

GUJARAT PASSES UNIFORM CIVIL CODE (UCC) BILL, 2026

GUJARAT UCC BILL, 2026
2nd State After Uttarakhand to Enact UCC

KEY FEATURES

- MANDATORY REGISTRATION:** Marriage to be registered within **60 DAYS**.
- LIVE-IN RELATIONSHIPS:** Registration within **30 DAYS**.
- EQUAL RIGHTS IN INHERITANCE:** Sons and daughters to have identical legal rights in all property.
- MONOGAMY MANDATE:** Polygamy and bigamy strictly prohibited. One spouse rule for all.
- JUDICIAL EXCLUSIVITY:** All divorces and separations only through civil courts.
- TRIBAL EXEMPTION:** Scheduled Tribes are exempted to protect their customary identities.

CONSTITUTIONAL BASIS

- ARTICLE 44:** DPSP directs the State to endeavour towards securing a Uniform Civil Code for all citizens.
- BALANCING RIGHTS:** UCC seeks to balance Article 14 (Equality before law) and Article 25 (Freedom of Religion).
- JUDICIAL CONSISTENCY:** Courts from Shah Bano (1985) to recent 2026 rulings have upheld UCC as essential for secular national identity.

SIGNIFICANCE

- Promotes gender justice and equality.
- Strengthens secularism and national unity.
- Simplifies diverse personal laws.
- Enhances legal certainty and accountability.
- Protects tribal autonomy through exemption.

FIRST STATE: Uttarakhand became the first state to pass its UCC legislation in 2024.

CONTEXT

The Gujarat Legislative Assembly passed the Uniform Civil Code (UCC) Bill, 2026, becoming the second Indian state after Uttarakhand to implement a state-level UCC.

WHAT IS THE UNIFORM CIVIL CODE (UCC)?

The Uniform Civil Code refers to a common set of civil laws governing matters such as marriage, divorce, inheritance, adoption, and maintenance for all citizens irrespective of religion.

Article 44

Article 44 of the Directive Principles of State Policy (DPSP) directs the State to endeavour towards securing a Uniform Civil Code across India.

KEY FEATURES OF THE GUJARAT UCC BILL, 2026

Standardised Civil Framework

The Bill replaces religion-based personal laws with uniform civil procedures related to marriage, divorce, and inheritance.

Gender Equality in Inheritance

Sons and daughters are granted equal inheritance rights over all forms of property, strengthening constitutional equality.

Mandatory Registration

- Marriages must be registered within **60 days**.
- Live-in relationships must be registered within **30 days**.

Monogamy for All

The law prohibits polygamy and bigamy across all communities and enforces a one-spouse system.

Civil Court Jurisdiction

All divorces and separations must be processed through civil courts, abolishing customary or extra-judicial divorce practices.

Tribal Exemption

Scheduled Tribes have been exempted to preserve their customary traditions and cultural identity.

CONSTITUTIONAL AND LEGAL SIGNIFICANCE

Provision	Significance
Article 14	Equality before law
Article 25	Freedom of religion
Article 44	Uniform Civil Code under DPSP

The UCC debate largely concerns balancing religious freedom with gender justice and equality.

The Supreme Court, in cases such as Mohd. Ahmed Khan v. Shah Bano Begum, has repeatedly highlighted the need for a uniform civil framework to ensure justice and national integration.

ARGUMENTS IN FAVOUR OF UCC

- Promotes gender justice and equal rights.
- Strengthens secularism and national unity.

- Simplifies complex personal laws.
- Reduces legal discrimination based on religion.

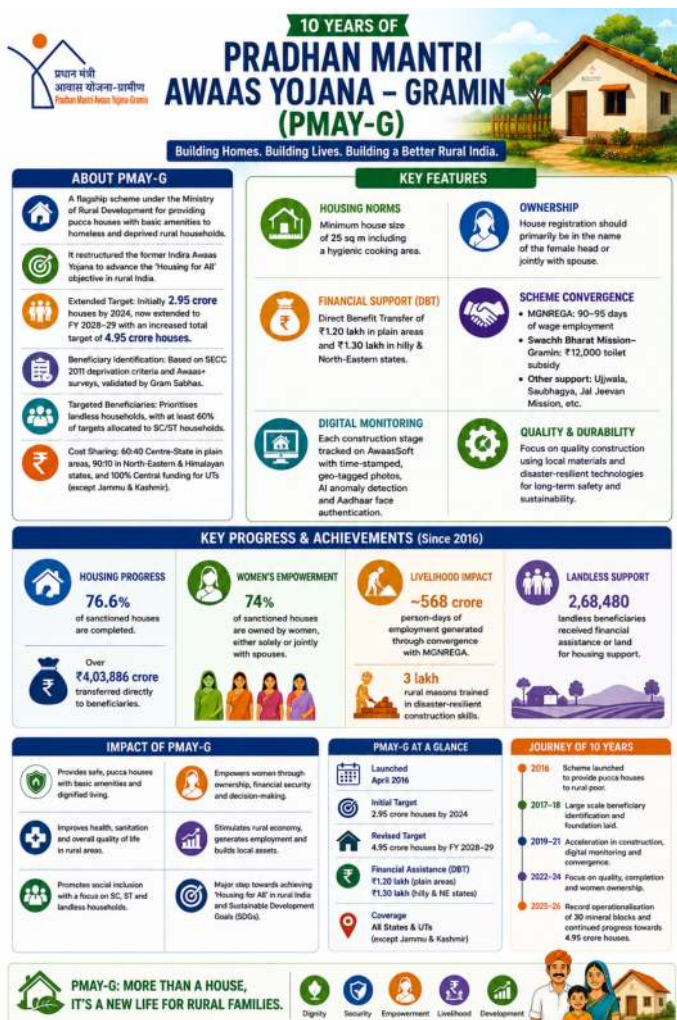
CONCERNS ASSOCIATED WITH UCC

- Fear of erosion of religious and cultural autonomy.
- Concerns among minority communities regarding uniformity.
- Challenges in balancing diversity with legal uniformity.

CONCLUSION

The Gujarat UCC Bill, 2026 marks a significant development in India's governance and legal reform landscape. While it advances the principles of equality, secularism, and gender justice, its long-term success will depend upon balancing constitutional morality with India's cultural diversity.

10 YEARS OF PRADHAN MANTRI AWAAS YOJANA – GRAMIN (PMAY-G)



INTRODUCTION

Pradhan Mantri Awaas Yojana – Gramin (PMAY-G) has emerged as one of India's largest rural welfare programmes since its launch in 2016. Implemented by the Ministry of Rural Development (MoRD), the scheme aims to provide pucca houses with basic amenities to homeless and deprived rural households under the broader vision of "Housing for All".

PMAY-G replaced the earlier Indira Awaas Yojana and introduced major reforms in beneficiary identification, financial transparency, digital monitoring, and convergence with other welfare schemes. Over the last decade, it has significantly improved rural housing conditions, women's empowerment, and livelihood generation.

ABOUT PMAY-G

PMAY-G is a flagship rural housing scheme designed to provide affordable and durable housing to poor households living in kutcha or dilapidated houses.

OBJECTIVES

The scheme seeks to:

- Eliminate rural homelessness
- Improve living standards in villages
- Promote dignity and social security
- Ensure access to basic amenities
- Support inclusive rural development

KEY FEATURES OF PMAY-G

1. Expanded Housing Target

Initially, the scheme targeted the construction of **2.95 crore rural houses by 2024**.

The programme has now been extended till **FY 2028-29**, with an enhanced target of **4.95 crore houses**.

This expansion reflects the government's commitment to universal rural housing coverage.

2. Targeted Beneficiary Approach

PMAY-G prioritises the most vulnerable sections of rural society.

Major Beneficiaries

- Landless households
- Homeless families
- Families living in kutcha houses
- Scheduled Castes (SCs)
- Scheduled Tribes (STs)

At least **60% of the targets** are allocated to SC/ST households, ensuring social inclusion and equity.

3. Beneficiary Identification Process

Beneficiaries are identified through:

- Socio-Economic and Caste Census (SECC) 2011 housing deprivation criteria
- Awaas+ surveys
- Gram Sabha verification

This process ensures transparency, local participation, and reduced exclusion errors.

4. Financial Assistance

Under PMAY-G, financial support is directly transferred to beneficiaries through Direct Benefit Transfer (DBT).

Assistance Amount

- ₹1.20 lakh in plain areas
- ₹1.30 lakh in hilly, difficult, and North-Eastern states

The DBT mechanism reduces leakages and enhances accountability.

5. Cost Sharing Formula

The scheme follows different Centre-State funding ratios:

- **60:40** in plain states
- **90:10** in North-Eastern and Himalayan states
- **100% Central funding** for Union Territories (except Jammu & Kashmir)

This flexible structure supports financially weaker and geographically difficult regions.

6. Housing Standards

Each PMAY-G house must have:

- Minimum area of **25 square metres**
- Hygienic cooking space
- Basic living facilities

The scheme focuses on quality housing rather than mere shelter provision.

7. Women-Centric Ownership

A major reform under PMAY-G is prioritising women in house ownership.

Houses are generally registered:

- In the name of the female head, or
- Jointly with the spouse

This has strengthened women's economic security and social empowerment.

8. Convergence with Other Schemes

PMAY-G integrates with multiple rural welfare schemes for holistic development.

Major Convergences

MGNREGA

Provides **90-95 days of wage employment** during house construction.

Swachh Bharat Mission – Gramin

Provides **₹12,000 assistance** for toilet construction.

Other Support

Beneficiaries may also receive support under:

- Ujjwala Yojana
- Saubhagya Scheme
- Jal Jeevan Mission

This convergence improves overall rural living conditions.

DIGITAL GOVERNANCE AND MONITORING

PMAY-G has adopted technology-driven implementation mechanisms.

AwaasSoft Platform

Construction stages are digitally monitored through:

- Time-stamped photographs
- Geo-tagging
- Aadhaar-based face authentication
- AI-based anomaly detection

These features enhance:

- Transparency
- Real-time monitoring
- Accountability
- Reduction in corruption

The use of digital governance has made PMAY-G one of India's most technology-enabled welfare schemes.

MAJOR ACHIEVEMENTS OF PMAY-G

1. Large-Scale Housing Construction

Around **76.6% of sanctioned houses** have already been completed.

More than **₹4,03,886 crore** has been directly transferred to beneficiaries.

This demonstrates efficient fund utilisation and implementation.

2. Women's Empowerment

Approximately **74% of sanctioned houses** are owned by women either solely or jointly.

This has improved:

- Financial inclusion
- Household decision-making
- Social status of rural women

3. Employment Generation

The scheme has generated nearly **568 crore person-days of employment** through convergence with MGNREGA.

PMAY-G has therefore contributed significantly to rural livelihoods and economic activity.

4. Skill Development

Nearly **3 lakh rural masons** have received training in disaster-resilient construction techniques.

This has:

- Improved construction quality
- Created rural employment opportunities
- Enhanced local technical capacity

5. Support for Landless Families

About **2,68,480 landless beneficiaries** have received land or financial assistance for housing support.

This promotes social justice and inclusion.

SIGNIFICANCE OF PMAY-G

The scheme is important because it:

- Reduces rural poverty and homelessness
- Improves health and sanitation outcomes
- Strengthens women's empowerment
- Generates rural employment
- Promotes financial inclusion through DBT
- Supports inclusive and sustainable rural development

PMAY-G also contributes to achieving Sustainable Development Goals (SDGs), especially:

- SDG 1 (No Poverty)
- SDG 5 (Gender Equality)
- SDG 11 (Sustainable Communities)

CHALLENGES

Despite significant progress, some challenges remain:

- Delays in land availability
- Rising construction costs
- Regional disparities in implementation
- Quality concerns in some areas
- Digital literacy and connectivity gaps

Addressing these issues is essential for achieving universal rural housing coverage.

CONCLUSION

Over the last decade, PMAY-G has transformed rural housing in India by providing millions of poor households with dignified and durable homes. Through transparent beneficiary selection, women-centric ownership, digital monitoring, and convergence with welfare schemes, PMAY-G has become a model of technology-driven and inclusive governance.

As India moves toward the goal of universal housing, PMAY-G will continue to play a critical role in improving rural living standards, empowering vulnerable communities, and promoting equitable socio-economic development.

CBSE INTRODUCES THIRD LANGUAGE & SKILL-BASED CURRICULUM REFORMS

CBSE INTRODUCES THIRD LANGUAGE & SKILL-BASED CURRICULUM REFORMS
A step towards implementing NEP 2020 and building 21st century learners

CONTEXT (IE)
CBSE has released a new secondary school curriculum to operationalise reforms proposed under NEP 2020. The changes aim to shift the education system from rote learning to multidisciplinary & skill-based learning.

KEY OBJECTIVES

- Promote multilingualism and Indian languages
- Integrate vocational and life skills
- Build digital & AI competencies
- Provide flexibility in subject choices
- Reduce rote learning and encourage critical thinking

KEY CHANGES IN THE NEW SCHOOL CURRICULUM

- THREE-LANGUAGE FORMULA**
• A third language will be compulsory from Class 6.
• It will be part of Class 10 board exams by 2031.
- LANGUAGE POLICY**
• Students must study at least two Indian languages.
• English will be treated as a foreign language.
- LANGUAGE OPTIONS**
• CBSE will offer all 22 scheduled languages from the 8th schedule of the Constitution.
- VOCATIONAL EDUCATION**
• Vocational education will become compulsory in Classes 9-10.
• Board or annual exams from the 2027-28 session.
- TWO-LEVEL SUBJECTS**
• Mathematics and Science will be offered at standard and advanced levels.
- AI EDUCATION & COMPUTATIONAL THINKING**
• AI and computational thinking introduced from Classes 3-8.
• It will become a compulsory board subject in Class 10 by 2029.
- PHASED ROADMAP TILL 2031**
• The curriculum provides a phased implementation plan up to 2031.
• Ensures smooth transition, teacher training, infrastructure preparation and curriculum realignment.

EXPECTED IMPACT

- Holistic & multidisciplinary education
- Skill development & better employability
- Promotion of Indian languages & cultural diversity
- Digital readiness and future competencies
- Less rote learning, more creativity & critical thinking

GOVERNMENT INITIATIVES SUPPORTING REFORMS

- NEP 2020: Promotes multilingualism, vocational education and flexible curriculum.
- Samagra Shiksha: Supports holistic school education and infrastructure.
- DIKSHA & Digital India: Strengthening digital learning and teacher training platforms.
- PM Kaushal Vikas Yojana: Promotes skill training and vocational opportunities.

CHALLENGES AHEAD

- Teacher training and capacity building
- Infrastructure gaps, especially in rural areas
- Language-related political sensitivities
- Digital divide and unequal access to technology
- Need for updated assessment methods

LEGAL & POLICY BACKING

- Right of Children to Free and Compulsory Education Act, 2009
- National Curriculum Framework for School Education (NCF-SE 2023)
- Aligned with NEP 2020 vision of experiential, inclusive and flexible education

44 These reforms mark a decisive move towards creating a future-ready, inclusive and skilled India through holistic education.

From rote to relevance, from textbooks to life skills – CBSE reforms are shaping the learners of New India!

The Central Board of Secondary Education (CBSE) has introduced major curriculum reforms for secondary education to implement the vision of the National Education Policy. The reforms aim to transform India's education system from rote memorisation toward multidisciplinary, competency-based, and skill-oriented learning.

The new curriculum emphasises multilingualism, vocational education, digital literacy, and flexible subject choices, aligning school education with 21st-century requirements.

KEY FEATURES OF THE NEW CURRICULUM

1. Three-Language Formula

Under the new framework:

- A third language will become compulsory from Class 6.
- It will be included in Class 10 board examinations by 2031.

- Students must study at least two Indian languages.
- English will be treated as a foreign language rather than the primary medium of identity.

CBSE will offer all 22 languages listed in the Eighth Schedule of the Constitution, promoting linguistic diversity and cultural inclusion.

2. Vocational Education

Vocational education will become compulsory for Classes 9 and 10 from the 2027–28 academic session.

Students will be assessed through:

- Board examinations, or
- Annual evaluation systems.

The reform seeks to bridge the gap between education and employability by introducing practical and industry-relevant skills at an early stage.

3. Two-Level Subjects

Mathematics and Science will be offered at:

- Standard level, and
- Advanced level.

This flexibility allows students to choose subjects according to their aptitude, reducing academic pressure while encouraging deeper learning for interested students.

4. Artificial Intelligence and Digital Skills

AI and computational thinking will be introduced from Classes 3–8 and gradually expanded.

By 2029:

- AI will become a compulsory board subject in Class 10.

The curriculum also promotes coding, problem-solving, and digital literacy to prepare students for emerging technological demands.

5. Phased Implementation

CBSE has adopted a phased roadmap extending up to 2031 for complete implementation of NEP-aligned reforms.

The gradual transition aims to:

- Train teachers,
- Develop infrastructure,
- Revise textbooks and assessment methods,
- Ensure smooth adaptation across schools.

SIGNIFICANCE OF THE REFORMS

The reforms are significant because they:

- Promote holistic and multidisciplinary education,
- Encourage experiential and skill-based learning,
- Strengthen linguistic diversity,
- Improve employability and digital readiness,
- Reduce dependency on rote learning.

They also align with India's objective of building a knowledge-based economy and preparing students for global competitiveness.

CHALLENGES

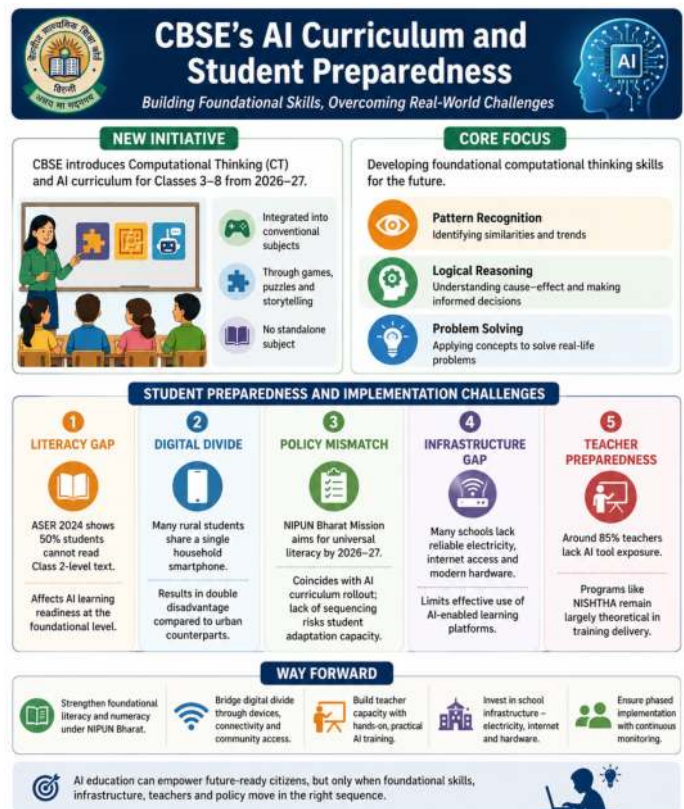
However, implementation challenges remain:

- Teacher training and availability,
- Infrastructure gaps in rural schools,
- Language-related political concerns,
- Unequal digital access,
- Need for updated assessment systems.

CONCLUSION

The CBSE curriculum reforms represent a major step toward transforming India's education system in line with NEP 2020. Successful implementation will require coordinated efforts among governments, schools, teachers, and parents to ensure inclusive, flexible, and future-ready education for all students.

CBSE'S AI CURRICULUM AND STUDENT PREPAREDNESS



CONTEXT

The Central Board of Secondary Education (CBSE) has introduced a **Computational Thinking (CT) and Artificial Intelligence (AI) curriculum** for Classes 3–8 from the academic session 2026–27. Instead of creating a separate subject, the curriculum integrates AI concepts into conventional subjects through games, puzzles, storytelling, and activity-based learning.

The initiative aligns with the objectives of the Central

Board of Secondary Education and the National Education Policy 2020 to promote 21st-century skills among students.

KEY FEATURES OF THE CURRICULUM

Integration-Based Approach

- AI and computational thinking are embedded within existing subjects.
- Focus on experiential learning through activities and storytelling.

Core Skills Targeted

The curriculum aims to develop:

- Pattern recognition
- Logical reasoning
- Problem-solving ability
- Algorithmic thinking

These skills form the foundation for future digital and AI literacy.

CHALLENGES IN STUDENT PREPAREDNESS

1. Literacy Gap

According to ASER 2024, nearly **50% of students cannot read Class 2-level text**. Weak foundational literacy directly affects students' ability to grasp computational concepts and logical reasoning.

2. Digital Divide

Many rural households depend on a single smartphone shared among family members. Limited digital access creates unequal learning opportunities between rural and urban students.

3. Policy Sequencing Issues

The rollout coincides with the timeline of the NIPUN Bharat Mission, which seeks universal foundational literacy by 2026–27. Introducing AI learning before achieving basic literacy may burden students and reduce learning effectiveness.

4. Infrastructure Deficit

Several schools continue to face:

- Irregular electricity supply
- Poor internet connectivity
- Lack of modern hardware and digital labs

This limits the practical implementation of AI-enabled education.

5. Teacher Preparedness

Around **85% of teachers lack exposure to AI tools and digital pedagogy**. Existing training programmes such as NISHTHA Programme are often criticised for being theoretical rather than practice-oriented.

SIGNIFICANCE OF THE INITIATIVE

Despite challenges, the curriculum is an important step toward preparing students for a technology-driven

future. Early exposure to computational thinking can:

- Improve analytical skills
- Encourage innovation and creativity
- Enhance employability in emerging sectors
- Promote digital inclusion in the long term

It also supports India's ambition of becoming a global digital and innovation hub.

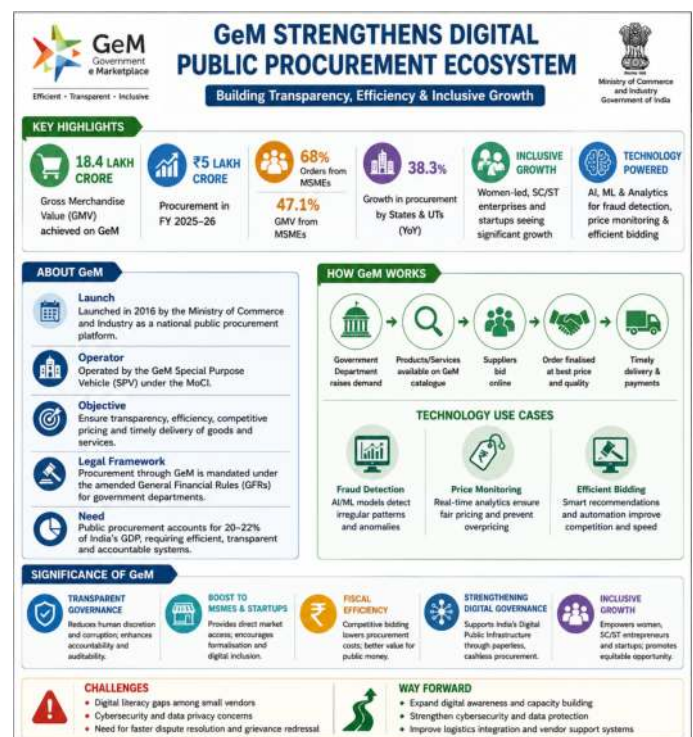
WAY FORWARD

- Strengthen foundational literacy and numeracy before advanced AI integration.
- Expand digital infrastructure in rural schools.
- Provide affordable device access and internet connectivity.
- Introduce practical teacher training in AI and digital pedagogy.
- Ensure phased and region-sensitive implementation.

CONCLUSION

The CBSE's AI curriculum reflects India's attempt to prepare students for the future digital economy. However, successful implementation requires strong foundational education, teacher readiness, and digital infrastructure. Without addressing these structural gaps, the benefits of AI education may remain unevenly distributed.

GEM STRENGTHENS DIGITAL PUBLIC PROCUREMENT ECOSYSTEM



CONTEXT

The Government e-Marketplace (GeM) has achieved a Gross Merchandise Value (GMV) of ₹18.4 lakh crore, including ₹5 lakh crore procurement in FY 2025–26. The platform has emerged as a major pillar of India's digital governance and public procurement reforms.

ABOUT GEM

Launch and Administration

- Launched in 2016 by the Ministry of Commerce and Industry.
- Operated by the GeM Special Purpose Vehicle (SPV).
- Replaced the earlier Directorate General of Supplies and Disposals (DGS&D) system.

Objective

GeM aims to ensure:

- Transparency in procurement
- Competitive pricing
- Efficient bidding
- Timely delivery of goods and services

Legal Basis

- Procurement through GeM is mandated under the amended General Financial Rules (GFRs) for government departments.

KEY HIGHLIGHTS

Rising Procurement Volume

- GeM has crossed ₹18.4 lakh crore GMV.
- Procurement worth ₹5 lakh crore was recorded in FY 2025–26 alone.

MSME Participation

- MSMEs account for nearly 68% of total orders.
- They contribute around 47.1% of total GMV.
- More than 11 lakh MSMEs are registered on the platform.

Increasing State Participation

- Procurement by States and Union Territories increased by 38.3%, indicating wider adoption.

Inclusive Growth

- Participation of women-led enterprises, startups, and SC/ST entrepreneurs has significantly increased.

Technology Integration

GeM uses:

- Artificial Intelligence (AI)
- Machine Learning (ML)
- Data analytics

These tools help in:

- Fraud detection
- Price monitoring
- Efficient bidding and vendor assessment

SIGNIFICANCE

Promotes Transparent Governance

- Reduces human discretion and corruption in procurement processes.
- Enhances accountability and auditability.

Boost to MSMEs and Startups

- Provides direct market access to small businesses.
- Encourages formalisation and digital inclusion.

Fiscal Efficiency

- Competitive bidding lowers procurement costs and improves value for public money.

Strengthening Digital Governance

- Supports India's Digital Public Infrastructure (DPI) ecosystem through paperless and cashless procurement.

Challenges

- Digital literacy gaps among small vendors.
- Cybersecurity and data privacy concerns.
- Need for faster dispute resolution and grievance redressal.

WAY FORWARD

- Expand digital awareness among rural enterprises.
- Strengthen cybersecurity architecture.
- Improve logistics integration and vendor support systems.

HIGH MATERNAL MORTALITY IN INDIA





Maternal mortality remains a critical public health and governance challenge in India. Although the country has achieved one of the world's largest declines in Maternal Mortality Ratio (MMR), progress has slowed in recent years. A study published in *The Lancet* highlights that India still faces major challenges in achieving the Sustainable Development Goal (SDG) target of reducing MMR below 70 by 2030.

MMR refers to the number of maternal deaths per one lakh live births due to pregnancy-related causes. India contributes nearly 10% of global maternal deaths, underlining the need for sustained policy intervention.

STATUS OF MATERNAL MORTALITY IN INDIA

India's MMR has declined significantly from 508 in 1990 to around 116 in 2023, reflecting improvements in maternal healthcare infrastructure, institutional deliveries, and public health interventions.

According to the Sample Registration System (SRS), MMR reduced from 122 during 2015–17 to 88 during 2021–23. However, differences remain between national and UN estimates, with UN estimates placing India's MMR at around 80. Such data gaps create challenges in accurate policy assessment and monitoring.

Despite overall progress, interstate disparities remain severe. States such as Kerala and Tamil Nadu have achieved relatively low MMR levels due to better healthcare systems and higher institutional deliveries. In contrast, states like Assam and Uttar Pradesh continue to report high maternal mortality, reflecting inequalities in healthcare access, nutrition, and infrastructure.

Further, the pace of reduction in maternal deaths has slowed, making the SDG target increasingly difficult to achieve within the remaining timeframe.

CAUSES OF HIGH MATERNAL MORTALITY

Haemorrhage

Severe bleeding during or after childbirth remains the leading cause of maternal deaths in India. Delayed emergency obstetric care significantly increases fatalities.

Sepsis and Infections

Poor hygiene during delivery and delayed treatment of infections contribute to maternal mortality, especially in rural and underserved regions.

Unsafe Abortions

Limited access to safe abortion services often forces women to undergo unsafe procedures, resulting in serious complications and deaths.

Anaemia and Malnutrition

Iron deficiency, undernutrition, and poor maternal health weaken women during pregnancy, increasing vulnerability to complications during childbirth.

Hypertensive Disorders

Conditions such as pre-eclampsia and eclampsia can cause seizures, organ failure, and maternal death if not diagnosed and treated on time.

DELAYS IN HEALTHCARE ACCESS

The "three delays" model remains a major challenge:

- Delay in deciding to seek care
- Delay in reaching healthcare facilities
- Delay in receiving timely treatment

These delays are often linked to poverty, poor transport infrastructure, and weak healthcare systems.

Government Initiatives

India has launched several schemes to improve maternal healthcare:

- Janani Suraksha Yojana promotes institutional deliveries through conditional cash transfers.
- Janani Shishu Suraksha Karyakram provides free delivery, medicines, diagnostics, transport, and food for pregnant women.
- Pradhan Mantri Surakshit Matritva Abhiyan ensures free antenatal check-ups and early detection of high-risk pregnancies.
- Surakshit Matritva Aashwasan guarantees respectful and quality maternal healthcare services.
- LaQshya Programme focuses on improving labour room and maternity care quality.
- Pradhan Mantri Matru Vandana Yojana provides maternity benefits to support nutrition and healthcare needs.

WAY FORWARD

Improving maternal health requires strengthening primary healthcare systems, especially antenatal, institutional delivery, and postnatal services in rural and high-burden states.

Special attention must be given to states such as Assam and Uttar Pradesh through better infrastructure, trained medical staff, and continuous monitoring.

Preventing major causes of maternal deaths requires timely management of haemorrhage, hypertension, and infections through emergency obstetric care and skilled birth attendants.

Further, improving maternal nutrition, promoting family planning, and increasing awareness regarding reproductive health can significantly reduce maternal risks and early pregnancies.

CONCLUSION

Reducing maternal mortality is essential for achieving gender justice, public health, and sustainable development goals. While India has made substantial progress, regional disparities, healthcare gaps, and slowing improvements remain serious concerns. A comprehensive approach focused on quality healthcare, nutrition, awareness, and equitable access is crucial to ensure safe motherhood for every woman in India.

NCERT GRANTED 'DEEMED TO BE UNIVERSITY' STATUS

NCERT GRANTED 'DEEMED TO BE UNIVERSITY' STATUS
A major step to expand NCERT's academic mandate and strengthen research, teacher education and innovation in India.

WHAT IS A 'DEEMED TO BE UNIVERSITY'?

- Granted by Ministry of Education on the advice of UGC under UGC Act, 1956.
- Autonomy in designing courses, syllabi and conducting examinations.
- Authority to award degrees similar to universities.
- Must adhere to UGC norms and guidelines for academic programmes and expansion.
- Not established by a separate Act of Parliament or State Legislature.

SIGNIFICANCE OF THE NEW STATUS

- Expanded Academic Mandate**: Can now offer UG, PG, diploma and research programmes.
- Strengthen Teacher Education**: Develop advanced teacher training and capacity-building programmes.
- Boost Research & Innovation**: Enhance educational research, experimentation and evidence-based policy support.
- Collaborations**: Facilitate national and international academic partnerships.
- Align with NEP 2020**: Will follow NIRF rankings, NAAC accreditation and implement Academic Bank of Credits (ABC).

KEY CONDITIONS AND PROVISIONS

- UGC Regulation**: NCERT will function under UGC Act, 1956 and follow all norms for course approvals, standards and quality.
- Academic Requirements**: Mandatory participation in NIRF rankings, obtain NAAC accreditation and implement ABC.
- Non-Commercial Clause**: Barred from engaging in any profit-making or commercial activities.
- Quality Assurance**: Must maintain high academic standards, transparency and accountability.
- Held to University Standards**: Subject to UGC oversight while enjoying academic autonomy in courses, syllabi and exams.

NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING (NCERT)

- Established in 1961 as an autonomous organisation under the Government of India.
- Nodal Ministry: Functions under Ministry of Education.
- Core Mandate: Advises & assists the government on school education.
- Curriculum Development: Develops the National Curriculum Framework (NCF) and prepares model textbooks (e.g., NCERT books).
- Research & Training: Conducts educational research, teacher training and capacity-building programmes.
- Resource Support: Provides academic resources, guidelines and support to States/UTs and schools.

CONCERNS AND CHALLENGES

- Increased UGC oversight may reduce institutional autonomy.
- Expansion into higher education could dilute core focus on school education.
- Risk of academic commercialisation despite the non-profit clause.
- Bureaucratic regulation may slow down curriculum reforms and innovation.
- Balance between autonomy and accountability will be crucial.

WAY FORWARD

NCERT's new status is an opportunity to evolve into a premier multidisciplinary institution. It must continue to prioritise quality school education while leveraging its academic autonomy to improve teacher training, educational research and policy innovation in India.

The National Council of Educational Research and Training (NCERT) has recently been granted the status of a "Deemed to be University" under the University

Grants Commission (UGC) Act, 1956. The move marks a significant shift in India's educational landscape, as NCERT will now be able to expand beyond its traditional role of curriculum development and school education research.

NCERT, established in 1961 as an autonomous organisation under the Ministry of Education, has played a central role in shaping school education in India. It develops the National Curriculum Framework (NCF), prepares NCERT textbooks, conducts teacher training programmes, and undertakes educational research and policy support.

WHAT IS A "DEEMED TO BE UNIVERSITY"?

A deemed university is an institution that is granted university status by the Central Government on the advice of the UGC under Section 3 of the UGC Act, 1956. Key features include:

- Autonomy in designing courses and syllabus.
- Authority to conduct examinations and award degrees.
- Freedom in academic and research activities.
- Mandatory compliance with UGC norms and standards.

Unlike regular universities, deemed universities are not established through a separate Act of Parliament or State Legislature.

SIGNIFICANCE OF THE NEW STATUS

The new status allows NCERT to:

- Offer undergraduate, postgraduate, diploma, and research programmes.
- Expand into higher education and teacher education.
- Strengthen educational research and innovation.
- Collaborate with national and international institutions.

Further, NCERT must now participate in the National Institutional Ranking Framework (NIRF), obtain NAAC accreditation, and implement the Academic Bank of Credits (ABC), aligning it with the objectives of the National Education Policy.

CONCERNS AND CHALLENGES

Despite the advantages, concerns have been raised regarding NCERT's institutional autonomy.

- Increased UGC oversight may affect NCERT's flexibility in policymaking.
- Expansion into higher education could dilute its core focus on school education.
- Academic commercialisation concerns persist despite the non-profit clause.

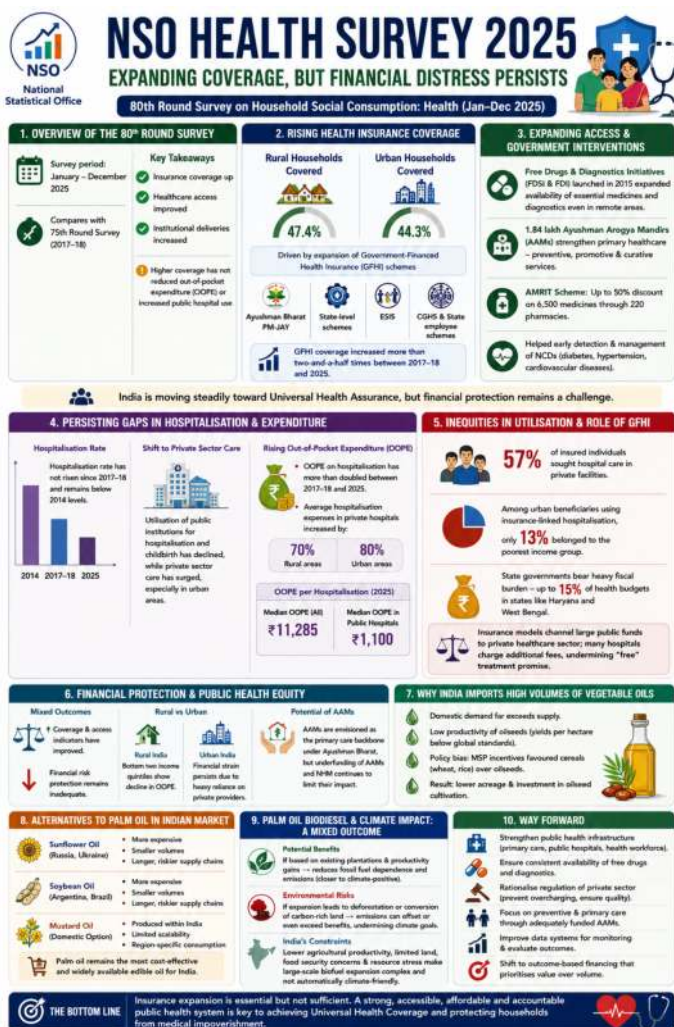
There are also apprehensions that bureaucratic regulation may slow curriculum reforms and innovation.

WAY FORWARD

The development presents an opportunity to transform NCERT into a premier multidisciplinary educational institution. However, maintaining a balance between autonomy and accountability will be essential. NCERT must continue prioritising quality school education while leveraging its new academic powers to improve teacher training, educational research, and policy innovation in India.

The move ultimately reflects India's broader push toward institutional strengthening and holistic educational reforms under NEP 2020.

**NSO HEALTH SURVEY 2025:
EXPANDING COVERAGE
BUT PERSISTENT FINANCIAL
DISTRESS**



INTRODUCTION

The latest 80th Round Survey on *Household Social Consumption: Health (2025)* released by the National Statistical Office presents a mixed picture of India's

healthcare sector. The survey highlights significant progress in health insurance coverage, healthcare access, and institutional deliveries. However, it also reveals persistent financial distress due to rising out-of-pocket expenditure (OOPE), increasing dependence on private healthcare, and unequal access to benefits. The findings underline the complex challenge of achieving Universal Health Coverage (UHC) in India.

OVERVIEW OF THE 80TH ROUND NSO HEALTH SURVEY

The survey was conducted between January and December 2025 and compares healthcare trends with the previous 75th Round Survey (2017–18).

KEY IMPROVEMENTS

- Expansion in health insurance coverage
- Better access to healthcare services
- Increase in institutional deliveries
- Wider availability of medicines and diagnostics

MAJOR CONCERNS

- Rising OOPE despite insurance coverage
- Growing reliance on private healthcare
- Limited increase in public hospital utilisation
- Unequal benefits across income groups

Thus, the survey reveals a paradox: healthcare coverage has improved, but financial protection remains weak.

RISING HEALTH INSURANCE COVERAGE

The survey indicates substantial growth in insurance penetration:

- **47.4% of rural households** covered under health insurance
- **44.3% of urban households** covered

This increase has largely been driven by Government-Financed Health Insurance (GFHI) schemes such as:

- Ayushman Bharat Pradhan Mantri Jan Arogya Yojana
- State-level health insurance schemes
- Employees' State Insurance Scheme
- Central Government Health Scheme

Government records show that GFHI coverage increased more than two-and-a-half times between 2017–18 and 2025.

This reflects India's rapid movement toward universal health assurance.

EXPANDING HEALTHCARE ACCESS

The Union Health Ministry has highlighted the survey findings as evidence of improved healthcare access.

Key Government Interventions

Free Drugs and Diagnostics Initiatives

The Free Drugs and Diagnostics Initiatives (FDSI and FDI) launched in 2015 expanded access to essential medicines and diagnostic services.

Ayushman Arogya Mandirs (AAMs)

India has established nearly **1.84 lakh AAMs**, strengthening primary healthcare services focused on:

- Preventive care
- Promotive healthcare
- Curative treatment

AMRIT Scheme

The Affordable Medicines and Reliable Implants for Treatment programme provides discounted medicines through pharmacies across India.

These interventions have improved early detection and management of non-communicable diseases such as:

- Diabetes
- Hypertension
- Cardiovascular diseases

This reflects India's ongoing epidemiological transition from communicable to non-communicable diseases.

PERSISTING CHALLENGES

Despite expanded coverage, important structural problems continue.

1. Limited Increase in Hospitalisation

Hospitalisation rates have not increased significantly since 2017–18 and remain below 2014 levels.

This suggests that:

- Insurance coverage alone does not guarantee healthcare utilisation
- Financial and accessibility barriers still persist

2. Rising Dependence on Private Healthcare

The survey shows growing preference for private healthcare facilities, especially in urban areas.

Key concern:

- 57% of insured individuals sought hospitalisation in private hospitals

This increases treatment costs and reduces the effectiveness of public insurance schemes.

3. Rising Out-of-Pocket Expenditure (OOPE)

Independent analysis of NSO data indicates that OOPE on hospitalisation has more than doubled between 2017–18 and 2025.

Hospitalisation Costs

- Median OOPE per hospitalisation: ₹11,285
- Median OOPE in public hospitals: ₹1,100

However, specialised treatments in private hospitals significantly raise average expenditure.

Causes of Continued OOPE

Even in public hospitals, patients often pay for:

- Medicines

- Diagnostics
- Transport
- Incidental expenses

This occurs due to shortages and infrastructural gaps.

INEQUITIES IN HEALTHCARE UTILISATION

The survey reveals unequal access to benefits under insurance schemes.

Uneven Distribution of Benefits

Among urban beneficiaries using insurance-linked hospitalisation:

- Only 13% belonged to the poorest income group

This indicates that wealthier households disproportionately benefit from government-financed insurance schemes.

Fiscal Burden on States

States such as Haryana and West Bengal reportedly spend nearly:

- 15% of their health budgets on GFHI schemes

Large public funds are increasingly flowing toward private healthcare providers through insurance reimbursements.

Public Health Equity Concerns

The survey highlights that:

- Coverage indicators have improved
- Financial risk protection remains inadequate

Rural vs Urban Divide

- Rural low-income households show some decline in OOPE
- Urban households continue facing heavy financial stress due to reliance on private care

This demonstrates the limitations of insurance-led healthcare models without strong public healthcare infrastructure.

WAY FORWARD

Strengthening Public Healthcare

India must prioritise:

- Public hospitals
- Primary healthcare systems
- Health workforce expansion

FOCUS ON PREVENTIVE AND PRIMARY CARE

Ayushman Arogya Mandirs can become the backbone of Universal Health Coverage if adequately funded.

Better Regulation of Private Sector

Stronger regulation is needed to:

- Prevent overcharging

- Improve transparency
- Ensure quality standards

Improve Drug and Diagnostic Availability

Consistent supply of free medicines and tests can reduce OOPEx significantly.

Outcome-Based Health Financing

Healthcare financing should focus on:

- Quality outcomes
- Preventive healthcare
- Affordability

rather than volume-based reimbursements.

CONCLUSION

The NSO Health Survey 2025 highlights both the achievements and limitations of India's evolving healthcare system. While insurance coverage and healthcare access have improved substantially, rising out-of-pocket expenditure and growing dependence on private healthcare continue to undermine financial protection.

India's experience demonstrates that insurance expansion alone cannot guarantee equitable healthcare outcomes. A strong, accessible, and adequately funded public healthcare system remains essential for achieving universal health coverage, reducing medical impoverishment, and ensuring inclusive development.

PARLIAMENT PASSED ANDHRA PRADESH REORGANISATION (AMENDMENT) BILL, 2026

Andhra Pradesh Reorganisation (Amendment) Bill, 2026
Amaravati Declared as Sole and Permanent Capital

KEY AMENDMENT

- Replaces the placeholder provision in Section 5(2) of the Andhra Pradesh Reorganisation Act, 2014 with: **"Amaravati shall be the capital."**
- Retrospective effect from **2 June 2024**.

JOINT CAPITAL ARRANGEMENT ENDED

- Hyderabad served as the common capital of Andhra Pradesh and Telangana from 2 June 2014 to 2 June 2024.
- The amendment ensures continuity in governance after the end of this arrangement.

THREE-CAPITAL MODEL OVERRIDDEN

The law nullifies the earlier proposal of:

- Visakhapatnam – Executive Capital
- Kurnool – Judicial Capital
- Amaravati – Legislative Capital

The state will now follow a **SINGLE-CAPITAL MODEL**.

SIGNIFICANCE

- Administrative Stability:** A single capital enables better coordination among executive, legislative and judicial institutions.
- Legal & Constitutional Importance:** First instance where Parliament has enacted a law explicitly naming a city as a state capital.
- Economic Implications:** Expected to boost infrastructure, investment and generate employment in Amaravati region.
- Governance Perspective:** Provides policy clarity after prolonged debate over capital location.

CHALLENGES

- High financial requirement for infrastructure development.
- Concerns of regional imbalance from Rayalaseema and North Coastal Andhra.
- Need for sustainable urban planning and environmental safeguards.

WAY FORWARD

- Ensure inclusive regional development alongside Amaravati's growth.
- Strengthen transport and institutional connectivity across all regions.
- Adopt transparent and sustainable urban governance practices.

The legislation marks a decisive step towards establishing Amaravati as the permanent capital, aiming for stable governance, planned development and long-term growth of Andhra Pradesh.

CONTEXT

The Parliament passed the Andhra Pradesh Reorganisation (Amendment) Bill, 2026, declaring Amaravati as the sole and permanent capital of Andhra Pradesh.

The amendment replaces the placeholder provision in Section 5(2) of the Andhra Pradesh Reorganisation Act, 2014, with the phrase: *"Amaravati shall be the capital."*

KEY PROVISIONS OF THE AMENDMENT

Permanent Capital Status

- Amaravati has been legally designated as the exclusive capital of Andhra Pradesh.
- The amendment came into effect retrospectively from June 2, 2024.

End of Joint Capital Arrangement

- Hyderabad functioned as the common capital of Andhra Pradesh and Telangana from 2014 to 2024 after state bifurcation.
- The amendment ensures continuity in governance after the end of this arrangement.

Override of Three-Capital Model

The law nullifies the earlier proposal of:

- Visakhapatnam – Executive Capital
- Kurnool – Judicial Capital
- Amaravati – Legislative Capital

The state will now follow a **single-capital model**.

SIGNIFICANCE

Administrative Stability

- A single capital can improve coordination among executive, legislative, and judicial institutions.
- It may reduce administrative fragmentation and policy uncertainty.

Legal and Constitutional Importance

- This is the first instance where Parliament has enacted a law explicitly naming a city as a state capital.
- It highlights Parliament's powers under Article 3 regarding state reorganisation.

Economic Implications

- The decision is expected to boost infrastructure development and investor confidence in Amaravati.
- Planned urban development may generate employment and improve connectivity.

Governance Perspective

- The move seeks to ensure policy clarity after prolonged debates over capital location.
- However, concerns remain regarding balanced regional development across Andhra Pradesh.

Challenges

- Large financial requirement for developing Amaravati's infrastructure.
- Regional imbalance concerns from Rayalaseema and North Coastal Andhra regions.
- Need for sustainable urban planning and environmental safeguards.

WAY FORWARD

- Ensure inclusive regional development alongside Amaravati's growth.
- Strengthen transport and institutional connectivity across all regions.
- Adopt transparent and sustainable urban governance practices.

RECUSAL OF A JUDGE

RECUSAL OF A JUDGE

CONTEXT (IE)

Delhi High Court heard a recusal plea by Arvind Kejriwal alleging bias against Justice Swarana Kanta Sharma in excise policy case proceedings.

“ Justice must not only be done, but must also be seen to be done. — Lord Hewart

WHAT IS THE RECUSAL OF A JUDGE?

	DEFINITION	Recusal refers to a situation where a judge withdraws from a case due to a conflict of interest or bias.
	OBJECTIVE	Ensures fair trial, judicial impartiality, and public confidence in the justice delivery system.
	LEGAL BASIS	Rooted in the principle that justice must not only be done but must also be seen to be done.
	TYPES OF BIAS	Includes personal bias, financial interest, prior involvement, or ideological predisposition.
	REASONABLE APPREHENSION	Recusal may be triggered when there is a reasonable likelihood of bias in the mind of a fair-minded observer.

LEGAL FRAMEWORK OF RECUSAL OF A JUDGE

- NO CODIFIED LAW**
India has no specific provision governing recusal, making it largely judge-driven.
- NEMO JUDEX RULE**
Based on the doctrine "nemo judex in causa sua" (no one should be the judge in their own cause).
- JUDICIAL PRECEDENTS**
The Supreme Court of India has developed principles of recusal through case law and conventions.
- JUDICIAL DISCRETION**
Decision to recuse rests solely with the concerned judge, not parties.

BANGALORE PRINCIPLES OF JUDICIAL CONDUCT

Bangalore Principles of Judicial Conduct were adopted by the Judicial Group on Strengthening Judicial Integrity in 2002 and later endorsed by the United Nations in 2006.

It provides global non-binding guidelines to ensure transparency, accountability, and public confidence in the judiciary.

- Judges shall perform their duties independently, impartially and with integrity.
- A judge shall avoid impropriety and the appearance of impropriety.
- A judge shall disclose any circumstances likely to give rise to a reasonable apprehension of bias or conflict of interest.

Essence: Recusal protects the integrity of the judiciary by ensuring that every decision is—and appears to be—impartial, fair, and in the interest of justice.

CONTEXT

The Delhi High Court recently heard a recusal plea filed by Arvind Kejriwal in the excise policy case, alleging bias against Justice Swarana Kanta Sharma. The case has once again highlighted the importance of judicial

impartiality and the concept of recusal in India's legal system.

WHAT IS RECUSAL OF A JUDGE?

Recusal refers to a situation where a judge voluntarily withdraws from hearing a case due to a possible conflict of interest, bias, or circumstances that may affect impartiality.

OBJECTIVE OF RECUSAL

- Ensure a fair trial,
- Protect judicial neutrality,
- Maintain public confidence in the judiciary.

The principle is based on the idea that **"Justice must not only be done, but must also be seen to be done."**

GROUND FOR RECUSAL

A judge may recuse in situations involving:

- **Personal Bias:** Relationship or hostility toward a party.
- **Financial Interest:** Direct or indirect monetary interest in the case.
- **Prior Involvement:** Earlier participation as lawyer, advisor, or witness.
- **Ideological Predisposition:** Strong views affecting neutrality.

Recusal may also arise when there exists a **reasonable apprehension of bias** in the mind of a fair-minded observer.

LEGAL FRAMEWORK IN INDIA

No Codified Law

India has no specific statute governing judicial recusal. The practice is largely based on judicial ethics, conventions, and case law.

Nemo Judex Principle

The doctrine of **"nemo judex in causa sua"** means that no person should act as a judge in their own cause.

Judicial Discretion

The decision to recuse rests solely with the concerned judge and cannot ordinarily be dictated by litigating parties.

Judicial Precedents

The Supreme Court has evolved principles regarding recusal through various judgments to uphold fairness and institutional credibility.

BANGALORE PRINCIPLES OF JUDICIAL CONDUCT

The **Bangalore Principles of Judicial Conduct** were adopted in 2002 by the Judicial Group on Strengthening

Judicial Integrity and later endorsed by the United Nations in 2006.

The principles provide global ethical standards for judges and emphasise:

- Independence,
- Impartiality,
- Integrity,
- Propriety,
- Equality,
- Competence and diligence.

SIGNIFICANCE OF RECUSAL

Recusal protects the credibility of courts, prevents conflict of interest, and reinforces citizens' trust in the justice delivery system.

ROAD SAFETY AND JUDICIAL INTERVENTION: SUPREME COURT INVOKES ARTICLE 142

SUPREME COURT STEPS IN FOR ROAD SAFETY
Invoking Article 142 for Safer Highways

ARTICLE 142: POWER OF COMPLETE JUSTICE

- Empowers the Supreme Court to pass any order necessary to ensure "complete justice".
- Enables the Court to go beyond existing laws when needed.
- Used in cases of legislative or administrative gaps.
- Discretionary power, subject to constitutional principles.
- Applied in areas like environment, governance reforms, and public safety.

LINK WITH ARTICLE 21: RIGHT TO LIFE

- Article 21 guarantees the right to life with dignity and safety.
- Court has held that safe roads and prevention of accidents are a positive obligation of the State.
- Failure to ensure road safety violates the right to life.

ROAD SAFETY IN INDIA: STRUCTURAL CONCERNS

High accident rate despite improvements.

National Highways constitute only about 2% of total road length but account for nearly 30% of road fatalities.

Key Issues

- Poor enforcement
- Unsafe parking
- Lack of surveillance
- Inadequate infrastructure

NEWS SUMMARY

BACKGROUND OF THE CASE

- Two major accidents in November 2025:
 - Rajasthan: Bus hit a stationary trailer on the Bharatmala Expressway, killing 15 people.
 - Telangana: Lorry collided with a bus while avoiding a pothole, resulting in 19 deaths.
- Supreme Court took suo motu cognisance of road safety issues.

OBSERVATIONS OF THE SUPREME COURT

- Criticised NHAI and State PWDs for lapses in safety management.
- Observed that highways must not become "corridors of peril".
- Highlighted dangers of illegal parking of heavy vehicles, especially near roadside establishments.

KEY DIRECTIONS ISSUED BY THE COURT

- Parking of heavy and commercial vehicles on highways prohibited except in designated areas such as lay-bys and wayside amenities.
- Use of Advanced Traffic Management Systems (ATMS) to monitor highways and detect violations through GPS-enabled systems.
- Deployment of ambulances and recovery vehicles at intervals of 75 km for quick response in emergencies.
- Identify accident-prone black spots within 45 days and install safety measures such as lighting, cameras, and warning signs.

REGULATION OF ROADSIDE ACTIVITIES

- Prohibited construction of new dhabas and commercial establishments within the Right of Way (ROW) of highways.
- Directed demolition of unauthorised structures.
- Imposed restrictions on land use within a specified distance from highways.

Aim: Reduce congestion and unsafe roadside practices.

STRENGTHENING ENFORCEMENT MECHANISMS

- Creation of dedicated highway surveillance teams involving police and transport departments.
- Round-the-clock monitoring of highways.
- Integration of surveillance systems with e-challan mechanisms for effective enforcement.

THE IMPACT

These directions aim to build a safer, more accountable and technology-driven road transport system in India, upholding the right to life and dignity of every citizen.

"Safe roads are a constitutional necessity, not an administrative option."
— Supreme Court of India

CONTEXT

The Supreme Court of India recently invoked **Article 142** of the Constitution to issue wide-ranging directions

on highway safety after two fatal road accidents. This intervention highlights the growing concern over road safety in India and the constitutional obligation of the State to protect life.

ARTICLE 142 AND THE CONCEPT OF COMPLETE JUSTICE

Article 142 empowers the Supreme Court to pass any decree or order necessary to ensure "complete justice" in a case before it. This provision is unique in its scope, allowing the Court to go beyond existing statutory frameworks where laws are inadequate or silent.

Over the years, Article 142 has been used in diverse areas such as environmental protection, governance reforms, and public safety. While the power is discretionary, it must remain consistent with constitutional principles and cannot override substantive rights. Its invocation in road safety reflects the urgency of addressing systemic failures where executive action has been insufficient.

LINK WITH RIGHT TO LIFE UNDER ARTICLE 21

The Court's intervention is closely tied to **Article 21**, which guarantees the right to life and personal liberty. Judicial interpretation has expanded this right to include the **right to live with dignity and safety**.

In the context of road safety, the Court has repeatedly held that:

- Safe road infrastructure is a **positive obligation of the State**
- Preventable accidents amount to a violation of the right to life
- Administrative negligence cannot be justified when human lives are at stake

Thus, road safety is no longer merely a policy issue but a **constitutional mandate**.

ROAD SAFETY IN INDIA: STRUCTURAL CONCERNS

India continues to record one of the highest numbers of road accidents globally. A striking statistic reveals that **National Highways constitute only about 2% of total road length but account for nearly 30% of road fatalities**. This indicates deep structural deficiencies in highway management.

Key challenges include:

- Weak enforcement of traffic regulations
- Unsafe parking practices, especially by heavy vehicles
- Lack of real-time surveillance and monitoring
- Inadequate infrastructure such as poor lighting, absence of signage, and limited emergency response systems

These issues collectively create hazardous conditions, turning highways into high-risk zones.

BACKGROUND OF THE CASE

The Court's suo motu intervention was triggered by two major accidents in November 2025:

- **Rajasthan:** A bus collided with a stationary trailer on the Bharatmala Expressway, killing 15 people
- **Telangana:** A lorry hit a bus while attempting to avoid a pothole, resulting in 19 deaths

These tragic incidents exposed serious lapses in road safety management and prompted judicial scrutiny.

OBSERVATIONS OF THE SUPREME COURT

The Supreme Court strongly criticised agencies such as the National Highways Authority of India and State Public Works Departments for negligence.

Key observations included:

- Highways must not become **"corridors of peril"** due to administrative failures
- Illegal parking of heavy vehicles near roadside establishments significantly increases accident risks
- Authorities have failed to ensure basic safety standards despite repeated warnings

The Court underscored that road safety cannot be compromised due to bureaucratic inefficiency.

KEY DIRECTIONS ISSUED BY THE COURT

1. Regulation of Parking

- Complete prohibition on parking of heavy/commercial vehicles on highways
- Allowed only in designated areas like lay-bys and wayside amenities

2. Technology-Driven Monitoring

- Deployment of **Advanced Traffic Management Systems (ATMS)**
- Use of GPS-enabled systems for real-time violation detection

3. Emergency Response Mechanism

- Mandatory deployment of ambulances and recovery vehicles at intervals of **75 km**
- Aim: Reduce response time and fatalities

4. Identification of Black Spots

- Authorities must identify accident-prone areas within **45 days**
- Installation of safety measures such as lighting, cameras, and warning signs

REGULATION OF ROADSIDE ACTIVITIES

The Court also addressed unsafe roadside practices:

- Prohibited construction of new dhabas and commercial establishments within the **Right of Way (ROW)**

- Ordered demolition of unauthorised structures
- Imposed restrictions on land use near highways

These measures aim to reduce congestion and minimise accident risks caused by roadside encroachments.

STRENGTHENING ENFORCEMENT MECHANISMS

To ensure effective implementation, the Court directed:

- Creation of **dedicated highway surveillance teams** involving police and transport departments
- Round-the-clock monitoring of highways
- Integration of surveillance systems with **e-challan mechanisms** for strict enforcement

This reflects a shift toward **technology-driven governance** in road safety.

SIGNIFICANCE OF THE JUDGMENT

The judgment marks an important evolution in constitutional jurisprudence:

- Reinforces **Article 21** as a tool for ensuring public safety
- Expands the scope of **Article 142** in governance-related issues
- Highlights judicial activism in filling administrative gaps
- Pushes for accountability of public authorities

It also signals that failure to ensure road safety may invite judicial intervention.

CHALLENGES AHEAD

Despite strong directives, several challenges remain:

- Implementation gaps due to federal structure (Centre-State coordination)
- Resource constraints in deploying technology and emergency systems
- Resistance to removal of roadside establishments
- Need for behavioural change among drivers and enforcement agencies

Without sustained effort, directives may remain ineffective.

WAY FORWARD

- Strengthen institutional coordination between central and state agencies
- Invest in smart infrastructure and surveillance technologies
- Promote road safety awareness and strict enforcement
- Establish accountability mechanisms for lapses

CONCLUSION

The Supreme Court's intervention represents a decisive step toward safer highways in India. By invoking Article 142, the Court has reaffirmed that **road safety is integral to the right to life**. However, long-term success depends on effective implementation, institutional accountability, and public cooperation. The judgment serves as a reminder that governance failures affecting human life cannot be ignored and will invite constitutional scrutiny.

RURAL DIGITAL GOVERNANCE THROUGH EGRAMSWARAJ AND SABHASAAR



INTRODUCTION

Digital governance has emerged as a crucial pillar for strengthening transparency, accountability, and efficiency in public administration. In rural India, Panchayati Raj Institutions (PRIs) play a central role in delivering governance and implementing development programmes at the grassroots level. Recognising the need for technology-driven decentralised governance, the Ministry of Panchayati Raj (MoPR) has introduced transformative initiatives such as eGramSwaraj and SabhaSaar.

These initiatives aim to modernise rural administration through digital planning, transparent financial management, and AI-enabled documentation systems. Together, they represent a major step toward achieving the vision of Digital India and strengthening participatory democracy in villages.

ABOUT EGRAMSWARAJ PORTAL

The eGramSwaraj portal is a unified web-based portal and mobile application developed by the Ministry of Panchayati Raj to enhance e-governance in Panchayati Raj Institutions across India.

It acts as an integrated digital platform for planning, accounting, monitoring, and implementation of rural development activities.

KEY FEATURES OF EGRAMSWARAJ

1. Decentralised Planning

The portal supports the preparation and monitoring of the Gram Panchayat Development Plan (GPDP). Gram Panchayats can digitally prepare annual development plans based on local needs and priorities.

This ensures:

- Participatory governance
- Need-based development planning
- Better utilisation of funds
- Increased public accountability

The plans are publicly accessible, thereby improving transparency in local governance.

2. Transparency and Financial Accountability

eGramSwaraj is integrated with the Public Financial Management System (PFMS), enabling online fund transfers and payments directly to vendors and beneficiaries.

This integration helps in:

- Reducing delays in payments
- Minimising leakages and corruption
- Ensuring real-time financial tracking
- Improving accountability in expenditure management

The platform has facilitated transparent digital payments worth more than ₹3 lakh crore.

3. Geo-tagging and Asset Verification

The portal allows geo-tagging of village assets using GPS technology. Infrastructure assets such as roads, water tanks, schools, and community centres can be digitally mapped and verified.

This feature improves:

- Monitoring of developmental works
- Verification of public assets
- Prevention of duplication and misuse
- Transparency in implementation of schemes

4. Digital Procurement through GeM

The integration of eGramSwaraj with the Government e-Marketplace (GeM) enables Gram Panchayats to purchase goods and services online.

Benefits include:

- Competitive and transparent pricing
- Reduced procurement-related corruption
- Standardisation of purchases
- Improved efficiency in local administration

5. Massive Outreach and Adoption

Currently, more than 2.59 lakh Panchayati Raj Institutions are using the platform across India. This reflects the increasing penetration of digital governance at the grassroots level.

ABOUT SABHASAAR

SabhaSaar is an AI-enabled voice-to-text meeting summarisation tool launched by the Ministry of Panchayati Raj in 2025.

The initiative aims to simplify and modernise documentation of Gram Sabha and Panchayat meetings through Artificial Intelligence and language technologies.

KEY FEATURES OF SABHASAAR

1. AI-based Meeting Documentation

SabhaSaar automatically converts spoken discussions into written records and summaries. It reduces dependence on manual note-taking and ensures accurate documentation of meetings.

This helps in:

- Faster record preparation
- Improved efficiency in administration
- Better maintenance of official records
- Enhanced institutional memory

2. Integration with BHASHINI Platform

The tool is integrated with the BHASHINI platform, India's AI-powered language translation ecosystem.

It supports transcription and translation in 23 Indian languages, thereby promoting:

- Linguistic inclusivity
- Accessibility for local communities
- Greater citizen participation
- Effective communication in multilingual settings

3. Secure Digital Infrastructure

SabhaSaar operates securely through the IndiaAI Compute Portal under the Ministry of Electronics and Information Technology (MeitY).

This ensures:

- Data security and reliability
- Scalable AI infrastructure
- Secure storage of meeting records
- Efficient digital processing

4. Widespread Adoption

More than 1.15 lakh Gram Panchayats are already using SabhaSaar for automatic documentation and meeting summarisation.

SIGNIFICANCE OF THESE INITIATIVES

Strengthening Grassroots Democracy

The initiatives empower Panchayats through greater transparency, participatory planning, and easier access to information.

Promoting Good Governance

Digital records, online payments, and AI-driven documentation reduce corruption and improve efficiency in local administration.

Bridging the Rural Digital Divide

By introducing digital governance tools in villages, the government is expanding technological access and digital literacy in rural areas.

Enhancing Service Delivery

Real-time monitoring, geo-tagging, and digital procurement improve implementation of welfare schemes and infrastructure projects.

Supporting Digital India Mission

These initiatives align with the broader goals of Digital India, e-governance, and technology-driven public administration.

CHALLENGES

Despite their achievements, certain challenges remain:

- Digital illiteracy among rural populations
- Poor internet connectivity in remote regions
- Cybersecurity and data privacy concerns
- Requirement of regular training for Panchayat officials
- Language and technological adaptation challenges

Addressing these concerns is essential for ensuring inclusive and effective digital governance.

CONCLUSION

The eGramSwaraj and SabhaSaar initiatives represent a major transformation in rural governance in India. By integrating digital planning, financial transparency, AI-enabled documentation, and multilingual accessibility, the Ministry of Panchayati Raj has strengthened grassroots democracy and administrative efficiency.

These initiatives demonstrate how technology can empower local self-government institutions and make governance more transparent, participatory, and citizen-centric. With continued digital infrastructure development and capacity-building efforts, rural India can become a strong pillar of India's digital governance ecosystem.

SC CALLS FOR PRACTICAL SOP ON HUMAN TRAFFICKING

SC CALLS FOR PRACTICAL SOP ON HUMAN TRAFFICKING
A uniform, time-bound and actionable SOP is essential to save lives

SUPREME COURT DIRECTIONS

- Actionable at Local Level:** SOP must be practical and implementable at the local police station level.
- Immediate Action is Critical:** Time is crucial in missing person cases. Prompt police response is essential.
- Active Investigation Mandate:** Cases must be actively pursued on the ground until the missing person is found, not kept pending on paper.
- Stakeholder Consultation:** Union and State authorities to consult stakeholders to develop concrete and effective proposals.
- Uniform & Time-bound SOP:** SOP should be uniform across states and implemented within a fixed timeline.

HUMAN TRAFFICKING IN INDIA: THE ISSUE

- Scale:** ~ 2,183 trafficking cases were registered in 2023 (NCRB).
- Women & Children:** Majority of victims are women and children (NCRB 2023).
- Low Conviction Rate:** Despite high charge-sheeting, conviction rate is very low (~10%).
- Underreporting:** Official figures capture only a fraction. Thousands of victims identified but many cases go unreported.
- Organised Nature:** Operates through interstate networks and organised crime groups, making investigation & coordination difficult.

GOVERNMENT INITIATIVES AGAINST HUMAN TRAFFICKING

- UJJAWALA SCHEME (2007):** Focus on prevention, rescue, rehabilitation, and reintegration of victims of trafficking for commercial sexual exploitation.
- MISSION SHAKTI:** Integrates schemes like State Sahasra to provide a comprehensive support system for women victims, including trafficking survivors.
- ANTI-HUMAN TRAFFICKING UNITS (AHTUs):** Specialised police units set up by Ministry of Home Affairs for investigation, rescue operations and coordination across agencies.
- NATIONAL INVESTIGATION AGENCY (NIA):** Empowered to investigate trafficking cases with inter-state and international dimensions.
- NATIONAL PLAN OF ACTION (NPA):** Government framework to prevent trafficking, protect victims and prosecute offenders with special focus on minor girls and marginalised children.

LEGAL PROVISIONS ON HUMAN TRAFFICKING IN INDIA

- Article 23 of the Constitution:** Prohibits human trafficking, begar (forced labour) and similar forms of exploitation.
- Section 143, BNS:** Defines human trafficking as recruitment, transportation, harbouring, transfer or receipt of persons using force, coercion, fraud or inducement for exploitation.
- Immoral Traffic (Prevention) Act, 1956:** Primary law to combat trafficking for commercial sexual exploitation; penalises brothel keeping, pimping and solicitation.
- Protection of Children from Sexual Offences Act, 2012 (POCSO):** Provides strict punishment for child sexual exploitation and trafficking-related offences involving minors.
- Bonded Labour System (Abolition) Act, 1976:** Abolishes bonded labour, a key form of trafficking, and provides for rehabilitation of victims.
- Juvenile Justice (Care and Protection of Children) Act, 2015:** Addresses care, protection and rehabilitation of trafficked children and defines them as children in need of care and protection.
- India is a signatory to the UN Palermo Protocol,** which provides a global framework to prevent, suppress and punish trafficking.

WAY FORWARD TO COMBAT HUMAN TRAFFICKING

- 1. ENFORCEMENT & PROSECUTION:** Enhance investigation, prosecution and punishment mechanisms. Take strict action against complicit officials.
- 2. EMPOWER AHTUs:** Provide adequate funding, training and clear mandates to Anti-Human Trafficking Units to effectively tackle all forms of trafficking across states.
- 3. VICTIM IDENTIFICATION & PROTECTION:** Implement standardised SOPs for early identification, expand shelters, ensure compensation and adopt a victim-centric, trauma-informed approach.
- 4. INTER-STATE COORDINATION:** Strengthen coordination among states, UTs and ministries, revive inter-ministerial bodies and improve cross-border cooperation.
- 5. REGULATE LABOUR & MIGRATION SYSTEMS:** Increase inspections of vulnerable sectors, regulate recruitment agencies, protect migrant workers and establish bilateral agreements to prevent exploitation.

"A strong SOP, swift action and collective responsibility can break the chains of human trafficking."

The Supreme Court of India has directed the Union and State governments to frame a practical, uniform, and time-bound Standard Operating Procedure (SOP) to effectively tackle human trafficking cases. The Court stressed that the SOP must be actionable at the local police station level, ensuring immediate response in missing person and trafficking cases.

The Court observed that delay in investigation often leads to loss of crucial evidence and increases the risk to victims, especially women and children. It emphasised that police authorities must actively pursue cases on the ground instead of merely keeping them pending on paper.

HUMAN TRAFFICKING IN INDIA

Human trafficking remains a serious governance and human rights challenge in India.

- Around **2,183 trafficking cases** were registered in 2023 according to NCRB data.
- Women and children constitute the majority of victims.
- Conviction rates remain extremely low at nearly **10%**, despite high charge-sheeting rates.
- Many cases go unreported due to fear, stigma, poverty, and weak institutional support.

Trafficking networks often operate across states through organised criminal groups involved in:

- Forced labour,
- Sexual exploitation,
- Child trafficking,
- Beggary,
- Illegal migration and organ trade.

LEGAL AND CONSTITUTIONAL FRAMEWORK

India has multiple legal safeguards against trafficking:

- Article 23: Prohibits human trafficking, forced labour, and exploitation
- Article 23: Prohibits human trafficking, forced labour, and exploitation
- Bharatiya Nyaya Sanhita defines trafficking involving force, coercion, fraud, or inducement for exploitation.
- Immoral Traffic (Prevention) Act addresses trafficking for commercial sexual exploitation.
- Protection of Children from Sexual Offences Act provides safeguards for children against sexual exploitation.
- Bonded Labour System (Abolition) Act abolishes bonded labour.
- Juvenile Justice Act ensures care and rehabilitation of trafficked children.

India is also a signatory to the UN Palermo Protocol.

GOVERNMENT INITIATIVES

Key measures include:

- Ujjawala Scheme for prevention, rescue, rehabilitation, and reintegration of trafficking victims.
- Mission Shakti for women protection and support services.
- Anti-Human Trafficking Units (AHTUs) for specialised investigations and rescue operations.
- National Plan of Action focusing on prevention, protection, and prosecution.

CHALLENGES

Major challenges include:

- Poor inter-state coordination,
- Weak victim protection,
- Lack of trained investigators,
- Judicial delays,
- Inadequate rehabilitation mechanisms.

WAY FORWARD

The Supreme Court's intervention highlights the need for:

- A victim-centric and trauma-informed approach,
- Faster police response and investigation,
- Strengthened AHTUs with proper funding and training,

- Better interstate and international coordination,
- Strong regulation of labour recruitment and migration systems.

A robust SOP backed by accountability and institutional coordination can significantly improve India's fight against human trafficking and safeguard vulnerable populations.

WORKERS' PROTEST IN NOIDA

WORKERS' PROTEST IN NOIDA

CONTEXT (TH | IE | TH): Large-scale workers' protests in Noida over wage hikes turned violent, involving arson, stone-pelting, and clashes with police.

Industrial Spread: Protests were reported across Noida and Greater Noida industrial hubs, affecting traffic and factory operations.

WORKERS' GRIEVANCES & ISSUES

- 🔥 **Wage Insecurity:** Workers face low and stagnant wages (₹11–₹13,000/month) that fail to keep pace with inflation and rising living costs.
- 👤 **High Informalisation:** Over 90% of India's workforce is informal (ILO), lacking contracts & protections.
- 🏭 **Poor Working Conditions:** Long working hours, unsafe workplaces, and a lack of occupational safety measures remain widespread.
- 🏠 **Weak Social Security:** Limited access to benefits like provident fund, insurance, and healthcare exposes workers to vulnerabilities.
- ⚖️ **Implementation Gaps:** Labour laws & codes are poorly enforced, leading to denial of statutory rights.
- 🗳️ **Lack of Representation:** Declining unionisation and limited collective bargaining reduce workers' ability to negotiate fair conditions.

GOVERNMENT RESPONSE

- 👥 **High-Level Committee:** The UP government constituted a multi-stakeholder committee to investigate the unrest and facilitate dialogue between workers and employers.
- 📄 **Wage Revision:** The state government announced an increase in minimum wages to address workers' core demands.
- 🗣️ **Stakeholder Consultation:** Authorities engaged with labour unions and industrial associations.

→ Minimum wage is the legally mandated lowest remuneration that employers must pay workers.

→ Minimum wages in India are legally enforceable under the Code on Wages, 2019.

MEASURES TO STRENGTHEN LABOUR WELFARE

Wage Framework	Formalisation	Social Security	Improve Law Enforcement	Collective Bargaining	Grievance Redressal	Skill Development
Ensure timely revision and strict enforcement of minimum wages under the Code on Wages, 2019, to address income insecurity.	Promote formal employment through incentives, digital registration (e-Shram), and compliance mechanisms for MSMEs.	Expand coverage of schemes like ESI, EPF, & pensions to include informal & gig workers.	Strengthen inspection systems using technology and data-driven monitoring to curb violations.	Encourage institutional dialogue platforms between workers, employers, and government.	Set up fast-track labour dispute resolution systems and revive tripartite dialogue (govt-employer-workers).	Invest in skilling, reskilling, and upskilling to improve wages, employability, and industrial competitiveness.

GOVERNMENT INITIATIVES & SCHEMES FOR UNORGANISED WORKERS

e-Shram Portal	PM Shram Yojana (PM-SYM)	Labour Codes Reform	Skill India Mission	One Nation One Ration Card
National database of unorganised workers providing a UAN card to access multiple welfare schemes and benefits.	Provides ₹3,000/month pension after age 60 with equal contribution by government and worker.	The four labour codes aim to simplify and modernise labour laws while ensuring wage security and social protection.	Enhances the employability of workers through skill development and vocational training programmes.	Ensures food security portability for migrant workers across states.

WAY FORWARD: Sustained dialogue, robust enforcement of labour laws, and inclusive welfare measures are essential to ensure dignity, security, and justice for every worker.

CONTEXT

Large-scale workers' protests recently erupted across Noida and Greater Noida industrial hubs over demands for wage hikes and improved labour conditions. The protests turned violent in some areas, involving arson, stone-pelting, and clashes with police, disrupting traffic and factory operations.

The incident has renewed attention on labour welfare, wage security, and the condition of informal workers in India.

WORKERS' MAJOR GRIEVANCES

1. Wage Insecurity

Many workers earn only around ₹11,000–₹13,000 per

month, which is insufficient to cope with inflation and rising living costs.

2. High Informalisation

According to the International Labour Organization (ILO), over 90% of India's workforce is employed in the informal sector without formal contracts or legal protections.

3. Poor Working Conditions

Workers often face:

- Long working hours,
- Unsafe workplaces,
- Inadequate occupational safety measures.

4. Weak Social Security

A large section of workers lack access to:

- Provident Fund (PF),
- Health insurance,
- Pension benefits,
- Healthcare facilities.

5. Labour Law Implementation Gaps

Weak enforcement of labour laws and labour codes leads to denial of statutory rights.

6. Declining Unionisation

Reduced collective bargaining power weakens workers' ability to negotiate fair wages and conditions.

GOVERNMENT RESPONSE

High-Level Committee

The Uttar Pradesh government formed a multi-stakeholder committee to investigate the unrest and facilitate dialogue.

Wage Revision

The government announced an increase in minimum wages to address workers' concerns.

Stakeholder Consultation

Authorities engaged with labour unions and industrial associations to restore peace.

MEASURES TO STRENGTHEN LABOUR WELFARE

- Timely revision and strict enforcement of minimum wages under the **Code on Wages, 2019**.
- Promotion of formal employment through digital registration platforms like **e-Shram**.
- Expansion of social security coverage to informal and gig workers.
- Technology-driven labour inspections and monitoring.
- Institutional mechanisms for collective bargaining and tripartite dialogue.

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- Fast-track labour dispute resolution systems.
- Skill development, reskilling, and upskilling initiatives.

GOVERNMENT INITIATIVES

- **e-Shram Portal:** Database for unorganised workers with UAN cards.
- **PM Shram Yogi Maandhan:** Pension scheme for unorganised workers.
- **Four Labour Codes:** Simplify labour laws and improve social security.
- **Skill India Mission:** Enhances employability through training.
- **One Nation One Ration Card:** Food security portability for migrant workers.

CONCLUSION

Balancing industrial growth with workers' welfare is essential for sustainable economic development. Strong labour protections, social security, and effective dialogue mechanisms can help reduce industrial unrest and ensure inclusive growth.

WORLD'S LARGEST DIGITAL CENSUS BEGINS WITH PHASE I ROLLOUT



INTRODUCTION

India has commenced Phase I of Census 2027, marking the beginning of the world's largest population enumeration exercise. The process began with self-enumeration on 1 April 2026, while the House Listing and Housing Census (HLO) field operation is being conducted from 16 April to 15 May 2026 in notified States and Union Territories. Conducted by the Ministry of Home Affairs under the Census Act, 1948 and Census Rules, 1990, Census 2027 is historically significant as it will be India's first fully digital census and the first complete caste enumeration since 1931.

The census is a critical administrative exercise because it provides the foundational demographic, social, and economic data required for governance, development planning, and welfare implementation.

KEY FEATURES OF CENSUS 2027

1. India's First Fully Digital Census

Census 2027 represents a major technological shift from traditional paper-based enumeration to digital data collection. Enumerators will use mobile applications and digital devices for real-time data entry. Technologies such as web mapping, geo-tagging, and digital house-listing blocks are being integrated to improve efficiency and reduce human errors.

The adoption of digital methods is expected to:

- Increase transparency and accuracy
- Reduce duplication and delays
- Enable faster data processing and analysis
- Improve monitoring of field operations

This digital transformation reflects India's broader push toward e-governance and data-driven public administration.

2. Self-Enumeration Facility

For the first time in India's census history, citizens can self-enumerate through a secure online portal available in 16 Indian languages. Residents present within India can voluntarily submit household details digitally.

This initiative has several advantages:

- Encourages citizen participation
- Reduces dependence on enumerators
- Minimises manual data-entry errors
- Promotes digital inclusion and awareness

The move aligns with initiatives such as Digital India and strengthens the integration of technology into governance.

3. House Listing and Housing Census (HLO)

Phase I mainly focuses on collecting information regarding housing conditions, household amenities, and assets. The questionnaire includes 33 questions covering areas such as:

- Type and condition of housing
- Availability of drinking water and sanitation
- Access to electricity and clean cooking fuel
- Internet connectivity and smartphone ownership
- Ownership of household assets

This data is crucial for evaluating living standards and identifying developmental gaps across urban and rural India.

4. Inclusion of Live-in Relationships

A socially significant development is the classification of live-in couples as married if they are in a stable union. This change reflects evolving social realities and aims to improve the accuracy of demographic and family-structure data.

It also indicates the state's attempt to make census practices more inclusive and reflective of contemporary society.

5. Complete Caste Enumeration Since 1931

One of the most debated aspects of Census 2027 is the inclusion of caste enumeration. India last conducted a complete caste census in 1931 during British rule.

Updated caste data can assist in:

- Better targeting of welfare schemes
- Evidence-based policy formulation
- Socio-economic assessment of communities
- Debates related to reservation and representation

However, caste enumeration also raises concerns regarding political mobilisation, data privacy, and social tensions.

IMPORTANCE OF CENSUS IN GOVERNANCE

The census serves as the backbone of policymaking and administration in India. Accurate census data is essential because it influences:

Resource Allocation

Government funds for healthcare, education, housing, and welfare schemes are distributed based on population data.

Delimitation and Representation

Census figures determine the delimitation of

parliamentary and assembly constituencies, thereby impacting political representation.

Urban and Rural Planning

Data on migration, housing, and population density helps in planning smart cities, transport networks, and rural development programmes.

Welfare Delivery

Targeted welfare programmes such as food security, healthcare, employment schemes, and housing initiatives rely heavily on census data.

CHALLENGES ASSOCIATED WITH CENSUS 2027

Despite its significance, Census 2027 faces several challenges:

- Digital divide may affect online participation in rural and remote regions.
- Concerns regarding data security and privacy may arise due to digital collection.
- Massive logistical coordination is required for a population exceeding 1.4 billion.
- Caste enumeration could trigger political and social debates.
- Ensuring accuracy in self-enumeration remains a challenge.

The government will need strong institutional mechanisms, awareness campaigns, and cybersecurity safeguards to address these issues effectively.

CONCLUSION

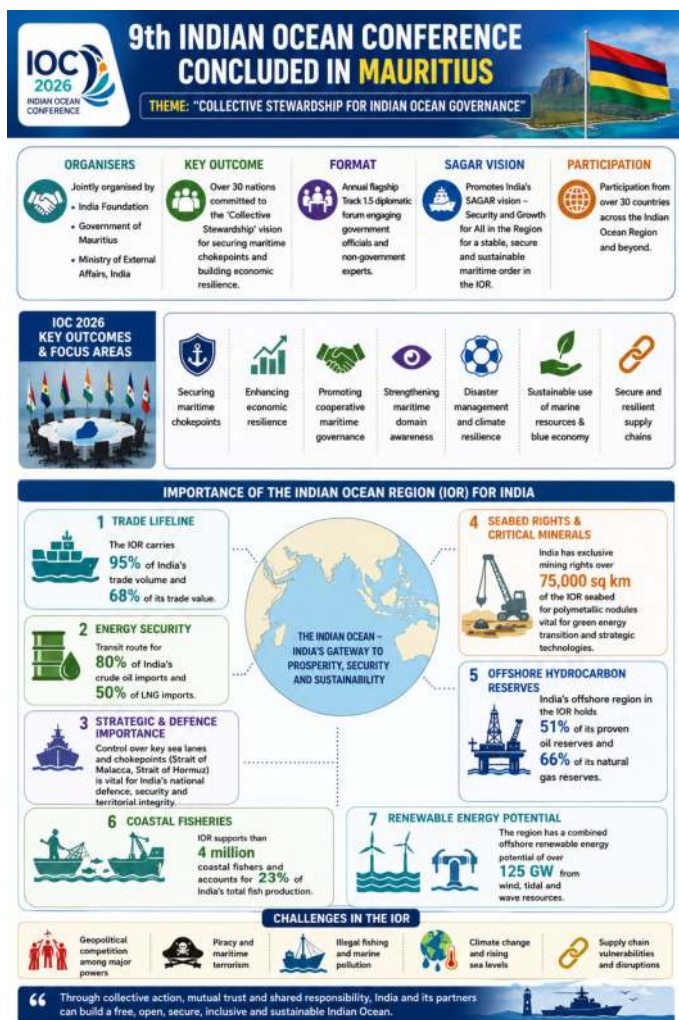
Census 2027 marks a transformational phase in India's administrative and governance framework. By integrating digital technology, self-enumeration, and caste enumeration, the exercise aims to create a more accurate and comprehensive demographic database. The data generated will play a crucial role in policymaking, welfare distribution, social justice, and long-term development planning.

As the world's largest digital census, Census 2027 reflects India's transition toward modern, technology-driven governance while also highlighting the importance of inclusive and evidence-based public administration.

INTERNATIONAL RELATIONS

GS PAPER 2

9TH INDIAN OCEAN CONFERENCE CONCLUDED IN MAURITIUS



CONTEXT

The **9th Indian Ocean Conference (IOC) 2026** was held in Mauritius under the theme “**Collective Stewardship for Indian Ocean Governance**.” The conference was jointly organised by the India Foundation, the Government of Mauritius, and India’s Ministry of External Affairs.

The conference witnessed participation from over 30 countries, which collectively endorsed the vision of cooperative maritime governance and regional resilience in the Indian Ocean Region (IOR).

ABOUT THE INDIAN OCEAN CONFERENCE (IOC)

The IOC is an annual flagship **Track 1.5 diplomatic forum** that brings together:

- Government representatives
- Policymakers
- Strategic experts
- Academicians and industry leaders

It serves as an important platform for discussing:

- Maritime security
- Blue economy
- Regional connectivity
- Climate resilience
- Sustainable ocean governance

The conference also advances India’s SAGAR Vision, which seeks a **secure, stable, and sustainable maritime order** in the Indian Ocean.

KEY OUTCOMES OF IOC 2026

Collective Stewardship Vision

Participating nations committed to:

- Securing maritime chokepoints
- Enhancing economic resilience
- Promoting cooperative maritime governance
- Strengthening regional security partnerships

Focus Areas

- Maritime domain awareness
- Blue economy cooperation
- Disaster management
- Sustainable use of marine resources
- Secure and resilient supply chains

IMPORTANCE OF THE INDIAN OCEAN REGION (IOR) FOR INDIA

1. Trade Lifeline

The IOR carries:

- **95% of India's trade volume**
- **68% of India's trade value**

making it central to India’s economic security.

2. Energy Security

The region serves as a critical transit route for:

- **80% of India's crude oil imports**
- **50% of LNG imports**

Strategic chokepoints like the Strait of Hormuz and Strait of Malacca are vital for uninterrupted energy flows.

3. Strategic and Defence Importance

Control and monitoring of sea lanes in the IOR are essential for:

- National defence
- Territorial integrity
- Countering piracy and maritime threats

4. Resource Potential

India has exclusive seabed mining rights over **75,000 sq km** in the IOR for polymetallic nodules, crucial for green technologies and critical minerals.

5. Offshore Energy and Fisheries

- Offshore reserves account for **51% of India's oil reserves** and **66% of natural gas reserves**.
- The region supports over **4 million coastal fishers** and contributes significantly to India's fish production.

6. Renewable Energy Potential

The IOR possesses offshore renewable energy potential exceeding **125 GW** through:

- Offshore wind
- Tidal energy
- Wave energy

CHALLENGES IN THE IOR

- Geopolitical competition among major powers
- Piracy and maritime terrorism
- Illegal fishing and marine pollution
- Climate change and rising sea levels
- Supply chain vulnerabilities

CONCLUSION

The 9th Indian Ocean Conference highlighted the growing strategic importance of the Indian Ocean Region in global geopolitics and economic security. Through the SAGAR vision and cooperative regional frameworks, India seeks to promote a free, open, secure, and inclusive maritime order in the Indo-Pacific region.

GERMANY: STRATEGIC GEOGRAPHY AND INDIA-GERMANY DEFENCE COOPERATION



Recent developments highlight growing defence cooperation between India and **Germany**, as India's Ministry of Defence called for stronger defence industrial partnerships during interactions with German parliamentarians in **Berlin**. This reflects the deepening strategic ties between the two countries amid evolving global security dynamics.

About Germany

Germany is a major European nation located in Central Europe, playing a key role in global politics, economy, and security.

- Capital: Berlin
- Location: Central Europe
- Maritime Boundaries:
 - North Sea (Northwest)
 - Baltic Sea (Northeast)

NEIGHBOURING COUNTRIES

Germany shares borders with:

- North: Denmark
- East: Poland, Czech Republic
- South: Austria, Switzerland
- West: France, Luxembourg, Belgium, Netherlands

GEOGRAPHICAL FEATURES OF GERMANY

1. Climate

Germany experiences a temperate climate, with moderate seasonal variations, making it suitable for agriculture and human settlement.

2. Major Mountain Ranges

- Alps (in the south) – highest peaks and tourism hub
- Bavarian Highlands – rolling uplands with forests

3. Important Rivers

- Rhine River – crucial for trade and navigation
- Danube River – originates in Germany and flows across Europe
- Elbe River – supports ports like Hamburg

4. Lakes

- Lake Constance – largest freshwater lake linked with Germany

5. Natural Resources

Germany has diverse mineral resources:

- Lignite (brown coal)
- Hard coal
- Natural gas
- Iron ore
- Copper, nickel, potash, uranium

STRATEGIC IMPORTANCE OF GERMANY

- Economic Powerhouse: Largest economy in Europe
- Industrial Strength: Advanced manufacturing and engineering
- Geopolitical Role: Key member of EU and NATO
- Transport Hub: Dense network of rivers, roads, and railways

INDIA-GERMANY DEFENCE COOPERATION

The recent call for enhanced defence industrial collaboration reflects:

- Technology Transfer: Joint development of advanced defence systems
- Make in India Boost: German expertise supporting Indian manufacturing
- Strategic Alignment: Shared interests in Indo-Pacific stability
- Diversification: Reducing dependence on traditional defence partners

Germany's technological capabilities combined with India's growing defence market create strong potential for long-term collaboration.

EGYPT – STRENGTHENING INDIA-EGYPT DEFENCE COOPERATION

EGYPT

LATEST NEWS
India and Egypt advanced their defence cooperation at the 11th Joint Defence Committee (JDC) meeting held in Cairo.

ABOUT EGYPT

- Transcontinental country that stretches from the northeast corner of Africa to the southwest corner of Asia.
- The Sinai Peninsula acts as the land bridge between Africa and Asia.
- Bordering Countries: Sudan (south), Libya (west), Israel and the Gaza Strip (northeast).
- Water Bodies: Coastline on the Mediterranean Sea (North) while the Red Sea and Gulf of Aqaba border it to the east.
- Capital City: Cairo

LOCATION: BRIDGE BETWEEN CONTINENTS

EUROPE, ASIA, AFRICA, Sinai Peninsula, Spans Northeastern Africa and Southwestern Asia

GEOGRAPHICAL FEATURES

- **Climate**: Tropical climate with high temperatures throughout the year.
- **Rivers**: The Nile River, the longest river in the world, flows from south to north through Egypt.
- **Terrain**: Topography marked by a striking contrast between arid desert regions and the fertile Nile River Valley.
- **Highest Peak**: Mount Catherine in Sinai Peninsula is the highest point, reaching 2,642 m (8,668 ft) above sea level.

EGYPT AT A GLANCE

Mediterranean Sea, Israel Gaza Strip, Gulf of Aqaba, Red Sea, Nile River, Libya, Sudan, Cairo

NATURAL RESOURCES

- Petroleum
- Natural Gas
- Phosphates
- Iron Ore

INDIA-EGYPT RELATIONS

- **Defence Cooperation**: Joint exercises, training programs and defence production discussions.
- **Economic Engagement**: Trade in energy, fertilizers, pharmaceuticals and other sectors.
- **Strategic Importance**: Egypt's location near the Suez Canal strengthens global trade and maritime security.
- **Historical Ties**: Close ties since the Non-Aligned Movement era; partnership continues to grow.

WHY EGYPT MATTERS

- Geopolitical hub connecting Africa, Asia and Europe
- Proximity to Suez Canal – key maritime route
- Energy and trade corridor for global oil and gas transit
- Key player in Middle Eastern and African geopolitics

WHY IN NEWS

India and Egypt recently advanced their defence ties during the **11th Joint Defence Committee (JDC) meeting** held in Cairo. The meeting focused on enhancing military cooperation, training exchanges, and defence industrial collaboration, reflecting the growing strategic partnership between the two nations.

ABOUT EGYPT

Egypt is a **transcontinental country**, spanning northeastern Africa and southwestern Asia. The **Sinai Peninsula** serves as a land bridge between the two continents, giving Egypt immense geopolitical importance.

It shares borders with Sudan (south), Libya (west), and Israel and the Gaza Strip (northeast). Egypt also enjoys a strategic maritime position, with coastlines along the

Mediterranean Sea (north) and the Red Sea and Gulf of Aqaba (east).

The capital city, Cairo, is one of Africa's largest urban centres and a major political and cultural hub.

GEOGRAPHICAL FEATURES

Egypt's geography is marked by stark contrasts:

- **Climate:** Predominantly hot and arid, with desert conditions dominating most regions.
- **Terrain:** About two-thirds of Egypt is covered by the vast **Western Desert**, part of the Sahara.
- **Fertile Core:** The **Nile River Valley and Delta** form the lifeline of the country, supporting agriculture and dense population.
- **River System:** The Nile River, the longest river in the world, flows from south to north through Egypt.
- **Highest Peak:** Mount Catherine (2,642 m) located in the Sinai Peninsula.

This unique geography makes Egypt heavily dependent on the Nile for water, food security, and economic activity.

NATURAL RESOURCES AND ECONOMY

Egypt possesses several important natural resources:

- **Petroleum and Natural Gas**
- **Phosphates and Iron Ore**

The economy is diversified, with contributions from agriculture (Nile basin), tourism (ancient civilization sites), manufacturing, and services. However, challenges such as population pressure, water scarcity, and economic inequality persist.

INDIA-EGYPT RELATIONS

India and Egypt share **historical ties dating back to the Non-Aligned Movement (NAM)** era. In recent years, relations have strengthened across multiple sectors:

- **Defence Cooperation:** Joint exercises, training programs, and defence production discussions
- **Economic Engagement:** Trade in energy, fertilizers, and pharmaceuticals
- **Strategic Importance:** Egypt's location near the **Suez Canal** enhances its role in global trade and maritime security

The 11th JDC meeting signals a deepening of defence ties, particularly in **capacity building and military interoperability**.

STRATEGIC SIGNIFICANCE OF EGYPT

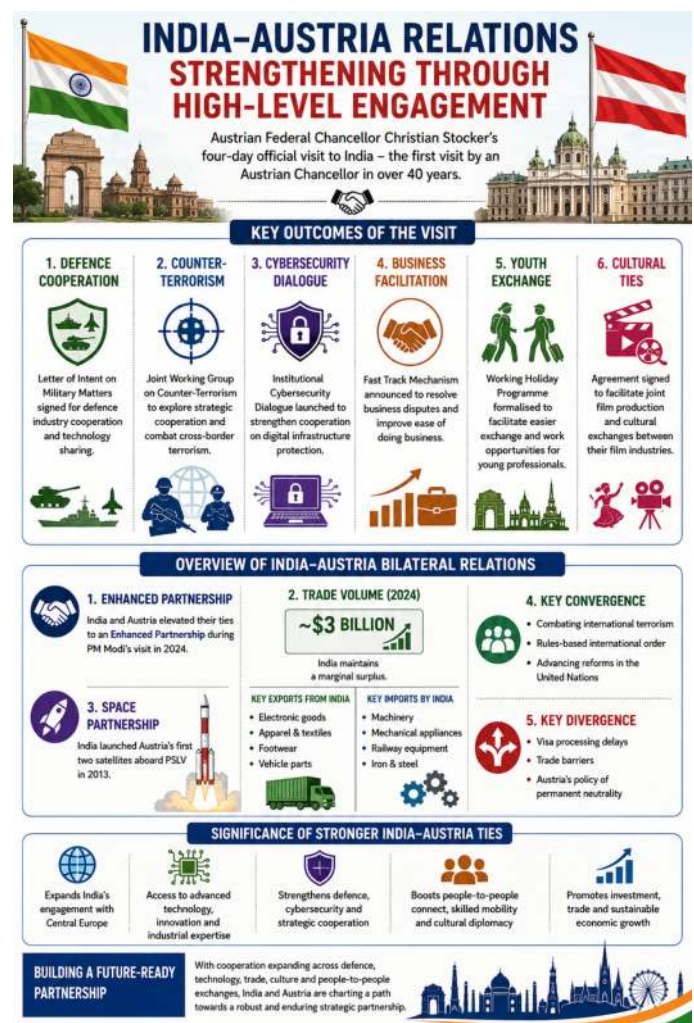
- **Geopolitical Hub:** Connects Africa, Asia, and Europe
- **Control of Key Maritime Routes:** Proximity to the Suez Canal

- **Energy and Trade Corridor:** Important for global oil and gas transit
- **Regional Influence:** Plays a key role in Middle Eastern and African geopolitics

CONCLUSION

Egypt's geographical position, resource base, and strategic importance make it a crucial partner for India. The recent Joint Defence Committee meeting reflects a broader effort to strengthen bilateral ties in defence and security. As global geopolitics evolves, partnerships like India-Egypt will play a vital role in ensuring regional stability and economic cooperation.

INDIA-AUSTRIA RELATIONS STRENGTHENING THROUGH HIGH-LEVEL ENGAGEMENT



CONTEXT

Christian Stocker is on a four-day official visit to India, marking the first visit by an Austrian Chancellor in more than four decades. The visit reflects the growing

strategic importance of India–Austria relations amid changing geopolitical and economic realities.

The engagement follows the elevation of bilateral ties to an **Enhanced Partnership** during Prime Minister Narendra Modi's visit to Austria in 2024.

KEY OUTCOMES OF THE VISIT

1. Defence Cooperation

Both countries signed a **Letter of Intent on Military Matters** to promote:

- Defence industry collaboration
- Technology sharing
- Strategic cooperation in security sectors

2. Counter-Terrorism Cooperation

The Joint Working Group on Counter-Terrorism will strengthen cooperation against:

- Cross-border terrorism
- Extremism
- Terror financing

3. Cybersecurity Dialogue

An **Institutional Cybersecurity Dialogue** was launched to enhance:

- Protection of digital infrastructure
- Cyber resilience
- Information-sharing mechanisms

4. Business Facilitation

A **Fast Track Mechanism** was introduced to:

- Resolve business disputes efficiently
- Improve ease of doing business
- Promote investments and industrial cooperation

5. Youth and Cultural Exchanges

- A **Working Holiday Programme** was formalised for young professionals.
- Both countries signed agreements on **joint film production** and cultural exchanges.

OVERVIEW OF INDIA–AUSTRIA BILATERAL RELATIONS

Trade Relations

Bilateral trade reached nearly **\$3 billion in 2024**, with India maintaining a marginal trade surplus.

India's Major Exports

- Electronic goods
- Textiles and apparel
- Footwear
- Automobile components

India's Major Imports

- Machinery
- Railway equipment
- Mechanical appliances
- Iron and steel products

STRATEGIC AREAS OF COOPERATION

1. Space Cooperation

India launched Austria's first two satellites aboard Polar Satellite Launch Vehicle in 2013, demonstrating growing technological cooperation.

2. Shared Global Priorities

Both countries support:

- Combating international terrorism
- A rules-based international order
- Reform of global institutions, including the United Nations

3. Economic and Technological Collaboration

Austria's strengths in green technology, precision engineering, and renewable energy complement India's manufacturing and digital ambitions.

CHALLENGES IN BILATERAL RELATIONS

Visa and Mobility Issues

Indian professionals and students continue to face visa processing delays.

Trade Barriers

Regulatory barriers and market access issues affect smoother trade expansion.

Strategic Differences

Austria's policy of **permanent neutrality** sometimes limits deeper defence alignment.

Significance for India

Strengthened ties with Austria can help India:

- Expand engagement with Central Europe
- Access advanced technology and industrial expertise
- Enhance defence and cybersecurity cooperation
- Promote skilled workforce mobility and cultural diplomacy

CONCLUSION

The high-level engagement between India and Austria reflects the growing diversification of India's foreign policy partnerships in Europe. With cooperation expanding across defence, technology, trade, and culture, the relationship has the potential to evolve into a robust strategic partnership in the coming years.

INDIA-RUSSIA ARCTIC PARTNERSHIP



INTRODUCTION

The Arctic region has emerged as a critical geopolitical and geoeconomic frontier in the 21st century due to its vast hydrocarbon reserves, strategic sea routes, and critical mineral resources. With climate change opening new maritime pathways and increasing accessibility to untapped resources, major powers are competing to strengthen their Arctic presence.

In this context, recent India-Russia bilateral discussions have highlighted Arctic cooperation as an important pillar of their strategic partnership, particularly for ensuring India's long-term energy security amid global geopolitical instability and the escalating Middle East crisis.

India's engagement with the Russian Arctic reflects its broader objectives of energy diversification, strategic balancing, and participation in emerging global trade corridors.

NEED FOR INDIA-RUSSIA ARCTIC COOPERATION

1. Ensuring Energy Security

India is one of the world's fastest-growing energy consumers. However, domestic natural gas production currently meets only around half of the country's demand.

Long-term cooperation with Russia can help India secure stable supplies of oil and liquefied natural gas (LNG), reducing dependence on volatile West Asian energy markets.

The Russia-India Arctic partnership gains importance in light of:

- Rising geopolitical tensions in the Middle East
- Vulnerability of traditional shipping routes
- Fluctuations in global crude oil prices
- Growing domestic energy demand

Stable Russian energy supplies can support India's long-term economic growth and industrial expansion.

2. Access to Vast Hydrocarbon Resources

The Russian Arctic possesses nearly 80% of Russia's natural gas reserves along with significant untapped oil deposits.

India's participation in Arctic resumed LNG supply projects can:

- Diversify crude oil import sources
- Reduce overdependence on a few suppliers
- Strengthen long-term energy resilience
- Enhance strategic petroleum partnerships

Indian public and private companies have already invested in several Russian energy ventures and are exploring opportunities in Arctic LNG projects.

3. Access to Critical Minerals

The Arctic region contains large reserves of critical minerals such as:

- Rare earth elements
- Coking coal
- Nickel
- Copper
- Graphite

These minerals are essential for:

- Renewable energy technologies
- Electric vehicles
- Semiconductor manufacturing
- Defence production
- High-tech industries

Partnership with Russia can help India secure critical mineral supply chains necessary for green energy transition and technological advancement.

4. Strategic and Logistical Benefits

The development of the Northern Sea Route (NSR) and the Chennai-Vladivostok Maritime Corridor (CVMC) can

significantly reduce shipping time between India and Europe compared to the traditional Suez Canal route.

Benefits include:

- Reduced transportation costs
- Faster cargo movement
- Lower fuel consumption
- Improved trade connectivity
- Diversification of maritime routes

The NSR is becoming increasingly important due to climate-driven melting of Arctic ice.

5. Geopolitical Balancing

China has expanded its Arctic engagement through its “Polar Silk Road” initiative.

A stronger Indian presence in the Russian Arctic helps:

- Maintain strategic balance in the Arctic region
- Prevent excessive Chinese dominance
- Strengthen India's role in polar governance
- Enhance India's profile as an emerging global power

Thus, Arctic cooperation aligns with India's broader strategic autonomy and multipolar foreign policy objectives.

KEY INITIATIVES DRIVING INDIA–RUSSIA ARCTIC PARTNERSHIP

1. Policy Framework and Institutional Cooperation

The 2025 India–Russia summit endorsed stronger cooperation in the Russian Far East and Arctic under the 2024–2029 bilateral programme.

The partnership focuses on:

- Energy cooperation
- Infrastructure development
- Maritime connectivity
- Mining and critical minerals
- Scientific collaboration

This institutional framework provides long-term direction for Arctic engagement.

2. Joint Energy Projects

Indian companies have invested in major Russian oil and gas projects and are exploring further participation in Arctic LNG ventures.

Russia's Arctic LNG projects offer India opportunities for:

- Long-term LNG contracts
- Equity participation
- Technology collaboration
- Energy diversification

India has also resumed LNG supply negotiations with Russian companies such as NOVATEK.

3. Capacity Building and Training

Russia is training Indian specialists in polar navigation and Arctic maritime operations.

This cooperation will help India develop expertise in:

- Ice navigation
- Arctic shipping
- Polar logistics
- Cold-climate operations

Such capacity building is essential for India's long-term Arctic ambitions.

4. Logistical and Naval Cooperation

Under the Reciprocal Exchange of Logistics Support (RELOS) agreement, India has gained access to Russian Arctic naval facilities for replenishment and repair purposes.

This strengthens:

- Maritime cooperation
- Strategic reach in northern waters
- Naval interoperability
- India's polar operational capabilities

5. Scientific and Climate Research Cooperation

India has been actively involved in Arctic scientific research through its Himadri research station in Svalbard.

Collaboration with Russia can strengthen research in:

- Climate change
- Arctic ecology
- Polar sciences
- Sustainable development
- Environmental monitoring

CHALLENGES IN ARCTIC COOPERATION

Despite growing cooperation, several challenges remain:

- Harsh climatic and operational conditions in the Arctic
- High infrastructure and transportation costs
- Environmental concerns related to Arctic exploitation
- Western sanctions on Russia affecting investments and technology transfer
- Geopolitical competition among major powers in the Arctic region

Balancing economic interests with environmental sustainability remains a key challenge.

CONCLUSION

The India–Russia Arctic partnership represents an important dimension of India's evolving foreign policy and energy strategy. Through cooperation in hydrocarbons, critical minerals, maritime connectivity, and polar research, India aims to strengthen its energy security and strategic autonomy.

At a time of increasing geopolitical uncertainty and competition in the Arctic, closer collaboration with

Russia offers India opportunities to diversify energy sources, secure critical supply chains, and expand its global strategic footprint.

If pursued sustainably and strategically, the partnership can emerge as a major pillar of India–Russia relations and contribute significantly to India’s long-term economic and geopolitical interests.

INDIA–SOUTH KOREA RELATIONS – CURRENT AFFAIRS UPDATE

INDIA - SOUTH KOREA RELATIONS
STRENGTHENING A SPECIAL STRATEGIC PARTNERSHIP

LATEST NEWS
South Korean President Lee Jae Myung met Prime Minister Narendra Modi at Hyderabad House, New Delhi. Multiple agreements were signed across trade, technology, maritime and culture.

DIPLOMATIC TIES
1973 Establishment of diplomatic relations
2015 Elevated to Special Strategic Partnership

PILLARS OF PARTNERSHIP

- ROBUST ECONOMIC TIES**
 - Strong trade and investment
 - Presence of major Korean companies – Samsung, Hyundai
 - Target to scale trade from \$27 billion to \$50 billion by 2030
- TECHNOLOGICAL & SECURITY CONVERGENCE**
 - Cooperation in AI, semiconductors, IT, shipbuilding
 - Joint production – K9 Vajra-T gun system
 - Economic Security Dialogue for critical technologies & supply chains
- DEFENCE COOPERATION**
 - Joint production and research
 - K9 Vajra-T self-propelled howitzer manufactured in India
 - Expanding collaboration in emerging defence technologies
- CULTURAL BONDS**
 - Queen Suriratna memorial in Ayodhya
 - K-pop & K-dramas popular in India, Indian cinema gaining recognition in Korea
 - People-to-people connect growing stronger

KEY OUTCOMES OF THE MEETING

- TRADE & ECONOMIC COOPERATION**
 - Target to increase trade to \$50 billion by 2030
 - Restart of CEPA upgrade negotiations
 - CEPA (2010) has grown trade nearly 90% (from \$14.2 bn to \$26.89 bn in 2024-25)
 - 11 rounds of CEPA upgradation talks held
 - Launched India–Korea Financial Forum
 - Industrial Cooperation Committee established
 - Economic Security Dialogue initiated
- DIGITAL & INDUSTRIAL PARTNERSHIP**
 - Launch of India–Korea Digital Bridge for AI, semiconductors & IT collaboration
 - Agreements on digital cooperation in AI and support for SMEs
 - Korean Industrial Township to be established in India to ease market entry for Korean businesses (especially SMEs)
- MARITIME & SHIPBUILDING COOPERATION**
 - Comprehensive Framework for Partnership in Shipbuilding, Shipping & Maritime Logistics signed
 - Supports India’s Maritime India Vision 2030
 - Korea brings advanced shipbuilding technology; India offers policy support, land & growing order base
 - Dialogue on climate change, Arctic and maritime cooperation launched
- MULTILATERAL & GEOPOLITICAL ALIGNMENT**
 - South Korea joined International Solar Alliance (ISA) and Indo-Pacific Oceans Initiative (IPOI)
 - Both nations agreed on reforming global institutions
 - Exchanged views on wars in West Asia & Europe; agreed on restoring peace in the Middle East for global stability
- CULTURAL DIPLOMACY – PEOPLE CONNECT**
 - Launch of Mumbai Korea Centre – a permanent K-pop performance hall & cultural hub
 - India–Korea Friendship Festival to be organised in 2028
 - K-pop & Bollywood collaboration to be encouraged

CHALLENGES

- Trade Imbalances:** India runs a large trade deficit (imports –\$21 bn vs exports –\$5.8 bn).
- Building Shipbuilding Capacity in India:** Needs investment, skilled labour & regulatory reforms.
- Geopolitical Uncertainties:** Risk to energy supply chains that both countries depend on.
- Implementation Gaps:** Challenges in grounding MoUs, especially for SMEs & technology transfer.

WAY FORWARD

- Fast-track CEPA renegotiation with focus on reducing trade deficit and expanding market access for Indian goods (pharma, textiles, IT services).
- Leverage digital technology to co-develop semiconductor supply chains – critical in global chip geopolitics.
- Attract Korean FDI and manufacturing into India’s industrial corridors.
- Build resilient supply chains for critical minerals and emerging technologies.
- Align shipbuilding cooperation with India’s Sagarmala Project and Maritime India Vision for mutual strategic depth.
- Position the Indo-Pacific as a zone of cooperative prosperity.

SIGNIFICANCE
A key partnership for security in the Indo-Pacific and economic development of both nations, based on technology, trade and shared values.

VISION
From ‘ships to ships, talent to technology’ – driving a forward-looking, inclusive and resilient strategic partnership.

The visit of South Korean President **Lee Jae-myung** to India and his meeting with Prime Minister **Narendra Modi** at Hyderabad House marks a significant step in strengthening the **India–South Korea Special Strategic Partnership**. Several agreements were signed across trade, technology, maritime, and cultural cooperation.

BACKGROUND OF RELATIONS

India and South Korea established diplomatic relations in **1973**, which were elevated to a **Special Strategic Partnership in 2015**. The relationship is driven by:

- Strong trade and investment ties

- Technological collaboration
- Defence cooperation
- Presence of Korean companies like **Samsung** and **Hyundai**

The partnership aligns India’s **Act East Policy** with South Korea’s **New Southern Policy**.

KEY AREAS OF COOPERATION

1. Political & Strategic

- Convergence in Indo-Pacific vision
- Cooperation in global governance reforms

2. Defence & Technology

- Joint production like the **K9 Vajra-T**
- Collaboration in AI, semiconductors, and shipbuilding

3. Cultural Relations

- Historical link through Queen Suriratna (Ayodhya)
- Rising popularity of K-pop and Indian cinema

KEY OUTCOMES OF THE MEETING

Trade & Economy

- Target to increase trade from **\$27 billion to \$50 billion by 2030**
- Revival of CEPA upgrade negotiations
- Launch of:
 - India–Korea Financial Forum
 - Industrial Cooperation Committee
 - Economic Security Dialogue

Digital & Industrial Partnership

- Launch of **India–Korea Digital Bridge**
- Cooperation in AI, IT, and SMEs
- Establishment of a **Korean Industrial Township in India**

Maritime Cooperation

- Framework for shipbuilding and maritime logistics
- Supports India’s **Maritime India Vision 2030**

Multilateral Alignment

- South Korea joins:
 - International Solar Alliance**
 - Indo-Pacific Oceans Initiative**
- Shared stance on global conflicts and institutional reforms

Cultural Diplomacy

- Launch of Mumbai Korea Centre
- India–Korea Friendship Festival (2028)

CHALLENGES

- Persistent **trade deficit** for India
- Slow progress in CEPA negotiations
- Need for infrastructure in shipbuilding
- Implementation gaps in MoUs
- Geopolitical uncertainties affecting supply chains

WAY FORWARD

- Fast-track CEPA to improve market access
- Build semiconductor and critical tech supply chains
- Attract Korean FDI into manufacturing corridors
- Strengthen maritime cooperation under Sagarmala
- Enhance people-to-people exchanges

CONCLUSION

The recent engagement reflects a shift toward a **technology-driven, future-oriented partnership**. With shared democratic values and complementary strengths, South Korea emerges as a key partner for India in ensuring economic resilience and strategic stability in the Indo-Pacific region.

INS NIREEKSHAK & INDIA-SRI LANKA DIVEX 2026

INS NIREEKSHAK & DIVEX 2026
STRENGTHENING MARITIME PARTNERSHIP & HUMANITARIAN COOPERATION

INS NIREEKSHAK – AT A GLANCE

- BUILT BY:** Mazagon Dock Shipbuilders Limited (1985)
- IN SERVICE:** Since 1989
- COMMISSIONED:** 1995

A specialised Dive Support and Submarine Rescue Vessel of the Indian Navy

CAPABILITIES & ROLE

- Deep-sea & Saturation Diving:** Supports prolonged underwater operations.
- Submarine Rescue:** Can deploy Deep Submergence Rescue Vehicles (DSRV).
- Recompression Chambers:** Advanced facilities for diver treatment.
- Underwater Operations:** Search & rescue, underwater inspection, salvage & diver training.
- Stability & Precision:** Sophisticated systems ensure stability during sensitive missions.

DIVEX 2026 – INDIA-SRI LANKA DIVING EXERCISE

- 4th EDITION:** Week-long exercise
- PARTICIPANTS:** Indian Navy & Sri Lanka Navy
- FOCUS AREAS:**
 - Specialised underwater operations
 - Rescue & salvage drills
 - Diver training
 - Exchange of best practices
- AIM:** Enhance interoperability, strengthen coordination & build strong maritime partnership.

HUMANITARIAN OUTREACH – AAROGYA MAITRI INITIATIVE

INS Nireekshak will hand over **TWO BHISM CUBES** to Sri Lankan authorities.

BHISM Cubes are portable medical units designed for rapid deployment.

- Capacity to handle up to 200 emergency cases
- Equipped with essential medicines
- Basic surgical capabilities
- Ready for disaster relief & emergency response

SIGNIFICANCE

- Strengthens bilateral defence cooperation with Sri Lanka
- Enhances maritime security & submarine rescue readiness
- Promotes exchange of expertise & capacity building
- Reinforces India's commitment to humanitarian assistance
- Supports India's vision of Security and Growth for All in the Region (SAGAR)

★ INS Nireekshak and DIVEX 2026 exemplify the synergy of strength, cooperation and compassion.

INTRODUCTION

In a recent development, INS *Nireekshak*, a specialised vessel of the Indian Navy, arrived at Colombo to participate in the 4th edition of the India-Sri Lanka Diving Exercise (DIVEX 2026). The exercise highlights growing maritime cooperation between India and Sri Lanka and reflects India's broader commitment to regional security and humanitarian outreach.

ABOUT INS NIREEKSHAK

INS *Nireekshak* is a Dive Support and Submarine Rescue Vessel designed to assist in complex underwater operations. Built by Mazagon Dock Shipbuilders Limited in 1985, the ship has served the Indian Navy for decades and was formally commissioned in 1995.

The vessel is equipped with advanced deep-sea diving systems, recompression chambers, and submarine rescue infrastructure. It can deploy Deep Submergence Rescue Vehicles (DSRVs) and supports saturation diving missions, which allow divers to work at great depths for extended durations.

Its dynamic positioning and stabilisation systems ensure precision during delicate underwater operations. This makes INS *Nireekshak* crucial for search-and-rescue missions, underwater inspections, salvage operations, and diver training.

KEY FEATURES (INFOGRAPHIC)

Type: Dive Support & Submarine Rescue Vessel

Builder: Mazagon Dock Shipbuilders Ltd

Commissioned: 1995

Capabilities:

- Deep-sea diving & saturation diving
- Submarine rescue (DSRV deployment)
- Recompression chambers
- Underwater inspection & salvage

DIVEX 2026: KEY HIGHLIGHTS

The India-Sri Lanka Diving Exercise (DIVEX 2026) marks its fourth edition, bringing together naval diving teams from both countries.

The week-long exercise focuses on specialised underwater drills, including rescue operations, salvage techniques, and diver training. It aims to enhance interoperability between the Indian Navy and the Sri Lanka Navy, ensuring better coordination during joint maritime operations.

Such exercises also promote the exchange of technical expertise and best practices, strengthening bilateral defence ties in the Indian Ocean Region.

HUMANITARIAN OUTREACH: AAROGYA MAITRI INITIATIVE

As part of India's humanitarian diplomacy, INS *Nireekshak* will hand over two BHISM (Bharat Health Initiative for Sahyog Hita & Maitri) cubes to Sri Lankan authorities under the Aarogya Maitri Initiative.

These portable medical units are designed for rapid deployment during emergencies. Each unit can handle up to 200 patients and is equipped with essential medicines, diagnostic tools, and basic surgical facilities. This initiative reflects India's role as a "first responder" in the region, particularly during natural disasters and health crises.

SIGNIFICANCE

The participation of INS *Nireekshak* in DIVEX 2026 holds strategic and humanitarian importance. From a defence perspective, it strengthens maritime cooperation and enhances preparedness for underwater emergencies, including submarine accidents.

From a diplomatic angle, it reinforces India-Sri Lanka relations under the framework of regional cooperation and Security and Growth for All in the Region (SAGAR). Additionally, the humanitarian component through BHISM cubes underscores India's commitment to soft power and disaster relief.

CONCLUSION

INS *Nireekshak*'s deployment to DIVEX 2026 exemplifies the synergy between military capability and humanitarian outreach. As maritime challenges evolve, such collaborations will play a crucial role in ensuring regional stability, safety, and mutual trust in the Indian Ocean Region.

CONTEXT

The 2026 U.S.-Iran conflict has emerged as a critical geopolitical test for BRICS. While the crisis has accelerated efforts toward financial and strategic autonomy from Western systems, it has simultaneously exposed deep internal divisions and institutional weaknesses within the grouping.

STRATEGIC ADVANTAGES FOR BRICS

1. Voice of the Global South

BRICS has projected itself as a major representative of the Global South by:

- Maintaining relative neutrality
- Advocating diplomatic and multipolar solutions
- Criticising unilateral sanctions and military escalation

2. Push for Alternative Payment Systems

Sanctions on Iran accelerated the development of:

- **BRICS Pay**
- Local-currency settlement mechanisms

These initiatives aim to reduce dependence on:

- SWIFT payment systems
- U.S. dollar-dominated transactions

3. Strengthening Non-Western Supply Chains

The crisis encouraged greater coordination between:

- Energy producers (Russia, Iran, UAE)
- Energy consumers (India, China)

to create resilient and non-Western trade corridors.

4. Currency Sovereignty

Regional instability increased momentum toward:

- Local currency trade
- De-dollarisation of energy transactions
- Financial sovereignty within the bloc

5. Growing Global Appeal

Many developing countries increasingly view BRICS as a shield against:

- Unilateral sanctions
- Western economic pressure
- Dollar dependency

LONG-TERM CONSEQUENCES OF U.S.-IRAN WAR ON BRICS

The 2026 Iran War acts as a double-edged catalyst for BRICS, accelerating its sanctions-proof financial and logistical architecture while exposing its political impotence.

STRATEGIC ADVANTAGES FOR BRICS	STRATEGIC DISADVANTAGES FOR BRICS
<p>1 GLOBAL VOICE BRICS has positioned itself as the primary voice of the Global South by maintaining neutrality and advocating multipolar solutions to the conflict.</p>	<p>1 INTERNAL FRAGMENTATION Direct military confrontation between alliance members like Iran and the UAE severely fractures core diplomatic cohesion.</p>
<p>2 PAYMENT SYSTEMS Western-led sanctions against Iran have accelerated the development of the BRICS Pay system to circumvent SWIFT and U.S. dollar dominance.</p>	<p>2 GEOPOLITICAL PARALYSIS Conflicting national interests have prevented the grouping from issuing a unified condemnation or a formal joint statement.</p>
<p>3 SUPPLY CHAINS The crisis has forced closer coordination between energy-producing and energy-consuming members to secure long-term, non-Western supply chains.</p>	<p>3 CREDIBILITY DEFICIT Systemic inability to protect or to mediate effectively on behalf of Iran has reduced international trust in the bloc as a viable security alternative.</p>
<p>4 CURRENCY SOVEREIGNTY Persistent regional instability has compelled the bloc to transition to local-currency settlements for energy trade.</p>	<p>4 CHAIR DEPENDENCY The contrast between Brasilia's proactive 2025 tenure and India's 2026 strategic silence proves that host-nation priorities override collective BRICS outputs.</p>
<p>5 EXPANSION APPEAL Escalating tensions have heightened BRICS's global appeal as a defensive shield against unilateral economic sanctions.</p>	<p>5 INFRASTRUCTURE RISK Ongoing kinetic military operations threaten high-stakes multilateral investments like the INSTC and Chabahar developments.</p>

WAY FORWARD FOR INDIA AS BRICS CHAIR

<p>1. INSTITUTIONAL MEDIATION Formalise a dedicated Conflict Resolution Mechanism to prevent internal military disputes between members.</p>	<p>2. CURRENCY STANDARDISATION Establish a common intra-bloc pricing framework for oil and gas to eliminate collective reliance on the petrodollar.</p>	<p>3. INFRASTRUCTURE INTEGRATION Harmonise digital customs protocols along the INSTC to establish it as a high-capacity trade artery managed by member states.</p>	<p>4. ENERGY SOLIDARITY Propose an Energy Security Pact that guarantees priority access to hydrocarbons for consumer members during regional crises.</p>
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READ MORE > BRICS: EVOLUTION, EXPANSION & IMPORTANCE FOR INDIA

STRATEGIC DISADVANTAGES FOR BRICS

1. Internal Fragmentation

Military tensions involving members such as Iran and the UAE exposed sharp internal contradictions and weakened bloc cohesion.

2. Geopolitical Paralysis

Divergent national interests prevented BRICS from issuing:

- A unified condemnation

- A formal collective response

This highlighted the absence of a common foreign policy framework.

3. Credibility Deficit

The grouping's inability to:

- Protect Iran diplomatically
- Mediate the conflict effectively

reduced confidence in BRICS as a credible geopolitical alternative.

4. Chair Dependency

The contrast between Brazil's active 2025 presidency and India's cautious 2026 approach demonstrated that BRICS outcomes depend heavily on the priorities of the chairing nation.

5. Infrastructure Vulnerability

The conflict threatened strategic connectivity projects such as:

- International North-South Transport Corridor
- Chabahar Port

raising concerns over long-term trade security.

WAY FORWARD FOR INDIA AS BRICS CHAIR

Institutional Mediation

India can propose a formal **Conflict Resolution Mechanism** to manage disputes among member states.

Currency Coordination

A common pricing and settlement framework for oil and gas can reduce dependence on the petrodollar system.

Infrastructure Integration

India should accelerate:

- Digital customs harmonisation
- Connectivity through INSTC
- Regional logistics integration

Energy Security Cooperation

An intra-BRICS **Energy Security Pact** can ensure stable hydrocarbon access during geopolitical crises.

CONCLUSION

The U.S.–Iran conflict has simultaneously strengthened and weakened BRICS. While it accelerated de-dollarisation and strategic coordination, it also exposed serious institutional and geopolitical limitations. For BRICS to evolve into a credible multipolar platform, it must move beyond symbolic solidarity toward stronger institutional cohesion and conflict-management mechanisms.

U.S.–IRAN ANNOUNCE TWO-WEEK CEASEFIRE

U.S. AND IRAN ANNOUNCE TWO-WEEK CEASEFIRE
Temporary Truce After Over a Month of Direct Military Conflict

DIPLOMACY
Formal peace negotiations to begin on 11 April 2026 in Islamabad, led by U.S. Vice President JD Vance.

SANCTIONS RELIEF
Tehran demands the immediate lifting of all primary and secondary economic restrictions as part of its 10-point plan.

STRAIT OF HORMUZ
Iran agreed to reopen the Strait of Hormuz for two weeks under the military's traffic coordination.

AMERICAN DEMAND
Washington demands the complete dismantling of nuclear sites at Natanz, Isfahan, and Fordow to ensure a permanent non-nuclear Iran.

THE STRAIT OF HORMUZ: A GLOBAL ENERGY LIFELINE
Map showing the Strait of Hormuz between Iran and Oman, with the UAE and Oman labeled.

FRAGILITY OF THE CEASEFIRE

- REGIONAL SCOPE**: Washington excludes Lebanon from the truce while Tehran demands a total cessation of all regional hostilities.
- MARITIME CONTROL**: Iran threatens to re-close the Strait if Israel continues military operations against Hezbollah in Lebanon.
- NUCLEAR REDLINES**: U.S. prohibits any uranium enrichment whereas Iran demands formal recognition of its nuclear program.
- COMBAT READINESS**: U.S. forces maintain a strike-ready posture to resume combat operations if any specific condition is breached.
- CONDITIONAL TRUCE**: Deep mistrust and divergent redlines make the ceasefire temporary and reversible.

KEY IRANIAN DEMANDS (10-POINT PLAN)

- Lifting of all sanctions
- Recognition of enrichment rights
- Full war reparations
- Control of the Strait of Hormuz
- Termination of all UNSC and IAEA resolutions

GLOBAL AND REGIONAL SIGNIFICANCE

- ENERGY SECURITY**: Stability in the Strait of Hormuz is vital for global oil supply and energy prices.
- REGIONAL STABILITY**: The ceasefire could reduce tensions across West Asia and lower the risk of wider conflict.
- GLOBAL DIPLOMACY**: Negotiations may shape future non-proliferation frameworks and regional security architecture.
- ECONOMIC IMPACT**: Reduced uncertainty can support global markets and trade confidence.

WAY FORWARD

- Strengthen diplomatic engagement through multilateral mediation.
- Ensure phased confidence-building measures and verification mechanisms.
- Address core issues of sanctions and nuclear rights through balanced dialogue.
- Promote inclusive regional security for lasting peace and stability.

CONTEXT

United States and Iran announced a two-week ceasefire after more than a month of direct military confrontation in West Asia. Formal peace negotiations are scheduled to begin on 11 April 2026 in Islamabad under the leadership of JD Vance.

The temporary truce is viewed as an attempt to prevent further regional escalation and secure stability in critical energy and maritime routes.

KEY FEATURES OF THE CEASEFIRE

Diplomatic Negotiations

- Formal peace talks are expected to address regional security, nuclear concerns, and sanctions relief.

Strait of Hormuz Reopened

- Iran agreed to reopen the Strait of Hormuz for two weeks under military traffic coordination.
- The Strait is a critical global energy chokepoint through which a major share of world oil trade passes.

Iranian Demands

Iran's 10-point proposal includes:

- Removal of primary and secondary U.S. sanctions
- Recognition of uranium enrichment rights
- War reparations

- Termination of UNSC and IAEA restrictions
- Control over Hormuz security arrangements

U.S. Position

The United States demands:

- Complete dismantling of nuclear facilities at Natanz, Isfahan, and Fordow
- Permanent guarantees against nuclear weapon development
- Strict monitoring mechanisms

FRAGILITY OF THE CEASEFIRE

Regional Disagreements

- Washington excluded Lebanon from the ceasefire framework.
- Tehran insists on a complete halt to all regional hostilities.

Maritime Tensions

- Iran threatened to re-close the Strait of Hormuz if military operations against Hezbollah continue.

Nuclear Redlines

- The U.S. opposes any uranium enrichment activity.
- Iran seeks international recognition of its civilian nuclear programme.

Military Preparedness

- U.S. forces remain on high combat readiness, indicating the ceasefire remains conditional and reversible.

GLOBAL SIGNIFICANCE

Energy Security

- Stability in the Strait of Hormuz is vital for global oil supply and energy prices.

Regional Stability

- The ceasefire could reduce tensions across West Asia and lower risks of wider conflict.

Impact on Global Diplomacy

- Negotiations may influence future non-proliferation frameworks and regional security architecture.

Challenges

- Deep mistrust between both countries.
- Divergence on sanctions and nuclear enrichment rights.
- Possibility of proxy conflicts disrupting negotiations.

WAY FORWARD

- Strengthen diplomatic engagement through multilateral mediation.
- Ensure phased confidence-building measures.

- Promote balanced regional security arrangements and nuclear verification mechanisms.

UAE EXIT FROM OPEC: IMPLICATIONS FOR GLOBAL ENERGY MARKETS



INTRODUCTION

The decision of the United Arab Emirates to exit Organization of the Petroleum Exporting Countries and the broader OPEC+ alliance marks a major shift in global energy politics. After more than five decades of membership, the UAE's withdrawal reflects changing geopolitical realities, economic priorities, and evolving energy strategies. The move comes at a time when global oil markets are already facing instability due to the US-Iran conflict and disruptions in West Asian energy routes.

The development has important implications for oil prices, energy security, and the future cohesion of OPEC itself.

OPEC: ORIGIN AND EVOLUTION

OPEC was established in 1960 at the Baghdad Conference by five founding members:

- Iran
- Iraq
- Kuwait
- Saudi Arabia
- Venezuela

The organisation emerged in response to the dominance of Western multinational oil companies, popularly called the “Seven Sisters,” which controlled global oil pricing and production.

The primary objectives of OPEC are:

- Coordinating petroleum policies among member states
- Ensuring stable oil prices
- Securing fair revenues for oil-producing countries
- Maintaining reliable oil supply to consumers

The UAE joined OPEC in 1967 through Abu Dhabi and became an important oil-producing member of the organisation.

Currently, OPEC consists of 12 member countries, including Algeria, Libya, Nigeria, Saudi Arabia, Iran, Iraq, Kuwait, and Venezuela.

EMERGENCE OF OPEC+

In 2016, OPEC expanded its influence by forming OPEC+, an alliance between OPEC and major non-OPEC producers such as:

- Russia
- Mexico
- Kazakhstan

OPEC+ coordinates production quotas to regulate global oil supply and stabilise crude prices.

Today, OPEC+ accounts for:

- Nearly 40% of global crude oil production
- Around 60% of internationally traded petroleum

This gives the grouping enormous influence over global energy markets.

ROLE OF OPEC IN GLOBAL OIL MARKETS

OPEC functions similarly to a “central bank” for the global oil market.

Production Quotas

The organisation regulates oil output through production quotas allocated to member states.

Market Stabilisation

During periods of weak demand, OPEC reduces production to prevent oversupply and falling prices.

Supply Expansion

When supply shortages emerge, OPEC can increase production to prevent excessive price spikes.

Revenue Stability

Since many member countries depend heavily on oil exports, coordinated production policies help stabilise government revenues and domestic budgets.

REASONS BEHIND UAE'S EXIT

1. Geopolitical and Security Concerns

The ongoing US-Iran conflict has increased tensions in the Gulf region, especially around the Strait of Hormuz, through which nearly one-fifth of global oil trade passes. The UAE fears disruptions to oil exports and regional infrastructure due to escalating conflict.

2. Constraints Within OPEC

Since OPEC operates through consensus-based decision-making, the UAE believes its flexibility in responding to regional crises and adjusting production levels is restricted.

Exiting OPEC provides greater strategic autonomy in managing energy exports and foreign partnerships.

3. Economic Diversification Goals

The UAE is pursuing long-term economic diversification through investments in:

- Technology
- Education
- Tourism
- Financial services
- Renewable energy

However, achieving this transition requires substantial financial resources. The UAE seeks to maximise oil production in the short term to generate higher revenues for funding diversification initiatives.

4. Production Capacity Concerns

OPEC production quotas limited the UAE from fully utilising its oil production capacity. The country increasingly viewed these restrictions as economically disadvantageous.

IMPACT ON GLOBAL OIL MARKETS

Weakening of OPEC's Collective Power

The UAE's exit may weaken OPEC's ability to collectively control spare oil production capacity and influence global prices.

Increased Market Competition

As an independent producer, the UAE may increase production aggressively to capture larger market share. This could pressure other producers to raise output as well.

Downward Pressure on Oil Prices

Higher supply and increased competition are likely to reduce oil prices in the short term. However, reduced coordination could also increase price volatility.

Greater Market Uncertainty

The fragmentation of OPEC could make oil markets more unpredictable, particularly during geopolitical crises.

Risk of Further Fragmentation

The UAE's move may encourage other members to reconsider quota commitments, potentially weakening the long-term unity of OPEC+.

Implications for India

India, being one of the world's largest oil-importing countries, could benefit from lower global oil prices.

Positive Impacts

- Reduced import bill
- Lower inflationary pressures
- Improved energy security
- Better fiscal stability

Potential Risks

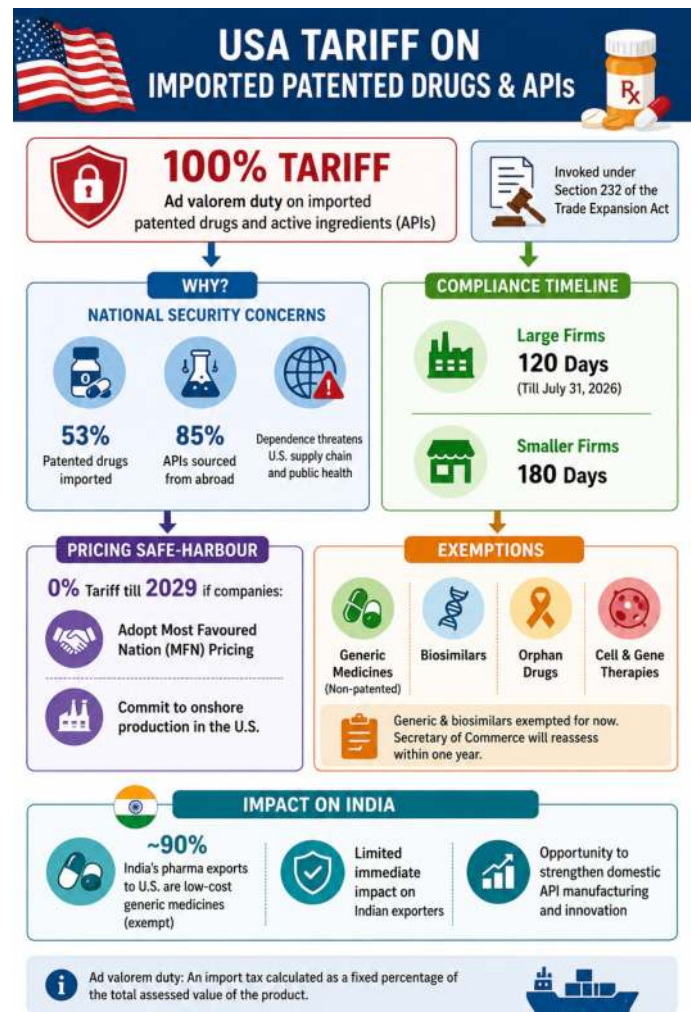
- Greater price volatility due to weakened market coordination
- Geopolitical instability in West Asia affecting supply routes

India must therefore continue diversifying its energy sources and strengthening strategic petroleum reserves.

CONCLUSION

The UAE's exit from OPEC marks a turning point in global energy geopolitics. The decision reflects broader shifts in economic priorities, regional security dynamics, and changing approaches toward oil market management. While the move could weaken OPEC's collective influence and increase competition in global oil markets, it may also accelerate the transition toward more flexible and diversified energy partnerships. For oil-importing nations like India, lower prices may provide temporary economic relief, but long-term energy security will continue to depend on diversification, strategic reserves, and the transition toward sustainable energy sources.

USA TARIFF ON IMPORTED PATENTED DRUGS AND APIS



CONTEXT

The United States, under President Donald Trump, invoked **Section 232 of the Trade Expansion Act** to impose a **100% ad valorem tariff** on imported patented drugs and Active Pharmaceutical Ingredients (APIs). The U.S. administration cited national security concerns arising from excessive dependence on foreign pharmaceutical supply chains.

WHY HAS THE U.S. IMPOSED THE TARIFF?

The U.S. government highlighted that nearly:

- **53% of patented drugs** consumed in the U.S. are imported.
- **85% of APIs** are sourced from foreign countries.

This dependence is viewed as a strategic vulnerability, especially during geopolitical tensions or global health emergencies. Therefore, the tariff seeks to encourage domestic pharmaceutical manufacturing and reduce supply-chain risks.

KEY FEATURES OF THE TARIFF POLICY

1. Compliance Timeline

- Large pharmaceutical firms have **120 days** (till July 31, 2026).
- Smaller firms have **180 days** to enter compliance agreements.

2. Pricing Safe-Harbour

Companies can avoid tariffs till **2029** if they:

- Adopt **Most Favoured Nation (MFN)** pricing mechanisms.
- Commit to shifting manufacturing to the U.S.

3. Exemptions

The U.S. excluded:

- Generic medicines
- Biosimilars
- Orphan drugs
- Cell and gene therapies

These exemptions aim to prevent shortages of affordable and specialised medicines.

IMPACT ON INDIA

India is one of the largest exporters of pharmaceuticals to the U.S. However, the immediate impact is expected to remain limited because:

- Around **90% of India's exports** to the U.S. are **generic medicines**, which are exempt from tariffs.
- India mainly supplies low-cost medicines rather than patented drugs.

Nevertheless, the move reflects growing protectionism in global trade and could indirectly affect Indian pharmaceutical companies in the future.

CONCERNS ASSOCIATED WITH THE MOVE

Economic Concerns

- Higher tariffs may increase medicine prices in the U.S.
- Pharmaceutical supply chains could become more fragmented.

Trade Concerns

- The move may trigger retaliatory trade measures.
- It reflects increasing use of "national security" exceptions in trade policy.

Global Health Concerns

- Reduced global cooperation in pharmaceuticals may affect affordability and accessibility of medicines.

Significance for India

The development highlights the need for India to:

- Strengthen domestic API manufacturing.
- Reduce dependence on Chinese imports.
- Expand pharmaceutical innovation and R&D.

Government initiatives such as the **Production Linked Incentive (PLI) Scheme** for bulk drugs can help India emerge as a stronger pharmaceutical manufacturing hub.

CONCLUSION

The U.S. tariff on patented drugs and APIs marks a shift towards strategic economic nationalism in critical sectors such as healthcare. While India remains relatively insulated due to the exemption for generic medicines, the policy underlines the importance of resilient supply chains and self-reliance in pharmaceuticals.

ECONOMY

GS PAPER 3

11 YEARS OF PRADHAN MANTRI MUDRA YOJANA (PMMY)

11 YEARS OF PRADHAN MANTRI MUDRA YOJANA
Empowering Micro Enterprises, Enabling Prosperity

APRIL 2015-2025 11 YEARS OF IMPACT

ABOUT PM MUDRA YOJANA

- Central Sector Scheme under Ministry of Finance
- Targets non-corporate, non-farm income-generating activities in Manufacturing, Trading, Services and Allied Agriculture
- Collateral-free credit up to ₹20 lakh. No security or third-party guarantee
- Interest rates decided by lending institutions as per RBI guidelines
- Flexible repayment: 3 to 7 years. Moratorium: up to 6-12 months
- Mudra Card (RuPay) for working capital with credit limit flexibility

LOAN CATEGORIES
Based on Stage of Business and Funding Needs

- SHISHU**: Up to ₹50,000. For startups and initial phase businesses.
- KISHORE**: ₹50,001 to ₹5 lakh. For businesses seeking to scale or stabilise.
- TARUN**: ₹5,00,001 to ₹10 lakh. For established enterprises seeking substantial growth.
- TARUN PLUS**: ₹10 lakh to ₹20 lakh. For entrepreneurs who have successfully repaid a prior Tarun loan.

NODAL AGENCY
MUDRA (Micro Units Development & Refinance Agency Ltd.), a subsidiary of SIDBI

MONITORING MECHANISM
Performance tracked through State Level Bankers' Committee (SLBC) for all districts

DIGITAL PORTALS
JanSamarth & Udyammitra portals for paperless PMMY loan applications

LENDING INSTITUTIONS
Banks, NBFCs, MFIs and other financial institutions

ACHIEVEMENTS AT A GLANCE

- 57.79 CRORE+ Loans Sanctioned since inception
- ₹40.07 LAKH CRORE+ Total Amount Disbursed
- 67% Beneficiaries are Women (38.29 crore accounts)
- 49% Beneficiaries belong to SC, ST & Other Backward Classes
- 12 CRORE+ Loans to First-time Entrepreneurs
- ₹38,000 TO ₹1.25 LAKH Average Loan Size increased from FY16 to FY26
- 1.5 CRORE+ Borrowers registered as MSMEs on Udyam Portal

PERSISTING BOTTLENECKS

- ASSET QUALITY**: NPA rate for SCBs under Mudra is 9.81% vs. overall MSME NPA average of 3.6%
- SHISHU DOMINANCE**: About 80% of Mudra loans fall under Shishu category (up to ₹50,000) primarily supporting subsistence rather than scalable growth
- REJECTION RATE**: 30% of Mudra loan applications are rejected due to insufficient documentation, lack of credit history or New-to-Credit status
- REGIONAL SKEW**: Credit outreach remains uneven. Tamil Nadu & Uttar Pradesh dominate; North East states show lower participation
- CAPACITY GAPS**: Only 25% of beneficiaries receive formal skill training. 60% do not fully understand their loan repayment terms

FORWARD

- Strengthen credit appraisal & monitoring to improve asset quality
- Promote higher-ticket loans for scaling micro enterprises
- Expand financial literacy, skill training & handholding support
- Enhance outreach in under-served regions including North East
- Link Mudra credit with market access, technology & capacity building

PM Mudra Yojana - Driving entrepreneurship, financial inclusion and inclusive growth for a self-reliant India.

CONTEXT

The Pradhan Mantri Mudra Yojana has completed 11 years since its launch in April 2015. The scheme was introduced to provide collateral-free institutional credit to unfunded micro and small enterprises and strengthen financial inclusion in India.

ABOUT PM MUDRA YOJANA (PMMY)

PMMY is a **Central Sector Scheme** under the Ministry of Finance aimed at supporting **non-corporate, non-farm micro enterprises** engaged in:

- Manufacturing
- Trading
- Services
- Allied agricultural activities

The scheme is implemented through Banks, NBFCs, and Micro Finance Institutions (MFIs).

LOAN CATEGORIES UNDER PMMY

Category	Loan Amount	Target Group
Shishu	Up to ₹50,000	Startups and small businesses
Kishore	₹50,001 - ₹5 lakh	Expanding enterprises
Tarun	₹5 lakh - ₹10 lakh	Established businesses
Tarun Plus	₹10 lakh - ₹20 lakh	Successful Tarun borrowers

Key Features

- Collateral-free loans up to ₹20 lakh
- Flexible repayment period of 3-7 years
- Moratorium period up to 6-12 months
- Mudra Card (RuPay debit card) for working capital management
- Digital access through JanSamarth and Udyammitra portals

The nodal agency for PMMY is Micro Units Development and Refinance Agency Ltd., a subsidiary of Small Industries Development Bank of India.

ACHIEVEMENTS OF PMMY

Financial Inclusion

- Over **57.79 crore loans** sanctioned since inception.
- Total disbursement exceeds **₹40.07 lakh crore**.

Women Empowerment

- Women constitute **67% of beneficiaries**, holding over **38 crore accounts**.

Social Inclusion

- Nearly **49% beneficiaries** belong to SC, ST, and OBC communities.

Entrepreneurship Promotion

- More than **12 crore loans** provided to first-time entrepreneurs.

Formalisation of Economy

- Around **1.5 crore borrowers** formally registered as MSMEs through the Udyam portal.

Rising Credit Access

- Average loan size increased from **₹38,000 (FY16)** to **₹1.25 lakh (FY26)**.

PERSISTING CHALLENGES

1. Rising NPAs

The NPA rate for Mudra loans in Scheduled Commercial Banks stands at **9.81%**, significantly higher than the MSME average.

2. Dominance of Shishu Loans

Nearly **80% loans** remain concentrated in the Shishu category, indicating support largely for subsistence activities rather than scalable enterprises.

3. Documentation and Credit Barriers

Around **30% applications are rejected** due to lack of documentation, credit history, or "new-to-credit" status.

4. Regional Imbalances

States like Tamil Nadu and Uttar Pradesh dominate credit disbursement, while northeastern states remain underrepresented.

5. Skill and Financial Literacy Gaps

Only **25% beneficiaries receive formal skill training**, while many borrowers lack understanding of repayment obligations.

WAY FORWARD

- Strengthen credit assessment and monitoring mechanisms.
- Promote larger-ticket enterprise loans for business expansion.
- Improve financial literacy and entrepreneurship training.
- Enhance outreach in underserved regions.
- Integrate Mudra loans with skilling and market-linkage programmes.

CONCLUSION

PM Mudra Yojana has emerged as a major instrument for financial inclusion, women empowerment, and grassroots entrepreneurship. However, addressing issues related to asset quality, regional disparities, and enterprise sustainability is essential to transform micro-credit into long-term economic growth.

ANNUAL SURVEY OF INCORPORATED SERVICES SECTOR ENTERPRISES (ASISSE)



CONTEXT

The National Statistical Office (NSO) has launched the Annual Survey of Incorporated Services Sector Enterprises (ASISSE), India's first dedicated survey of the incorporated services sector.

The survey aims to build a comprehensive database for evidence-based policymaking, economic planning, and sectoral analysis.

ABOUT ASISSE

Objective

- To generate reliable and comprehensive data on the incorporated services sector.
- To support data-driven governance and macroeconomic analysis.

Legal Framework

- Conducted under the Collection of Statistics Act, 2008.

Sectoral Coverage

The survey covers major service sectors such as:

- Trade
- Transport
- Hospitality
- Information Technology (IT)

- Education
- Healthcare

Enterprises Covered

ASISSE includes:

- Companies registered under the Companies Act, 1956/2013
- Limited Liability Partnerships (LLPs) under the LLP Act, 2008

SIGNIFICANCE OF ASISSE

Strengthening Economic Data

- India's services sector contributes over 50% of GDP and is a major employment generator.
- The survey will provide structured and reliable enterprise-level data.

Better Policymaking

- Enables targeted policy interventions in rapidly growing service industries.
- Helps assess productivity, employment, investment, and business performance.

Complementary Statistical Framework

ASISSE complements:

- Annual Survey of Industries (ASI) – Manufacturing sector
- Annual Survey of Unincorporated Sector Enterprises (ASUSE) – Informal sector

Together, these surveys create a comprehensive economic database.

Transparency and Participation

- The “Know Your Survey” initiative has been introduced to improve awareness, transparency, and participation among enterprises.

ABOUT NATIONAL STATISTICAL OFFICE (NSO)

Formation

- Established in 2019 under the Ministry of Statistics and Programme Implementation (MoSPI).

Components

The NSO includes:

- Central Statistical Office (CSO)
- National Sample Survey Office (NSSO)

Functions of CSO

- Compilation of:
 - Gross Domestic Product (GDP)
 - Index of Industrial Production (IIP)
 - Consumer Price Index (CPI)
- Annual Survey of Industries (ASI)

Functions of NSSO

- Conducts large-scale socio-economic surveys such as:

- Periodic Labour Force Survey (PLFS)
- Consumer Expenditure Surveys
- Health and social sector surveys

Challenges

- Ensuring accurate reporting by enterprises.
- Integrating large-scale digital data efficiently.
- Maintaining data privacy and statistical reliability.

WAY FORWARD

- Improve digital survey infrastructure and awareness campaigns.
- Strengthen statistical capacity and data verification systems.
- Use survey findings for targeted service-sector reforms and employment generation.

AVIATION TURBINE FUEL (ATF): RISING PRICES AND CHALLENGES FOR INDIA'S AVIATION SECTOR

AVIATION TURBINE FUEL (ATF)
RISING PRICES, GROWING CONCERNS
 High fuel costs threaten airline viability and passenger affordability

WHAT IS AVIATION TURBINE FUEL (ATF)?

- ATF is a refined petroleum product used in aircraft jet engines.
- Derived from crude oil, similar to kerosene but with higher quality standards for safety, efficiency and performance at high altitudes.
- A critical input cost for airlines, accounting for 30–50% of total operating expenses.

ATF PRICING IN INDIA

- ATF pricing is market-linked but not fully deregulated like petrol and diesel.
- Prices are revised periodically by Oil Marketing Companies (OMCs).
- Prices vary across states due to different state-level VAT, making India one of the costliest markets for aviation fuel.

ATF PRICING FORMULA: KEY COMPONENTS

1. International Benchmark Prices	Linked to global jet fuel prices, which depend on crude oil prices.
2. Exchange Rate	As crude oil is imported, rupee-dollar fluctuations directly affect prices.
3. Freight & Insurance Costs	Transportation and logistics costs are added to the base price.
4. OMC Margins	Refining and marketing margins of oil companies.
5. State Taxes (VAT)	States impose VAT ranging from 1% to over 25%, causing price variation across locations.

ATF PRICE = IMPORT PARITY PRICE + REFINING MARGIN + FREIGHT + MARKETING MARGIN + STATE TAXES

CHALLENGES IN ATF PRICING

- High taxation increases operational costs for airlines.
- Lack of uniform tax structure leads to regional price disparities, affecting route planning.
- GST: ATF is currently outside the GST framework, which prevents input tax credit benefits.
- Dependence on imported crude oil exposes prices to global volatility and exchange rate fluctuations.

NEWS SUMMARY: AIRLINE CONCERNS OVER RISING ATF PRICES

- Leading carriers like Air India, IndiGo and SpiceJet have warned of possible operational disruptions or shutdown risks due to rising fuel costs.
- Sharp increase in ATF prices has significantly raised the operational burden, as fuel is the largest expense component.
- Airlines are struggling to absorb costs in a competitive market where ticket prices cannot be increased proportionately.

IMPACT ON AIRLINE VIABILITY

- Reduced profitability and financial stress
- Capacity reduction & route rationalisation
- Possible delays, cancellations or service disruptions
- Higher costs may lead to increased airfares for passengers

DEMAND FOR POLICY INTERVENTION

- **GST**: Bring ATF under GST
 - Uniform tax structure
 - Input tax credit benefits
 - Lower overall cost
- **Reduce State-level VAT**
 - Rationalise VAT rates
 - Ensure fair competition
 - Support regional connectivity
- **Provide Temporary Relief**
 - Stabilise the sector during high price volatility
 - Ensure operational continuity

SIGNIFICANCE OF A STRONG AVIATION SECTOR

- Economic Growth
- Tourism Development
- Trade & Connectivity
- Employment Generation
- Regional Integration (UDAN Scheme)

THE WAY FORWARD

Addressing ATF pricing challenges through tax reforms, policy support and pricing rationalisation is essential to ensure the sustainability, competitiveness and long-term growth of India's aviation industry. Balanced policies will help keep India's skies affordable, accessible and future-ready.

Lower fuel costs = Stronger airlines • Better connectivity • Affordable air travel • Accelerated economic growth

INTRODUCTION

India's aviation sector is facing growing pressure due to the sharp rise in Aviation Turbine Fuel (ATF) prices. Major Indian airlines such as Air India, IndiGo, and SpiceJet have expressed concerns that increasing fuel costs could affect operations and financial sustainability. Since ATF constitutes one of the largest operational expenses for airlines, rising prices directly impact profitability, ticket pricing, and overall sectoral growth.

WHAT IS AVIATION TURBINE FUEL (ATF)?

Aviation Turbine Fuel (ATF) is a refined petroleum product used primarily in aircraft jet engines. It is derived from crude oil and has properties similar to kerosene, but with stricter quality standards to ensure safety, efficiency, and performance at high altitudes and varying temperatures.

ATF is a critical component of the aviation industry, accounting for nearly **30-50% of airline operating expenses**. Therefore, fluctuations in fuel prices significantly influence airline finances and passenger fares.

ATF PRICING IN INDIA

ATF pricing in India is market-linked, though not fully deregulated like petrol and diesel. Prices are revised periodically by Oil Marketing Companies (OMCs).

India is considered one of the costliest aviation fuel markets globally because of high taxation and varying state-level Value Added Tax (VAT) rates.

COMPONENTS OF ATF PRICING

The price of ATF is determined by multiple domestic and international factors:

1. International Crude Oil Prices

- Global jet fuel prices depend largely on crude oil prices in international markets.

2. Exchange Rate Fluctuations

- Since India imports a major portion of crude oil, depreciation of the rupee against the US dollar increases fuel costs.

3. Freight and Insurance Costs

- Transportation and logistics charges add to the final price.

4. Refining and Marketing Margins

- OMCs include refining costs and profit margins.

5. State-Level VAT

- States impose VAT ranging from 1% to over 25%, creating significant regional price disparities.

MAJOR CHALLENGES IN ATF PRICING

1. High Tax Burden

India imposes among the highest taxes on aviation fuel globally. Elevated VAT rates increase operational costs and reduce airline profitability.

2. Exclusion from GST

ATF remains outside the Goods and Services Tax (GST) framework. Consequently, airlines cannot claim input tax credit benefits, increasing the effective tax burden.

3. Regional Price Disparities

Variation in state VAT rates creates uneven fuel pricing across airports, affecting route planning and operational efficiency.

4. Dependence on Imported Crude

India's heavy dependence on imported crude oil exposes ATF prices to global geopolitical tensions and exchange rate volatility.

IMPACT OF RISING ATF PRICES ON AIRLINES

The recent increase in ATF prices has severely affected the financial health of Indian airlines.

Rising Operational Costs

Fuel is the largest expenditure for airlines. Sharp increases in ATF prices reduce profit margins, especially in a highly competitive market where airlines cannot proportionately raise ticket prices.

Risk of Operational Disruptions

Several airlines have warned that continued fuel price escalation may force:

- Reduction in flight frequency
- Route rationalisation
- Capacity cuts
- Delays in expansion plans
- Possible service disruptions

Impact on Consumers

Higher fuel costs may eventually translate into increased airfares, affecting passenger demand and reducing affordability of air travel.

Financial Stress on Airlines

Indian airlines already operate on thin margins due to intense competition, high airport charges, and maintenance expenses. Rising ATF prices further weaken financial sustainability.

Demand for Policy Intervention

Airlines have urged the government to adopt structural reforms to reduce fuel-related burdens.

Bringing ATF Under GST

Including ATF within GST could:

- Reduce cascading taxation
- Provide input tax credit benefits
- Lower operational costs
- Create a uniform national tax structure

Reduction in State VAT

States can reduce VAT rates to improve the competitiveness of the aviation sector and encourage regional connectivity.

Temporary Relief Measures

The government may consider short-term support measures during periods of extreme fuel price volatility to ensure operational continuity.

Significance for India's Economy

A strong aviation sector is essential for:

- Economic growth
- Tourism development
- Trade and connectivity
- Employment generation
- Regional integration under schemes like UDAN

Persistent fuel cost pressures may slow aviation sector expansion and weaken India's ambition of becoming a major global aviation hub.

CONCLUSION

The rising prices of Aviation Turbine Fuel have exposed structural weaknesses in India's aviation fuel taxation and pricing framework. While global crude oil prices remain an external factor, domestic tax reforms and policy interventions can reduce the burden on airlines. Bringing ATF under GST, rationalising state taxes, and improving pricing uniformity are essential steps to ensure the long-term sustainability and competitiveness of India's aviation sector. A balanced approach that protects both government revenue and airline viability will be crucial for supporting the future growth of civil aviation in India.

BHARAT MARITIME INSURANCE POOL (BMI POOL): SECURING INDIA'S SEABORNE TRADE

BHARAT MARITIME INSURANCE POOL (BMI POOL)
SECURING INDIA'S SEABORNE TRADE

ABOUT BMI POOL

- ✓ Centre-backed domestic maritime insurance scheme
- ✓ Guarantee of ₹12,980 Cr by govt.
- ✓ Covers risks to Indian shipping during global crises

KEY FEATURES

Coverage Scope: Indian-Flagged & Controlled Vessels, Cargo to-from INDIA

Insurance Types: Hull & Machinery, Cargo, Protection & Indemnity, War Risk

10 YEARS (1-5 year extension possible)

WHY IT'S NEEDED

- ✓ 90% of India's trade via sea routes
- ✓ Rising risks: wars, piracy, sanctions
- ✓ Dependence on foreign insurers for coverage
- ✓ Stable premium amid global uncertainty

SIGNIFICANCE

- Trade Security:** Uninterrupted trade flow even during crises
- Self-Reliance:** Atmanirbhar Bhaat in marine insurance
- Cost Stability:** Effective premium control during crises
- Expertise Building:** Develops domestic insurance capabilities

WAY FORWARD

- ✓ Strengthen public-private insurance partnerships
- ✓ Invest in risk modelling/data systems
- ✓ Follow global maritime best practices
- ✓ Gradually expand coverage & capacity

The Union Government has recently approved the creation of the **Bharat Maritime Insurance Pool (BMI Pool)** to protect India's seaborne trade from global disruptions. The move comes amid rising geopolitical tensions, supply chain uncertainties, and increasing risks in international shipping routes.

ABOUT BMI POOL

The Bharat Maritime Insurance Pool is a **Centre-backed domestic maritime insurance mechanism** designed to ensure uninterrupted and affordable insurance coverage for India's shipping sector. It aims to reduce dependence on foreign insurers and enhance resilience during global crises such as wars, sanctions, or disruptions in key maritime routes.

The scheme is supported by a **sovereign guarantee of ₹12,980 crore**, reflecting the government's commitment to safeguarding maritime trade and strategic economic interests.

KEY FEATURES

- **Coverage Scope:** The BMI Pool will provide insurance for **Indian-flagged vessels, Indian-controlled ships**, and vessels carrying cargo to or from India, including those passing through high-risk or volatile maritime zones.
- **Types of Insurance Covered:** It offers comprehensive coverage, including:
 - Hull and machinery insurance
 - Cargo insurance
 - Protection and indemnity (P&I) insurance
 - War risk insurance
- **Duration:** The scheme will operate initially for **10 years**, with a provision for a **5-year extension**, ensuring long-term stability.
- **Government Support:** Backed by sovereign guarantee, it ensures financial strength and credibility, especially during crises when global insurers may withdraw or increase premiums.

NEED FOR THE SCHEME

India's economy is heavily dependent on maritime trade, with nearly **90% of trade by volume** carried through sea routes. However, global shipping faces multiple risks:

- Geopolitical conflicts affecting major shipping lanes
- Piracy and security threats
- Sanctions and insurance withdrawal by global players
- Rising insurance premiums in high-risk zones

The BMI Pool addresses these vulnerabilities by creating a **domestic risk-sharing mechanism**.

SIGNIFICANCE

- **Trade Security:** Ensures uninterrupted movement of goods even during global disruptions.
- **Self-Reliance:** Reduces dependence on foreign marine insurers, aligning with *Atmanirbhar Bharat*.
- **Cost Stability:** Helps stabilise insurance premiums during crises.
- **Capacity Building:** Develops domestic expertise in underwriting, risk assessment, and claims management.
- **Strategic Autonomy:** Strengthens India's ability to manage maritime risks independently.

CHALLENGES

- Building sufficient **technical expertise** in marine insurance
- Managing **high-risk claims**, especially war-related losses

- Ensuring **financial sustainability** of the pool
- Coordination among insurers and stakeholders

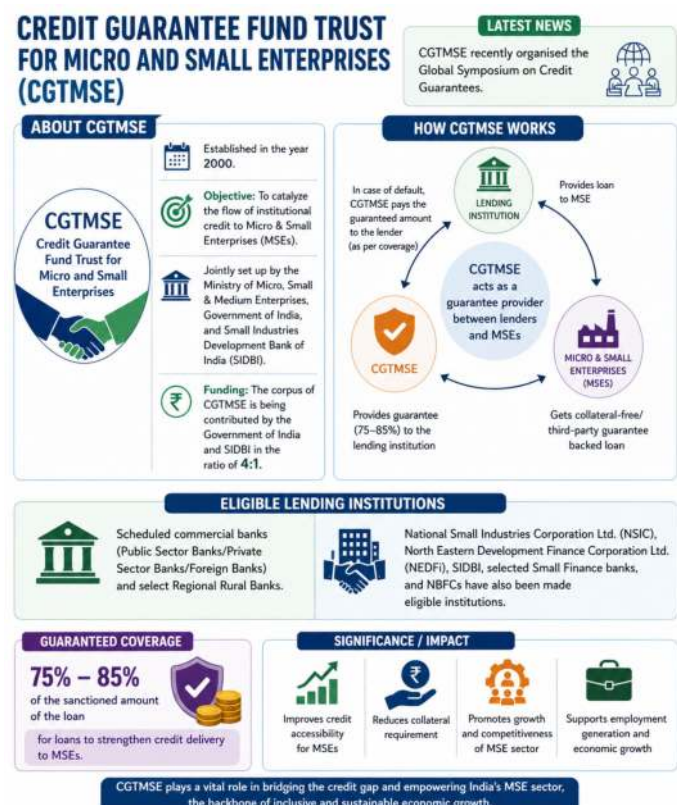
WAY FORWARD

- Strengthen **public-private partnerships** in insurance
- Invest in **risk modelling and maritime data systems**
- Align with global maritime standards and best practices
- Gradually expand coverage and capacity

CONCLUSION

The Bharat Maritime Insurance Pool represents a strategic step towards securing India's maritime trade and enhancing economic resilience. By ensuring reliable insurance coverage during uncertain times, it not only protects trade flows but also contributes to India's long-term goal of becoming a major global maritime power.

CREDIT GUARANTEE FUND TRUST FOR MICRO AND SMALL ENTERPRISES (CGTMSE) – STRENGTHENING CREDIT ACCESS FOR MSES



WHY IN NEWS

Recently, the Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) organised the **Global Symposium on Credit Guarantees**, highlighting its role in improving access to finance for Micro and Small Enterprises (MSEs) and promoting inclusive economic growth.

ABOUT CGTMSE

The CGTMSE was established in the year 2000 with the primary objective of catalyzing the flow of institutional credit to Micro and Small Enterprises. It was jointly set up by the Ministry of Micro, Small and Medium Enterprises and the Small Industries Development Bank of India (SIDBI).

The scheme addresses one of the most critical challenges faced by MSEs—**lack of collateral**, which often restricts their access to formal credit.

FUNDING AND STRUCTURE

The corpus of CGTMSE is jointly contributed by the Government of India and SIDBI in the ratio of **4:1**, reflecting strong public sector backing. The trust operates as a **credit guarantee mechanism**, reducing the risk for lending institutions and encouraging them to extend loans to small businesses.

HOW CGTMSE WORKS

CGTMSE provides a **credit guarantee cover of 75% to 85%** of the sanctioned loan amount to eligible lending institutions. In case of default by the borrower, the trust compensates the lender up to the guaranteed portion.

This mechanism ensures:

- Reduced risk for banks and financial institutions
- Increased willingness to lend to first-generation entrepreneurs
- Enhanced financial inclusion

ELIGIBLE LENDING INSTITUTIONS

A wide range of financial institutions are eligible under CGTMSE, including:

- Scheduled Commercial Banks (Public, Private, and Foreign Banks)
- Select Regional Rural Banks (RRBs)
- National Small Industries Corporation (NSIC)
- North Eastern Development Finance Corporation (NEDFi)
- SIDBI and selected Small Finance Banks
- Non-Banking Financial Companies (NBFCs)

This broad inclusion ensures deeper penetration of credit facilities across regions, especially in underserved and rural areas.

SIGNIFICANCE OF CGTMSE

1. Promoting Financial Inclusion

By removing the need for collateral, CGTMSE enables small entrepreneurs, especially from marginalized backgrounds, to access formal credit.

2. Boosting MSME Growth

Micro and Small Enterprises are the backbone of the Indian economy, contributing significantly to GDP, exports, and employment. The scheme supports their growth and competitiveness.

3. Encouraging Entrepreneurship

The availability of collateral-free loans fosters innovation and encourages new business ventures, particularly among youth and first-time entrepreneurs.

4. Employment Generation

As MSEs expand with better access to finance, they create more jobs, contributing to inclusive development.

CHALLENGES AND CONCERNS

Despite its success, CGTMSE faces certain challenges:

- **Rising NPAs:** Increased defaults can strain the guarantee fund.
- **Awareness Gaps:** Many small entrepreneurs remain unaware of the scheme.
- **Operational Delays:** Claim settlement and procedural delays can affect efficiency.
- **Risk Assessment Issues:** Lending institutions may still exercise caution due to credit risks.

RECENT DEVELOPMENTS

The Global Symposium on Credit Guarantees reflects India's intent to:

- Share best practices globally
- Strengthen credit guarantee frameworks
- Enhance resilience of MSME financing

WAY FORWARD

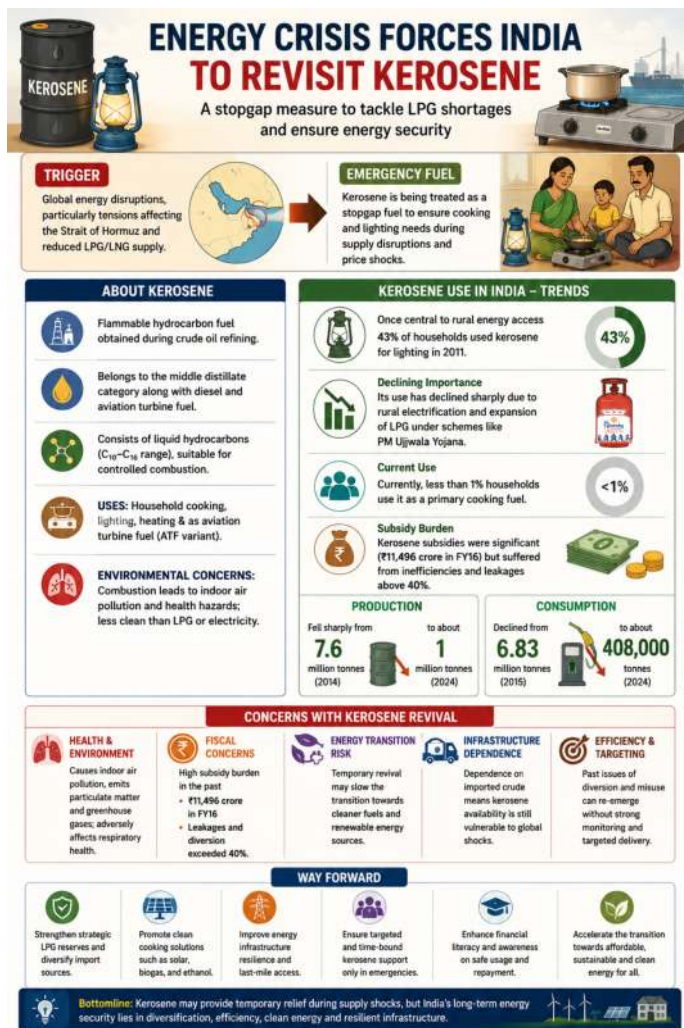
To improve effectiveness, the following steps are crucial:

- **Digital Integration:** Streamlining processes through digital platforms
- **Awareness Campaigns:** Expanding outreach to rural and semi-urban entrepreneurs
- **Improved Risk Management:** Strengthening credit appraisal and monitoring
- **Faster Claim Settlement:** Enhancing trust among lending institutions

CONCLUSION

The CGTMSE has emerged as a vital instrument in bridging the credit gap for Micro and Small Enterprises in India. By providing collateral-free credit support, it fosters entrepreneurship, promotes inclusive growth, and strengthens the MSME ecosystem. Continued reforms and efficient implementation will be key to maximizing its impact in the evolving economic landscape.

ENERGY CRISIS FORCES INDIA TO REVISIT KEROSENE



CONTEXT

India has temporarily reintroduced kerosene through the Public Distribution System (PDS) for 60 days due to disruptions in LPG and LNG supplies amid global energy tensions, especially around the Strait of Hormuz. The move reflects concerns over energy security and rising fuel prices.

ABOUT KEROSENE

Kerosene is a flammable hydrocarbon fuel derived during crude oil refining.

Key Features

- Belongs to the **middle distillate** category of petroleum products.
- Composed mainly of hydrocarbons in the **C10-C16 range**.
- Burns in a controlled manner, making it suitable for household and industrial use.

Major Uses

- Household cooking
- Lighting
- Heating
- Aviation Turbine Fuel (ATF variant)

However, kerosene combustion generates significant indoor air pollution and harmful emissions, making it less environmentally friendly than LPG or electricity.

WHY HAS INDIA REINTRODUCED KEROSENE?

1. Global Energy Disruptions

Geopolitical tensions affecting the Strait of Hormuz disrupted LPG and LNG supply chains, leading to shortages and rising prices.

2. Emergency Energy Security Measure

The government is treating kerosene as a temporary stopgap fuel to ensure uninterrupted cooking and lighting access, especially for vulnerable households.

3. Rural and Low-Income Dependence

In many remote regions, alternative clean fuels remain inaccessible or unaffordable during supply disruptions.

KEROSENE USE IN INDIA: TRENDS

Historical Importance

- In 2011, nearly **43% of households** used kerosene for lighting.
- It played a major role in rural energy access before widespread electrification.

Declining Usage

The importance of kerosene has sharply declined due to:

- Rural electrification
- Expansion of LPG access
- Pradhan Mantri Ujjwala Yojana

Currently, **less than 1% households** use kerosene as their primary cooking fuel.

FALLING PRODUCTION AND CONSUMPTION

Indicator	Earlier	Current
Production	7.6 million tonnes (2014)	~1 million tonnes (2024)
Consumption	6.83 million tonnes (2015)	~408,000 tonnes (2024)

Concerns Associated with Kerosene Revival

Environmental Concerns

- Causes indoor air pollution
- Emits particulate matter and greenhouse gases
- Adversely affects respiratory health

Fiscal Concerns

Kerosene subsidies historically imposed a major burden:

- Subsidy expenditure reached **₹11,496 crore in FY16**
- Leakages and diversion exceeded 40%

Energy Transition Concerns

Temporary revival of kerosene may slow the transition toward cleaner fuels and renewable energy sources.

WAY FORWARD

- Strengthen strategic LPG reserves and supply diversification.
- Expand renewable cooking solutions such as solar and biogas.
- Improve energy infrastructure resilience.
- Ensure targeted and temporary kerosene support only during emergencies.
- Accelerate universal access to affordable clean energy.

CONCLUSION

India's temporary return to kerosene highlights the continuing vulnerability of energy supply chains amid global geopolitical disruptions. While kerosene may provide short-term relief, long-term energy security lies in diversified imports, resilient infrastructure, and a sustained transition toward cleaner and sustainable fuels.

EXTENSION OF ROSCTL SCHEME TO BOOST TEXTILE EXPORTS

EXTENSION OF ROSCTL SCHEME TO BOOST TEXTILE EXPORTS
 Ministry of Textiles has extended the Rebate of State and Central Taxes and Levies (RoSCTL) Scheme for exports of apparel, garments and made-ups until **30 September 2026**.

ABOUT ROSCTL SCHEME

- Introduced in March 2019**
RoSCTL is an export rebate scheme introduced by the Ministry of Textiles.
- Predecessor**
It replaced the Rebate of State Levies (RoSL) and the Merchandise Exports from India Scheme (MEIS) to align textile export support with WTO norms.
- Purpose**
Scheme neutralises hidden domestic taxes so that such taxes are not exported along with goods.
- Implementation**
It is implemented by the Department of Revenue under the Ministry of Finance.

KEY FEATURES OF ROSCTL SCHEME

- TAX COVERAGE**
It reimburses non-GST embedded taxes, including:
 - State Levies:** Fuel VAT, Mandi tax, Electricity duty, Stamp duty
 - Central Levies:** Fuel excise and other central levies
- ELIGIBILITY**
RoSCTL covers exporters of:
 - Ready-made garments under HSN Chapters 61 and 62
 - Made-up textile products under HSN Chapter 63
- BENEFIT FORM**
Rebates are issued as transferable and tradable e-scripts via the ICEGATE portal.
- REDEMPTION**
Exporters may use these e-scripts to pay Basic Customs Duty on any imported goods.
- EXCLUSION**
The scheme is mutually exclusive with RoTEP. Exporters cannot claim both benefits on the same product.

TEXTILE SECTOR IN INDIA: AN OVERVIEW

- GDP SHARE:** The textile and garment sector contributes about **2%** to India's GDP and about **8%** to total merchandise exports.
- EMPLOYMENT:** It is the second-largest employer after agriculture, providing direct livelihoods to over **45 MILLION PEOPLE**.
- MARKET SIZE:** The domestic textile and apparel market is valued at **\$174 BILLION** and is projected to reach **\$350 BILLION** by 2030.
- EXPORT RANK:** India is the **6th LARGEST TEXTILE EXPORTER** with about **4%** share in the world textile trade.
- LARGEST SEGMENT:** Ready-Made Garments (RMG) forms the largest export segment, accounting for about **45%** of total textile exports.
- VISION 2030:** India aims for **\$100 BILLION** in textile and apparel exports by 2030, up from the current **\$37.7 BILLION**.
- FDI POLICY:** The sector permits **100% FOREIGN DIRECT INVESTMENT (FDI)** under the automatic route.

HOW ROSCTL SCHEME HELPS

- Reduces cost burden by refunding hidden taxes and levies.
- Enhances global competitiveness of Indian textile products.
- Supports employment generation in the labour-intensive sector.
- Boosts textile exports and foreign exchange earnings.
- Encourages investment and strengthens Make in India.

ROSCCTL EXTENSION = STRONGER EXPORTS, MORE JOBS, GREATER GROWTH
 BUILDING A VIBRANT, COMPETITIVE AND SELF-RELIANT TEXTILE SECTOR

INTRODUCTION

The Ministry of Textiles has extended the **Rebate of State and Central Taxes and Levies (RoSCTL) Scheme** for exports of apparel, garments, and made-up textile products until **30 September 2026**. The extension aims to enhance the global competitiveness of India's textile sector, support export growth, and generate employment in one of the country's most labour-intensive industries.

The scheme assumes greater importance at a time when India seeks to strengthen its position in global textile value chains amid rising international competition and shifting global supply chains.

ABOUT ROSCTL SCHEME

The **Rebate of State and Central Taxes and Levies (RoSCTL) Scheme** was introduced by the Ministry of Textiles in **March 2019**.

It provides rebates on embedded taxes and levies that are not refunded under the Goods and Services Tax (GST) framework.

OBJECTIVE OF THE SCHEME

The primary objective of RoSCTL is to ensure that hidden domestic taxes are not exported along with goods.

The scheme helps Indian textile exporters remain globally competitive by neutralising taxes that increase production costs.

It supports the principle of:

“Taxes should not be exported.”

EVOLUTION OF THE SCHEME

RoSCTL replaced:

- **Rebate of State Levies (RoSL)**
- **Merchandise Exports from India Scheme (MEIS)**

The replacement was necessary to align India's export support measures with **World Trade Organization (WTO)** norms.

The WTO discourages direct export subsidies linked to export performance. RoSCTL was therefore designed as a tax-neutralisation mechanism rather than a direct subsidy.

KEY FEATURES OF ROSCTL

1. Coverage of Hidden Taxes

The scheme reimburses embedded non-GST taxes and levies that are otherwise not refunded.

State Taxes Covered

- VAT on fuel
- Mandi tax
- Electricity duty
- Stamp duty

Central Levies Covered

- Fuel excise duties
- Other embedded taxes

This reduces the cost burden on exporters.

2. Eligible Export Categories

RoSCTL applies to:

- Ready-made garments under **HSN Chapters 61 and 62**
- Made-up textile products under **HSN Chapter 63**

The scheme mainly benefits India's labour-intensive apparel export sector.

3. Implementation Mechanism

The scheme is implemented by the **Department of Revenue under the Ministry of Finance**.

Rebates are issued in the form of:

- **Transferable**
- **Tradable e-scrips**

through the **ICEGATE portal**.

4. Utilisation of e-Scrips

Exporters can use these e-scrips to pay:

- Basic Customs Duty on imported goods

Since the scrips are transferable, exporters can also trade them in the market, improving liquidity.

5. Mutual Exclusivity with RoDTEP

RoSCTL and the **Remission of Duties and Taxes on Exported Products (RoDTEP)** scheme are mutually exclusive.

Exporters cannot claim benefits under both schemes for the same product.

IMPORTANCE OF INDIA'S TEXTILE SECTOR

The textile and garment industry is one of India's most significant manufacturing sectors.

Economic Contribution

- Contributes around **2% to India's GDP**
- Accounts for nearly **8% of total merchandise exports**

Employment Generation

The sector is the:

- **Second-largest employer after agriculture**

It provides direct livelihoods to over:

- **45 million people**

including large numbers of women and rural workers.

Expanding Domestic Market

India's textile and apparel market is valued at:

- **\$174 billion**

and is projected to reach:

- **\$350 billion by 2030**

The growth is driven by:

- Rising incomes
- Urbanisation
- Fashion demand
- E-commerce expansion

India's Position in Global Trade

India is the:

- **6th largest textile exporter globally**

with nearly:

- **4% share in world textile trade**

Ready-Made Garments (RMG) constitute the largest export segment, contributing around:

- **45% of total textile exports**

SIGNIFICANCE OF EXTENDING ROSCTL

1. Enhancing Export Competitiveness

The scheme lowers export costs by refunding hidden taxes, making Indian textile products more price competitive globally.

This is especially important against competitors such as:

- Bangladesh
- Vietnam
- China

2. Supporting Employment

Since the textile sector is labour-intensive, export growth under RoSCTL can generate large-scale employment opportunities, particularly for:

- Women
- MSMEs
- Rural workers

3. Boosting Foreign Exchange Earnings

Higher textile exports can strengthen India's foreign exchange reserves and improve trade performance.

India aims to achieve:

- **\$100 billion textile and apparel exports by 2030** up from the current level of around:
- **\$37.7 billion**

4. Encouraging Investment

The textile sector allows:

- **100% Foreign Direct Investment (FDI) under the automatic route**

Policy stability through RoSCTL extension can attract both domestic and foreign investment.

5. Strengthening Make in India

RoSCTL supports the broader objectives of:

- Make in India
- Atmanirbhar Bharat
- Export-led manufacturing growth

CHALLENGES FACING THE TEXTILE SECTOR

Despite government support, the sector faces several challenges:

- Intense global competition
- Rising input and logistics costs
- Dependence on imported synthetic fibres
- Compliance with sustainability standards
- Fragmented manufacturing structure
- Slow technological modernisation

Addressing these issues is essential for sustaining export growth.

WAY FORWARD

To fully realise the sector's export potential, India needs to:

- Modernise textile manufacturing
- Improve logistics infrastructure
- Promote technical textiles
- Strengthen FTAs with major markets

- Enhance sustainability and green manufacturing
 - Develop integrated textile parks under PM MITRA
- A stable and WTO-compliant export support framework will remain critical.

CONCLUSION

The extension of the RoSCTL scheme till September 2026 reflects the government's commitment to strengthening India's textile exports and supporting employment-intensive manufacturing. By neutralising hidden taxes, the scheme improves global competitiveness and helps Indian exporters compete effectively in international markets.

As India targets becoming a global textile manufacturing hub and aims for \$100 billion textile exports by 2030, RoSCTL will continue to play a crucial role in promoting export growth, investment, and inclusive economic development.

INDONESIA'S B50 BIOFUEL POLICY AND ITS IMPLICATIONS FOR INDIA

INDONESIA'S B50 BIOFUEL
Global Energy Shift, Local Impact on India
Indonesia rolls out B50 biofuel (50% palm oil biodiesel + 50% diesel) to cut oil imports and boost energy security amid rising oil prices.

WHAT IS B50 BIOFUEL?
A biodiesel blend containing 50% palm oil based biodiesel and 50% diesel.
Indonesia's Biodiesel Blending Journey: B20 (2015) → B30 (2016) → B40 (2020) → B50 (2026)

DRIVERS BEHIND INDONESIA'S B50 PUSH
Reduce Crude Oil Imports: Indonesia spent ~\$7.8 billion on crude oil imports in 2025. B50 cuts import dependence and saves foreign exchange.
Clean Energy Transition: Part of green energy roadmap; Sustainable Aviation Fuel (SAF) from 2027 (1% blend in aviation fuel).
Support Domestic Palm Oil Industry: Absorbs surplus production, supports farmers and stabilizes prices as export markets face environmental curbs.

IMPACT ON GLOBAL VEGETABLE OIL MARKETS
Indonesia is the world's largest palm oil producer and exporter, accounting for ~50% of global palm oil exports.
B50 policy will divert a significant portion of palm oil from exports to domestic biodiesel use.
Global supply tightens → Higher international palm oil prices and market volatility.

IMPLICATIONS FOR INDIA – A MAJOR IMPORTER
Higher Cooking Oil Prices: Increased import costs, higher household expenditure, food inflation.
Inflation Pressure: Edible oil inflation impacts overall CPI, higher subsidy burden, hits lower-income households more.
Industrial Cost Escalation: Food processing, soaps, cosmetics, agrochemicals face higher input costs, passed on to consumers.

LIMITED ALTERNATIVES FOR INDIA
Sunflower Oil (Russia, Ukraine): More expensive, limited availability, longer supply chains.
Soybean Oil (Argentina, Brazil): More expensive, limited availability, longer supply chains.
Mustard Oil (Domestic Option): Limited scalability, region-specific consumption.

WHY INDIA IMPORTS LARGE VOLUMES OF VEGETABLE OILS
Low Oilseed Productivity: Yields per hectare are below global standards.
Policy Bias Towards Cereals: MSP incentives favour wheat & rice → lower acreage & investment in oilseeds.
Rising Demand: Population growth, urbanisation & changing diets drive higher consumption.

CLIMATE IMPACT OF PALM OIL BIODIESEL – A MIXED OUTCOME
Potential Benefits: If produced from existing plantations, with productivity gains, sustainable practices. → Can reduce dependence on fossil fuels & lower emissions.
Environmental Risks: If expansion leads to deforestation, conversion of carbon-rich land, habitat destruction. → Emissions may offset or exceed climate benefits.
Sustainability standards and zero-deforestation are critical to ensure biofuel remains climate-positive.

INDIA'S CONSTRAINTS IN BIOFUEL EXPANSION
Limited land availability, Lower agricultural productivity, Food security concerns, Water stress.
Large-scale diversion of crops for biofuel may create trade-offs between energy security and food security.

POTENTIAL UPSIDE FOR INDIA
Higher global prices may encourage domestic oilseed production.
Better price realization for farmers and strengthening of India's edible oil value chain over time.

THE WAY FORWARD
Improve domestic oilseed productivity and yield, Diversify import sources and long-term supply partnerships, Strengthen edible oil self-reliance mission, Balance climate goals with food security and affordability, Promote sustainable biofuel with global sustainability norms.

BOTTOM LINE
Indonesia's B50 policy strengthens its energy security but tightens global palm oil supply. For India, it underscores the need for self-reliance, diversification and sustainable growth to manage inflation and ensure long-term food and energy security.

INTRODUCTION

Indonesia has announced the rollout of B50 biofuel, a fuel blend containing 50% palm oil-based biodiesel and 50% diesel. The decision comes amid rising global crude oil prices triggered by geopolitical tensions, particularly the Iran conflict.

The policy reflects Indonesia's efforts to improve energy security, reduce crude oil imports, and promote clean energy. However, since Indonesia is the world's largest exporter of palm oil, the move has major implications for global edible oil markets, especially for countries like India, which heavily depend on Indonesian palm oil imports.

WHAT IS B50 BIOFUEL?

B50 is a biodiesel blend consisting of:

- 50% palm oil-based biodiesel
- 50% conventional diesel

Biodiesel is a renewable fuel produced from vegetable oils or animal fats and is considered an alternative to fossil fuels.

Indonesia has gradually increased biodiesel blending targets:

- B20 → 20% biodiesel
- B30 → 30% biodiesel
- B40 → 40% biodiesel
- B50 → 50% biodiesel

The latest expansion marks one of the world's most ambitious biofuel programmes.

DRIVERS BEHIND INDONESIA'S B50 POLICY

1. Reducing Crude Oil Imports

Indonesia spent nearly **\$7.8 billion on crude oil imports in 2025**. By replacing diesel with biodiesel, the country aims to:

- Reduce import dependence
- Improve energy security
- Lower foreign exchange outflows

The urgency has increased as global crude oil prices crossed \$100 per barrel due to geopolitical tensions.

2. Advancing Clean Energy Transition

The B50 programme is part of Indonesia's broader green energy roadmap.

The country also plans to introduce:

- Sustainable Aviation Fuel (SAF) from 2027
- Biofuel integration in aviation and transport sectors

This positions Indonesia as a major regional player in renewable fuel development.

3. Supporting Domestic Palm Oil Industry

Indonesia is the world's largest palm oil producer and exporter.

Increasing domestic biodiesel consumption helps:

- Absorb surplus production
- Stabilise palm oil prices
- Support farmers and plantation owners

The move is especially important as export markets face restrictions due to environmental regulations, particularly from the European Union concerning deforestation-linked imports.

IMPACT ON GLOBAL VEGETABLE OIL MARKETS

Indonesia accounts for nearly half of global palm oil exports. Diverting a significant portion of palm oil toward biodiesel production is expected to tighten global supply.

Likely Outcomes

- Increase in international palm oil prices
- Reduced export availability
- Greater volatility in vegetable oil markets

Since palm oil is widely used in food products, cosmetics, soaps, and industrial applications, the impact may extend across sectors globally.

IMPLICATIONS FOR INDIA

India is among the world's largest importers of edible oils and imports more than 50% of its palm oil requirements from Indonesia.

India imports nearly **\$8.5 billion worth of palm oil annually**, making it highly vulnerable to supply disruptions.

1. Rising Cooking Oil Prices

Reduced exports from Indonesia could increase import costs, leading to:

- Higher household expenditure
- Increased food inflation
- Rising prices of processed food products

Palm oil is extensively used in:

- Cooking oils
- Packaged foods
- Bakery products
- Soaps and detergents

2. Pressure on Inflation

Edible oil inflation directly affects India's retail inflation because cooking oil is an essential household commodity.

Higher import costs may:

- Increase Consumer Price Index (CPI) inflation
- Raise subsidy burdens
- Affect lower-income households disproportionately

3. Industrial Cost Escalation

Industries dependent on palm oil derivatives such as:

- Food processing
- Cosmetics
- Oleochemicals
- Personal care products

may face higher input costs, which could eventually be passed on to consumers.

LIMITED ALTERNATIVES FOR INDIA

India can diversify imports toward:

- Sunflower oil from Russia and Ukraine
- Soybean oil from Argentina and Brazil

However, these alternatives face several constraints:

- Higher prices
- Limited supply volumes
- Longer supply chains
- Greater geopolitical risks

DOMESTIC ALTERNATIVE: MUSTARD OIL

Mustard oil serves as a domestic substitute but faces limitations:

- Region-specific consumption
- Limited scalability
- Lower production levels

Thus, replacing palm oil completely remains difficult.

WHY INDIA DEPENDS ON VEGETABLE OIL IMPORTS

India's edible oil imports stem from structural agricultural issues:

Low Oilseed Productivity

Oilseed yields per hectare remain below global standards.

Policy Bias Toward Cereals

Minimum Support Price (MSP) incentives historically favoured:

- Wheat
- Rice

This reduced incentives for oilseed cultivation.

Rising Demand

Population growth, urbanisation, and changing food

habits have steadily increased edible oil consumption.

Climate Impact of Palm Oil Biodiesel

Palm oil biodiesel presents both opportunities and risks.

Positive Aspects

If produced through:

- Existing plantations
- Productivity improvements
- Sustainable practices

biofuels can reduce dependence on fossil fuels and lower emissions.

Environmental Risks

However, if biodiesel expansion causes:

- Deforestation
- Conversion of carbon-rich forests
- Habitat destruction

the environmental costs may outweigh climate benefits.

India's Constraints in Biofuel Expansion

India faces unique challenges in expanding biofuel production:

- Limited land availability
- Lower agricultural productivity
- Food security concerns
- Water stress

Large-scale diversion of crops toward biofuel production may create trade-offs between energy security and food security.

CONCLUSION

Indonesia's B50 biofuel programme demonstrates how global energy transitions can directly affect food security and inflation in interconnected economies like India. While the policy strengthens Indonesia's energy security and supports its palm oil sector, it also tightens global edible oil supplies and raises import costs for major buyers.

For India, the development highlights the urgent need to:

- Improve domestic oilseed productivity
- Diversify import sources
- Strengthen edible oil self-reliance
- Balance climate goals with food security concerns

A long-term strategy combining agricultural reform, supply diversification, and sustainable biofuel development will be essential to reduce vulnerability to global commodity shocks.

LESSONS FROM SMARTPHONE PLI FOR INDIA'S INDUSTRIAL POLICY



India's success in the smartphone sector under the Production Linked Incentive Scheme has emerged as a major example of export-led manufacturing growth. The experience is now being viewed as a model for strengthening India's broader industrial policy and transforming the country into a global manufacturing hub.

The PLI scheme was launched in 2020 under the Atmanirbhar Bharat Abhiyan to encourage domestic manufacturing, attract investments, reduce import dependence, and boost exports.

WHAT IS THE PLI SCHEME?

The PLI scheme is a performance-based incentive programme in which companies receive financial incentives based on incremental production and sales over a base year.

Key features include:

- Coverage of 14 sectors such as electronics, pharmaceuticals, telecom, automobiles, textiles, and solar modules.
- Total allocation of nearly ₹1.97 lakh crore.
- Focus on creating global manufacturing competitiveness.

However, only around 10% of allocated funds have been disbursed so far, indicating uneven implementation across sectors.

SUCCESS OF SMARTPHONE MANUFACTURING

The smartphone PLI scheme has been one of the most successful industrial initiatives in recent years.

Key Achievements

- Export Growth:** Mobile phone exports increased dramatically:
 - From **\$3.1 billion in 2020**
 - To nearly **\$24 billion in FY2025**
 India's global share in smartphone exports rose from **1% to 8%**.
- Manufacturing Scale**
Production nearly doubled:
 - From **\$30 billion**
 - To around **\$64 billion**
 India has now become the world's second-largest mobile phone manufacturing country.
- Employment Generation**
The sector generated nearly:
 - **1.5-2 lakh jobs**
 The labour-intensive assembly ecosystem helped utilise India's demographic advantage.
- Integration into Global Value Chains**
The success was driven by:
 - Large global firms,
 - Export orientation,
 - Competitive assembly operations,
 - Improved logistics and policy support.

LESSONS FOR INDUSTRIAL POLICY

The smartphone experience offers several important lessons for expanding PLI success to other sectors.

1. Export-Led Growth

Future PLI schemes should focus on integrating India into global value chains instead of relying mainly on import substitution.

2. Assembly-First Strategy

Prioritising downstream manufacturing and final assembly can rapidly create jobs and scale production before moving into deeper component manufacturing.

3. Lower Input Costs

Reducing tariffs and non-tariff barriers on components and raw materials can improve competitiveness and exports.

4. Ease of Doing Business

Industrial growth requires:

- Faster approvals,
- Better logistics,

- Stable policy environment,
- Strong Centre-State coordination.

5. Focus on Labour-Intensive Sectors

PLI support should prioritise sectors such as:

- Textiles,
- Footwear,
- Toys,
- Electronics,
- Telecom equipment.

These sectors can generate large-scale employment and boost exports.

CONCLUSION

The smartphone PLI scheme demonstrates that targeted incentives, export orientation, and integration with global supply chains can significantly enhance India's manufacturing capabilities. Replicating these lessons across labour-intensive sectors can help India achieve sustainable industrial growth, employment generation, and greater global competitiveness.

MINERALS CONCESSION RULES (SECOND AMENDMENT), 2026

MINERALS CONCESSION RULES (SECOND AMENDMENT), 2026



Context (PIB): Ministry of Mines recently notified the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession (Second Amendment) Rules, 2026.

Objective: Optimise mineral allocation and operational efficiency to increase domestic production of critical and deep-seated minerals.

Significance: The amendment complements the MMDR (Amendment) Act, 2025, to cut delays and strengthen India's mineral self-reliance.



KEY PROVISIONS

	<p>1. AREAL CAP > Contiguous area inclusion capped at 10% (Mining Lease) and 30% (Composite Licence), to ensure viable extraction of deep-seated minerals like gold, copper, and lithium.</p>	
	<p>2. CRITICAL MINERALS > Mandated that State Governments must approve the inclusion of these minerals within 30 days of application.</p>	
	<p>3. RECLASSIFICATION > If a major mineral is found in a minor mineral block, the area must be re-auctioned as a major mineral block.</p>	
	<p>4. EXPLORATION MANDATE > Mining leases for minor minerals (excluding sand) require G3 level preliminary exploration proving commercial viability for approval.</p>	
	<p>5. CAPTIVE SALES > Removes previous restrictions, allowing surplus mineral sales from captive mines after end-use plant requirements are met.</p>	

EXPECTED IMPACT



Increased domestic production of critical and deep-seated minerals



Faster clearances and reduced delays



Strengthened regulatory clarity and governance



Stronger mineral self-reliance and Atmanirbhar Bharat

Overall: The amendment streamlines mineral concession processes, promotes efficient utilisation of mineral resources, and supports India's transition towards a self-reliant mineral ecosystem.

CONTEXT

The Ministry of Mines recently notified the **Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession (Second Amendment) Rules, 2026**. The amendment aims to improve operational efficiency, optimise mineral allocation, and boost domestic production of critical and deep-seated minerals.

The reforms complement the **MMDR (Amendment) Act, 2025**, which focuses on reducing procedural delays and strengthening India's mineral self-reliance.

WHY IS THE AMENDMENT IMPORTANT?

India is heavily dependent on imports for several critical minerals such as lithium, cobalt, copper, and nickel, which are essential for:

- Electric vehicles (EVs),
- Renewable energy systems,
- Electronics and semiconductors,
- Defence and strategic industries.

The amendment seeks to accelerate mineral exploration and ensure efficient utilisation of domestic resources.

KEY PROVISIONS OF THE AMENDMENT

1. Areal Cap for Contiguous Areas

- Contiguous area inclusion is capped at:
 - **10% for Mining Lease (ML),**
 - **30% for Composite Licence (CL).**
- The provision ensures economically viable extraction of deep-seated minerals like gold, copper, and lithium.

2. Faster Approval for Critical Minerals

- State Governments are mandated to approve the inclusion of critical minerals within **30 days** of application.
- This reduces delays and encourages investment in exploration.

3. Reclassification of Mineral Blocks

- If a major mineral is discovered in a minor mineral block, the area must be re-auctioned as a major mineral block.
- This ensures transparency and maximises revenue generation.

4. Exploration Mandate

- Mining leases for minor minerals (except sand) require **G3 level preliminary exploration** to establish commercial viability before approval.
- This improves scientific mining and reduces speculative allocation.

5. Liberalisation of Captive Mines

- The amendment removes earlier restrictions on surplus mineral sales.

- Captive mine operators can now sell excess minerals in the market after fulfilling end-use plant requirements.
- This promotes efficient utilisation of mineral resources.

Significance

The amendment is expected to:

- Boost domestic production of critical minerals,
- Reduce import dependence,
- Encourage private investment in mining,
- Strengthen supply chains for clean energy technologies,
- Improve transparency and scientific exploration.

The reforms support India's long-term goal of achieving mineral security and becoming self-reliant in strategic resources.

NATIONAL MINERAL EXPLORATION AND DEVELOPMENT TRUST (NMET): OFFSHORE EXPLORATION PUSH

NATIONAL MINERAL EXPLORATION & DEVELOPMENT TRUST (NMET)
OFFSHORE EXPLORATION PUSH

ABOUT NMET

- ✓ Statutory body under Mines and Minerals (Development & Regulation) Amendment Act, 2015
- ✓ Promotes systematic & scientific mineral exploration
- ✓ Reduces geological uncertainty via reliable data
- ✓ Focuses on strategic, critical, and seabed minerals

STRUCTURE & FUNDING

Two-Tier Structure

- Governing Body:** Chaired by Union Minister of Mines
- Executive Committee:** Headed by the Secretary, Ministry of Mines

KEY FUNCTIONS

- Regional & detailed mineral exploration
- Funding advanced mineral studies
- NMET Fund from 2% of royalty payments by mining lease holders

WAY FORWARD

- ✓ R&D in advanced technologies
- ✓ Build public private partnerships
- ✓ Ensure environmental safeguards
- ✓ Skill development & capacity building

CHALLENGES

- Technology & cost barriers
- Environmental impact
- National core repository for research

Seabed Mineral Resources

- Polymetallic Nodules (Nickel, Cobalt, Manganese)
- Rare Earth Elements
- Polymetallic Sulphides

The Parliamentary Standing Committee on Coal, Mines and Steel, in its 23rd report, has highlighted **offshore mineral exploration** as a “significant opportunity” for India. The recommendation brings renewed focus on the role of the **National Mineral Exploration and Development Trust (NMET)** in tapping **largely untapped seabed mineral resources**.

ABOUT NMET

The National Mineral Exploration and Development Trust (NMET) is a statutory body established under the Mines and Minerals (Development and Regulation) Amendment Act, 2015. It was created by the Central Government to promote **systematic and scientific mineral exploration** across the country.

The objective of NMET is to reduce geological uncertainty and encourage private sector participation by generating reliable exploration data, especially for **deep-seated and concealed mineral deposits**.

STRUCTURE OF NMET

NMET follows a **two-tier institutional structure**:

- **Governing Body (Apex Body):**

Chaired by the Union Minister of Mines, it provides overall policy direction and control.

- **Executive Committee:**

Headed by the Secretary, Ministry of Mines, it is responsible for the implementation and management of NMET activities.

This structure ensures both strategic oversight and efficient execution of exploration projects.

FUNDING MECHANISM

To carry out its activities, NMET is supported by a dedicated fund:

- The **NMET Fund** receives contributions from holders of mining leases and prospecting licence-cum-mining leases.
- An amount equivalent to **2% of royalty payments** (as per the MMDR Act) is deposited into the fund.

This creates a sustainable financial mechanism for long-term exploration activities.

KEY FUNCTIONS OF NMET

NMET plays a crucial role in strengthening India's mineral sector:

- **Exploration of minerals:** Conducts regional and detailed exploration of mineral resources.
- **Funding advanced studies:** Supports projects for identifying, extracting, beneficiating, and refining minerals.
- **Focus on critical minerals:** Promotes exploration of **strategic and critical minerals** essential for industries like electronics, defence, and renewable energy.

- **Technology adoption:** Encourages modern scientific and technological practices in mining and metallurgy.
- **Data repository:** Facilitates the creation of a **national core repository** for geological data and research.

OFFSHORE EXPLORATION: A NEW FRONTIER

The Standing Committee's emphasis on offshore exploration reflects a shift towards **deep-sea resource utilisation**. India's vast coastline and Exclusive Economic Zone (EEZ) hold significant potential for minerals such as:

- Polymetallic nodules (rich in nickel, cobalt, manganese)
- Rare earth elements
- Other strategic minerals critical for clean energy technologies

Harnessing these resources can enhance **resource security**, reduce import dependence, and support emerging sectors like electric mobility and renewable energy.

CHALLENGES

Despite its potential, offshore exploration faces several challenges:

- **Technological constraints** in deep-sea mining
- **High costs** and long gestation periods
- **Environmental concerns**, including marine ecosystem disruption
- **Regulatory and governance issues**

WAY FORWARD

To maximise benefits, India must:

- Invest in **advanced exploration technologies**
- Strengthen **public-private partnerships**
- Ensure **environmental safeguards and sustainability**
- Build **institutional capacity and skilled manpower**
- Align NMET's efforts with national initiatives like critical mineral missions

CONCLUSION

NMET plays a pivotal role in strengthening India's mineral exploration ecosystem. The focus on offshore exploration marks a strategic shift towards securing future mineral needs. With the right balance between development and sustainability, NMET can significantly contribute to India's economic growth, energy transition, and resource security.

RBI BAN ON NON-DELIVERABLE DERIVATIVES (NDDS)



CONTEXT

- RBI has banned banks from engaging in Non-Deliverable Derivative (NDD) contracts to curb rupee volatility.
- Objective:** To reduce speculative trading and stabilise the rupee, which was under pressure due to rising oil prices and global uncertainties.
- The ban is likely to reduce short-term volatility and strengthen the currency market. Following the ban, the rupee appreciated from below ₹95 to ~₹93/USD.
- The move aligns India's forex practices with international accounting and regulatory standards.

IMPACT OF THE BAN

- Reduction in speculative activity and short-term volatility
- Strengthening of the rupee and improved market confidence
- Better alignment with international regulatory and accounting standards

RUPEE MOVEMENT (USD)

Before Ban	After Ban
< ₹95	~ ₹93

WHAT IS A NON-DELIVERABLE DERIVATIVE (NDD)?

A Non-Deliverable Derivative (NDD) is a financial contract where parties agree on an exchange rate, but no actual currency is exchanged.

KEY FEATURES

- Traded in offshore financial centres like Singapore & London
- No physical delivery of rupees
- Used for hedging currency risk or speculating on rupee movements
- NDD markets can influence exchange rate expectations and cause volatility, diverging from the domestic market

WHY DID RBI BAN NDDs?

- Controlling Rupee Volatility:** Speculative activity in offshore NDD markets influences rupee expectations and increases volatility.
- Preventing Excessive Speculation:** Curbing bets on the rupee that have no underlying real economic activity.
- Strengthening Domestic Forex Market:** Channels forex activity towards regulated domestic markets under RBI's supervision.
- Ensuring Financial Stability:** Reduces systemic risks arising from global uncertainties, volatile oil prices and capital flows.

INITIATIVES TO STRENGTHEN MATURITY AND STABILITY OF FOREX MARKET

Jamini Suraksha Yojana (JSY) Conditional cash transfer scheme promoting institutional deliveries.	Jamini Shiksha Suraksha Karyakram (JSKS) Provides free delivery (including C-section), medicines, diagnostics, transport and food.	Pradhan Mantri Surakshit Matritva Abhiyan (PM-SMA) Ensures free antenatal check-ups on the 9th of every month; early detection of high-risk pregnancies.	Surakshit Matritva Aashwasan (SMAA) Guarantees free, respectful and quality maternal healthcare services with zero tolerance for denial of care.	Labour Room Quality Improvement (LRQI) Improves quality of care in labour rooms and maternity operation theatres, reducing preventable maternal deaths.	Pradhan Mantri Matru Vandana Yojana (PM-MVY) Provides maternity benefits (cash incentives) to support nutrition and health of pregnant and lactating mothers.
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CONCLUSION

RBI's ban on Non-Deliverable Derivatives is a decisive step towards safeguarding rupee stability, reducing speculative pressures and ensuring a more transparent and well-regulated forex market in India.

The Reserve Bank of India (RBI) recently prohibited banks from engaging in Non-Deliverable Derivative (NDD) contracts to contain volatility in the Indian rupee. The decision comes amid pressure on the rupee due to rising crude oil prices, global financial uncertainties, and speculative trading in offshore currency markets.

The move reflects the RBI's broader objective of ensuring stability in India's foreign exchange market while aligning domestic forex practices with international regulatory and accounting standards.

WHAT ARE NON-DELIVERABLE DERIVATIVES (NDDS)?

A Non-Deliverable Derivative (NDD) is a financial contract in which two parties agree on a future exchange rate for a currency, but no actual exchange of currency takes place.

Instead, the contract is settled in cash — usually in US dollars — based on the difference between:

- The pre-agreed exchange rate, and
- The prevailing market exchange rate at maturity.

Thus, NDDs are essentially cash-settled derivative contracts linked to currency movements.

Example

If an investor enters into an NDD contract expecting rupee depreciation and the rupee weakens more than the agreed rate, the investor earns profit through cash settlement without physically exchanging rupees.

FEATURES OF NDDS

Offshore Trading

NDDs are primarily traded in offshore financial centres such as:

- Singapore
- London

These markets operate outside the direct jurisdiction of Indian regulators.

No Physical Delivery

Unlike regular currency derivatives, NDDs do not involve actual transfer of rupees, making them attractive for speculative trading.

Hedging and Speculation

NDDs are used by:

- Foreign investors for hedging currency risk
- Traders and hedge funds for speculation on rupee movements

WHY DID RBI BAN NDDS?

Controlling Rupee Volatility

Speculative activity in offshore NDD markets often influences expectations regarding the rupee's value. Large speculative positions can increase exchange rate volatility and create divergence between offshore and domestic currency markets.

Preventing Excessive Speculation

Speculative trading involves buying or selling assets purely to profit from short-term price fluctuations without any underlying real economic transaction. The RBI aims to curb such speculative pressures on the rupee.

Strengthening Domestic Forex Market

By restricting bank participation in offshore NDD markets, the RBI seeks to channel forex activity toward

regulated domestic markets under its supervision.

Ensuring Financial Stability

Global uncertainties, volatile oil prices, and capital flow fluctuations can amplify currency instability. The RBI's action is intended to reduce systemic risks and maintain investor confidence.

IMPACT OF THE RBI DECISION

Appreciation of Rupee

Following the announcement, the rupee appreciated from below ₹95 per US dollar to around ₹93 per dollar, indicating improved market confidence and reduced speculative pressure.

Reduced Short-Term Volatility

The ban is expected to stabilise the foreign exchange market by limiting speculative bets against the rupee.

Better Regulatory Alignment

The move aligns India's forex practices with international accounting and prudential standards, improving transparency and oversight.

CONCERNS AND CHALLENGES

Despite its benefits, the ban may also create certain concerns:

- Reduced participation in offshore markets could affect market liquidity.
- Foreign investors may face limitations in hedging currency risks.
- Offshore markets may continue influencing rupee expectations indirectly.

Therefore, balancing market stability with adequate hedging mechanisms remains essential.

CONCLUSION

The RBI's ban on Non-Deliverable Derivatives reflects its proactive approach toward safeguarding currency stability and reducing speculative pressures on the rupee. While the measure may strengthen domestic forex regulation and reduce short-term volatility, sustained stability will depend on strong macroeconomic fundamentals, prudent monetary policy, and effective market supervision.

SCIENCE & TECHNOLOGY | SPACE | INNOVATION

GS PAPER 3

CERIUM-MAGNESIUM CHANGESITE – EXPANDING THE FRONTIERS OF LUNAR GEOLOGY



AT A GLANCE

- Newly discovered lunar mineral, the 11th known lunar mineral.
- Found in lunar meteorite Pahepake 005, the first of its kind to have fallen within China.
- A single spherical meteorite weighing 44 grams, with a dark molten outer shell.
- The mineral is colourless, transparent and brittle.
- Extremely small grain sizes ranging from 3 to 25 micrometres, most particles < 10 micrometres.
- Despite its tiny size, it holds significant scientific value due to its unique chemical and structural properties.

KEY FEATURES

FLUORESCENT BEHAVIOUR	UNIQUE CHEMICAL COMPOSITION	STRUCTURAL VARIATIONS	MICROSCOPIC SIZE
<p>Emits light under certain conditions.</p> <p>Potential applications in advanced technologies, especially next-generation LED materials.</p>	<p>Contains rare earth element Cerium, along with Magnesium and Iron.</p> <p>Rare earth element ratios provide clues about the Moon's surface and interior processes.</p>	<p>Variations in crystal structure help researchers understand how lunar minerals form and evolve under extreme conditions.</p>	<p>Grain sizes 3 to 25 micrometres, most < 10 micrometres.</p> <p>Requires advanced instruments for detection and analysis.</p>

SCIENTIFIC SIGNIFICANCE

INSIGHTS INTO LUNAR EVOLUTION	CONTRIBUTION TO PLANETARY SCIENCE	TECHNOLOGICAL POTENTIAL	ADVANCES SAMPLE SCIENCE
<ul style="list-style-type: none"> Helps decode lunar magma processes Understands volcanic activity on the Moon Reveals cooling history of lunar rocks 	<ul style="list-style-type: none"> Enhances knowledge of extraterrestrial mineralogy Helps compare Earth and Moon geology Aids understanding of early Solar System evolution 	<ul style="list-style-type: none"> Fluorescent property useful in next-generation LED materials Potential in optical, sensing and other advanced applications 	<ul style="list-style-type: none"> Study of micro-sized minerals pushes boundaries of analytical techniques Provides data on mineral formation in low-gravity environments

THE METEORITE: PAHEPAKE 005	CHALLENGES IN STUDY	GLOBAL CONTEXT
<ul style="list-style-type: none"> Spherical shape - 44 grams Dark molten outer shell Believed to be a piece of the Moon ejected by an impact event Fell to Earth and recovered in China 	<ul style="list-style-type: none"> Microscopic size makes isolation and analysis difficult Limited samples restrict extensive research Extreme lunar formation conditions are hard to replicate in labs Complex composition requires advanced instruments and methods 	<p>This discovery complements global lunar exploration efforts</p> <p>Such discoveries strengthen the importance of lunar exploration for scientific discovery and future resource utilization.</p>

DID YOU KNOW?

- Lunar meteorites are rare rocks from the Moon that are naturally ejected by impacts and fall to Earth.
- Each new lunar mineral discovery helps unlock the history of our Moon and the early Solar System.

ABOUT CERIUM-MAGNESIUM CHANGESITE

- It is a **newly discovered lunar mineral** and the **11th known mineral identified from the Moon**.
- The mineral was found in a lunar meteorite named **Pahepake 005**, the first such meteorite recovered within China.
- The meteorite is a **small spherical object (44 grams)** with a dark, molten outer crust formed during atmospheric entry.

PHYSICAL CHARACTERISTICS

- The mineral is **colourless, transparent, and brittle**.
- It occurs in extremely fine grains, ranging from **3 to 25 micrometres**, with most particles below 10 micrometres.
- Despite its microscopic size, it holds high scientific importance due to its **unique chemical composition and crystal structure**.

KEY FEATURES

1. Fluorescent Behaviour

- One of its most notable properties is **fluorescence**, meaning it emits light under specific conditions (e.g., UV radiation).
- This property opens possibilities for **advanced material science applications**, especially in next-generation lighting technologies.

2. Unique Chemical Composition

- The presence of **rare earth elements (especially cerium)** along with magnesium and iron provides critical clues about:
 - Lunar magma processes
 - Mineral crystallization under extreme conditions
 - Evolution of the Moon's interior

3. Structural Variations

- Variations in its crystal structure can help scientists understand:
 - Formation of minerals in low-gravity environments
 - Thermal and pressure conditions on the Moon

WHY IN NEWS

Recently, China announced the discovery of a new lunar mineral named **Cerium-Magnesium Changesite**, adding to the growing catalogue of extraterrestrial materials and advancing our understanding of the Moon's geological evolution.

SCIENTIFIC SIGNIFICANCE

1. Insights into Lunar Evolution

The mineral's composition helps decode processes such as:

- Magma differentiation
- Volcanic activity on the Moon
- Cooling history of lunar rocks

2. Contribution to Planetary Science

- Enhances knowledge of **extraterrestrial mineralogy**
- Helps compare Earth and Moon geological processes
- Aids in understanding **early Solar System evolution**

3. Technological Potential

- Fluorescent properties may contribute to:
 - **Next-generation LED materials**
 - Advanced optical and sensing technologies

Challenges in Study

- **Microscopic Size:** Difficult to isolate and analyze
- **Limited Samples:** Rare occurrence limits extensive experimentation
- **Extreme Formation Conditions:** Hard to replicate in laboratory settings

GLOBAL CONTEXT

The discovery highlights increasing global competition and collaboration in space exploration, complementing missions like:

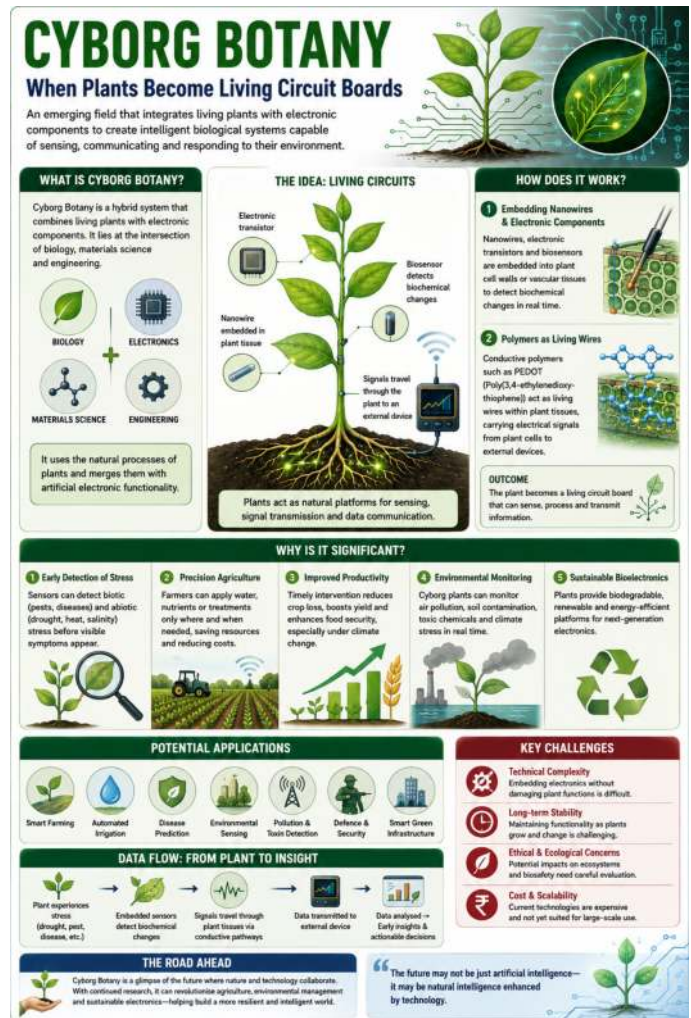
- Chang'e Lunar Program
- Artemis Program

Such findings strengthen the importance of lunar exploration for both scientific discovery and future resource utilization.

CONCLUSION

The discovery of Cerium-Magnesium Changesite marks a significant milestone in lunar science. Beyond expanding the known list of lunar minerals, it provides valuable insights into the Moon's geological history and opens new avenues for technological innovation. As space exploration accelerates, such discoveries will play a crucial role in shaping humanity's understanding of extraterrestrial environments.

CYBORG BOTANY: THE EMERGING FUSION OF PLANTS AND ELECTRONICS



WHY IN NEWS?

Scientists across several research institutions are making rapid advances in the field of **Cyborg Botany**, an emerging discipline that seeks to combine living plants with electronic systems. The objective is to transform plants into biological sensing networks capable of detecting environmental and physiological changes in real time. The field represents a significant convergence of biology, nanotechnology, electronics, and materials science, with major implications for agriculture, climate monitoring, and sustainable technology.

WHAT IS CYBORG BOTANY?

Cyborg Botany refers to the integration of living plants with artificial electronic components to create hybrid biological-electronic systems. The term “cyborg”

originates from “cybernetic organism,” describing entities that combine natural biological processes with mechanical or electronic functions.

Unlike traditional machines, plants are self-sustaining organisms that naturally grow, repair themselves, adapt to changing environments, and generate energy through photosynthesis. Scientists are now attempting to exploit these biological capabilities by embedding electronic circuits and conductive materials into plant tissues. The broader aim is to create intelligent living systems that can monitor, communicate, and respond to environmental conditions.

HOW DOES THE TECHNOLOGY WORK?

The technology primarily relies on embedding nanomaterials and conductive polymers inside plant tissues. Researchers insert nanowires, electronic transistors, and biosensors directly into plant cell walls or vascular systems. These components are capable of detecting biochemical changes occurring inside the plant.

One of the most important materials used in this field is **PEDOT (Poly (3, 4-ethylenedioxythiophene))**, a biodegradable conductive polymer. PEDOT functions as a “living wire” within plant tissues, carrying electrical signals from the plant’s cells to external monitoring devices. In effect, the plant begins functioning as a natural electrical circuit capable of transmitting information.

As plants experience stress due to disease, lack of water, temperature fluctuations, or pest attacks, they undergo subtle biochemical changes long before visible symptoms appear. Embedded biosensors can detect these early warning signals and transmit the data for analysis.

SIGNIFICANCE IN AGRICULTURE

The most immediate application of Cyborg Botany lies in precision agriculture. Crops face two broad categories of stress: biotic stress caused by pests, fungi, bacteria, and viruses, and abiotic stress caused by drought, salinity, heat waves, and extreme weather conditions.

Conventional farming practices often detect these problems only after physical symptoms become visible, by which time crop damage may already be substantial. Cyborg plants could fundamentally change this process by enabling real-time monitoring of crop health.

If embedded sensors detect moisture deficiency or disease markers at an early stage, farmers could intervene precisely where needed by supplying water, nutrients, or treatments only to affected areas. This would reduce wastage of water, fertilisers, and pesticides while increasing agricultural productivity.

Such technology is especially important in the context of climate change, where unpredictable weather patterns and water scarcity are emerging as major threats to food security.

ENVIRONMENTAL AND SCIENTIFIC APPLICATIONS

Beyond agriculture, Cyborg Botany has broader environmental applications. Plants equipped with biosensors could act as living environmental monitors capable of detecting:

- Air pollution
- Soil contamination
- Toxic chemicals
- Radiation exposure
- Climate stress indicators

Because plants are distributed naturally across ecosystems, they offer a sustainable and energy-efficient platform for environmental monitoring compared to conventional electronic sensors.

The field also contributes to the development of sustainable bioelectronics. Traditional electronics generate significant e-waste and depend on resource-intensive manufacturing. In contrast, plant-based bioelectronic systems are biodegradable, renewable, and potentially more environmentally friendly.

CHALLENGES AND LIMITATIONS

Despite its promise, Cyborg Botany remains in an experimental stage and faces several challenges. Integrating electronic materials into living tissues without damaging plant physiology is technically difficult. Since plants continuously grow and change structurally, maintaining long-term stability of embedded electronic systems is another challenge.

There are also concerns regarding scalability and cost. Current technologies are expensive and limited to laboratory settings. Commercial deployment across large agricultural systems would require significant technological refinement.

Additionally, ethical and ecological concerns may arise regarding biosafety, unintended environmental consequences, and long-term impacts of introducing synthetic materials into biological systems.

CONCLUSION

Cyborg Botany represents a remarkable fusion of natural biology and advanced technology. By transforming plants into living electronic systems, scientists are opening new possibilities in precision agriculture, environmental monitoring, and sustainable bioengineering. As climate change, resource scarcity, and food insecurity become more severe, such innovations may play a critical role in building resilient agricultural and ecological systems. Although the field is still developing, Cyborg Botany highlights how future technologies may increasingly rely on collaboration between living organisms and artificial intelligence-driven systems, redefining the relationship between nature and technology.

KARNATAKA LEADS IN NAMO DRONE DIDI YOJANA

KARNATAKA LEADS IN NAMO DRONE DIDI YOJANA
Empowering Rural Women. Transforming Agriculture with Drones.

Karnataka has emerged as the leading state under Namu Drone Didi Yojana, with 145 SHG women trained as drone pilots.

ABOUT NAMO DRONE DIDI YOJANA (NDY)

- Central Sector Scheme to empower rural women through agricultural drone services.
- Implemented through women Self-Help Groups (SHGs) under DAY-NRLM.

OBJECTIVE

- Promote precision agriculture
- Increase farm productivity
- Generate rural livelihoods
- Empower women through technology and entrepreneurship

KEY FEATURES OF THE SCHEME

- 1. DRONE TARGET**
Distribution of **15,000 drones** to women SHGs across India.
- 2. CENTRAL SUBSIDY**
Union Government provides **80%** financial assistance for drone and accessories, capped at **₹8 lakh**.
- 3. LOAN SUPPORT**
For the remaining **20%** SHGs can avail loans through Agriculture Infrastructure Fund (AIF) at **3% interest subvention**.
- 4. PILOT TRAINING**
Each SHG member undergoes **15 days of training**:
• 5 days for pilot certification
• 10 days for agricultural applications
- 5. ASSISTANT TRAINING**
A second member is trained as a drone assistant for repairs and maintenance.

IMPLEMENTING AGENCY
Lead Fertiliser Companies (LFC) act as key implementing agencies for:
• Drone procurement
• Technical assistance
• Coordination among drone manufacturers, SHGs and farmers.
• Capacity building and handholding support

NODAL AUTHORITY
Department of Agriculture & Farmers Welfare (DA&FW) under Ministry of Agriculture & Farmers Welfare (MoA&FW) oversees:
• Scheme budget
• Operational guidelines
• Monitoring and implementation

SIGNIFICANCE AND BENEFITS

- WOMEN EMPOWERMENT**
Promotes financial independence, skill development and entrepreneurship among rural women.
- AGRICULTURAL MODERNISATION**
Drone-based spraying reduces labour costs, improves precision, minimises chemical wastage and enhances productivity.
- RURAL EMPLOYMENT GENERATION**
Creates new livelihood opportunities through service-based income, maintenance and technical operations.
- PROMOTION OF PRECISION FARMING**
Supports digital agriculture and resource-efficient farming for sustainable agricultural growth.
- STRENGTHENS SHG ECOSYSTEM**
Builds confidence, capacity and market linkage of women SHGs in high-growth sectors.

CHALLENGES

- High maintenance and operational costs
- Limited rural technical expertise
- Connectivity and charging infrastructure gaps
- Small landholdings affecting scalability
- Need for continuous training and monitoring

WAY FORWARD

- Equip rural drone operators – service centres, repair facilities and charging stations.
- Strengthen capacity building with continuous technical and entrepreneurial training.
- Integrate digital agriculture with AI, GIS and crop monitoring platforms.
- Encourage farmer awareness on the benefits of drone-based precision farming.
- Ensure strong policy support and convergence with other agriculture schemes.

Namu Drone Didi Yojana is not just about drones, it is about dreams, dignity and development. Empowered women, advanced agriculture, prosperous India.

Karnataka has emerged as the leading state under the Namu Drone Didi Yojana, with 145 women from Self-Help Groups (SHGs) successfully trained as drone pilots. The scheme reflects India's growing emphasis on combining women's empowerment, rural entrepreneurship, and agricultural modernisation through drone technology. The initiative aims to create a new generation of "Drone Didis" capable of providing drone-based agricultural services such as fertiliser spraying, pesticide application, crop monitoring, and precision farming support.

ABOUT NAMO DRONE DIDI YOJANA

Namu Drone Didi Yojana is a Central Sector Scheme launched to empower rural women by integrating drone technology into agriculture through women-led SHGs under the Deendayal Antyodaya Yojana – National Rural Livelihoods Mission (DAY-NRLM).

The scheme seeks to:

- Promote precision agriculture
- Increase agricultural efficiency

- Generate livelihood opportunities for women
- Encourage technology adoption in rural India

KEY FEATURES OF THE SCHEME

Distribution of Drones

The scheme targets distribution of 15,000 agricultural drones to women SHGs across the country.

These drones are intended for:

- Nano fertiliser spraying
- Pesticide application
- Crop health monitoring
- Precision farming operations

Financial Assistance

The Union Government provides:

- 80% subsidy for drone purchase and accessories
- Financial assistance capped at ₹8 lakh

This significantly reduces the cost burden on SHGs.

Loan Support

For the remaining 20% contribution, SHGs can avail loans through the Agriculture Infrastructure Fund (AIF).

The loans are supported with:

- 3% interest subvention

This improves affordability and financial accessibility for rural women groups.

CAPACITY BUILDING AND TRAINING

Pilot Certification

Each selected SHG member receives 15 days of training, comprising:

- 5 days for drone pilot certification
- 10 days for agricultural drone applications

The training includes:

- Drone operations
- Safety protocols
- Precision spraying techniques
- Field demonstrations

Drone Assistant Training

An additional SHG member is trained as a drone assistant responsible for:

- Repair and maintenance
- Technical troubleshooting
- Operational support

This creates local technical capacity and ensures long-term sustainability of drone operations.

INSTITUTIONAL FRAMEWORK

Implementing Agencies

Lead Fertiliser Companies (LFCs) act as key implementing agencies responsible for:

- Drone procurement
- Technical assistance
- Coordination with manufacturers
- Farmer outreach

Nodal Ministry

The Department of Agriculture and Farmers Welfare under the Ministry of Agriculture and Farmers Welfare oversees:

- Budget allocation
- Operational guidelines
- Monitoring and implementation

SIGNIFICANCE OF THE SCHEME

Women Empowerment

The scheme promotes:

- Financial independence
- Skill development
- Entrepreneurship among rural women

It transforms SHG members into technology-enabled service providers.

Agricultural Modernisation

Drone-based spraying:

- Reduces labour costs
- Improves precision in fertiliser use
- Minimises chemical wastage
- Enhances productivity

Rural Employment Generation

Drone services create new livelihood opportunities in rural areas through:

- Service-based income
- Maintenance work
- Technical operations

Promotion of Precision Farming

The initiative supports digital agriculture and precision farming practices, improving efficiency and sustainability.

WHY KARNATAKA LEADS

Karnataka's success can be attributed to:

- Strong SHG networks
- Better training infrastructure
- Early adoption of agri-tech initiatives
- Effective coordination among government agencies and local institutions

The state's proactive implementation demonstrates how technology and women's empowerment can complement each other in rural development.

CHALLENGES

Despite its potential, the scheme faces several challenges:

- High maintenance costs
- Limited rural technical expertise
- Connectivity and charging infrastructure gaps
- Small landholdings affecting scalability
- Need for continuous training and monitoring

WAY FORWARD

Expand Rural Drone Ecosystem

Develop rural drone service centres, repair facilities, and charging infrastructure.

Strengthen Capacity Building

Provide continuous technical and entrepreneurial training for SHG members.

Improve Digital Agriculture Integration

Integrate drones with AI, GIS, and crop monitoring platforms for better agricultural planning.

Encourage Farmer Awareness

Increase awareness among farmers regarding the benefits of drone-based precision farming.

CONCLUSION

The Namu Drone Didi Yojana represents a transformative step toward combining women empowerment with agricultural technology and rural entrepreneurship. Karnataka's leadership under the scheme demonstrates the potential of SHG-driven innovation in modernising Indian agriculture. With sustained training, infrastructure support, and policy backing, the initiative can significantly strengthen precision farming, rural livelihoods, and women-led development.

SCHEME FOR INDIA'S HYDROGEN STARTUP ECOSYSTEM

The infographic provides a detailed overview of the Scheme for India's Hydrogen Startup Ecosystem. It features a central title and several key points:

- CONTEXT (DDN):** The Ministry of New and Renewable Energy (MNRE) launched the 'Scheme for New and Novel Uses of Hydrogen Production and Applications' for India's hydrogen startup ecosystem. It was launched under the broader National Green Hydrogen Mission (NGHM) framework.
- GOALS:** NGHM aims to develop a self-reliant green hydrogen ecosystem, achieve 5 MMT of annual production by 2030, decarbonise heavy industries, and make India a clean energy export hub.
- ACHIEVEMENTS:** India's hydrogen startup ecosystem is growing rapidly, with 249 recognised startups by September 2025.

OBJECTIVE The scheme funds pilot projects to advance indigenous green hydrogen innovation across production, storage, transport, and utilisation.

IMPLEMENTING AGENCY National Institute of Solar Energy (NISE) and the Biotechnology Industry Research Assistance Council (BIRAC) evaluate and support startup proposals.

STARTUP FOCUS Part B of the scheme allocates ₹100 crore to startup-led pilot projects.

FINANCIAL GRANT Eligible startups can receive up to ₹5 crore per pilot project to scale technologies from demonstration to commercial pilots.

TARGET INNOVATIONS It supports electrolysers, biomass-to-hydrogen, fuel cells, hydrogen drones, AI-driven grids, sensors, and decentralised applications.

SIGNIFICANCE Hydrogen startups strengthen domestic R&D needed to reduce green hydrogen costs towards India's target of \$1.5/kg by 2030.

TARGET BY 2030 Cost of Green Hydrogen: \$1.5/kg

BENEFITS

- Decarbonises heavy industries and hard-to-abate sectors
- Builds self-reliant and innovative hydrogen ecosystem
- Positions India as a global clean energy export hub
- Creates new green jobs and entrepreneurship opportunities
- Strengthens India's energy security and net-zero goals

CONTEXT

The Ministry of New and Renewable Energy (MNRE) recently launched the '**Scheme for New and Novel Uses of Hydrogen Production and Applications**' to promote India's hydrogen startup ecosystem.

The initiative has been launched under the broader **National Green Hydrogen Mission (NGHM)** framework.

NATIONAL GREEN HYDROGEN MISSION (NGHM)

The mission aims to:

- Build a self-reliant green hydrogen ecosystem,
- Achieve **5 Million Metric Tonnes (MMT)** of annual green hydrogen production by 2030,
- Decarbonise hard-to-abate industries,
- Make India a global clean energy export hub.

India's hydrogen startup ecosystem is expanding rapidly, with nearly **249 recognised startups** by September 2025.

OBJECTIVE OF THE SCHEME

The scheme aims to support pilot projects and indigenous innovation in:

- Green hydrogen production,
- Storage technologies,
- Transportation systems,

- Industrial and decentralised applications.

The goal is to bridge the gap between research, demonstration, and commercial deployment.

IMPLEMENTING AGENCIES

The scheme is jointly implemented by:

- **National Institute of Solar Energy (NISE),**
- **Biotechnology Industry Research Assistance Council (BIRAC).**

These agencies will evaluate, support, and monitor startup proposals.

KEY FEATURES OF THE SCHEME

1. Startup-Focused Funding

Part B of the scheme allocates ₹100 crore specifically for startup-led pilot projects.

2. Financial Assistance

Eligible startups can receive grants of up to **₹5 crore per pilot project** to scale technologies from demonstration to commercial pilot stages.

3. Innovation Areas Supported

The scheme supports innovations in:

- Electrolysers,
- Biomass-to-hydrogen technologies,
- Fuel cells,
- Hydrogen-powered drones,
- AI-enabled energy grids,
- Hydrogen sensors,
- Decentralised hydrogen applications.

SIGNIFICANCE OF THE SCHEME

The initiative is significant because it:

- Strengthens domestic R&D capabilities,
- Encourages clean energy entrepreneurship,
- Reduces dependence on imported technologies,
- Supports India's energy transition,
- Helps reduce green hydrogen production costs.

The scheme contributes to India's target of reducing green hydrogen cost to nearly **\$1.5 per kg by 2030**.

CONCLUSION

The scheme reflects India's push towards innovation-driven clean energy development. By supporting startups and indigenous technologies, India aims to become a global leader in the green hydrogen economy.

ENVIRONMENT & ECOLOGY

GS PAPER 3

APIS MELLIFERA LATEST NEWS

Apis mellifera Latest News

CSIR-Indian Institute of Integrative Medicine Pulwama has demonstrated that *Apis mellifera* can survive sub-zero temperatures, benefiting beekeepers by reducing costly hive migration during winter.

About *Apis mellifera*

- ▶ The Western Honey Bee is the most common honey bee species worldwide.
- ▶ Widely domesticated for honey, beeswax, propolis, and pollination of crops.
- ▶ Crucial for agriculture, contributing to global food production.

Habitat & Distribution

- ▶ Native to Europe, Western Asia, and Africa.
- ▶ Introduced to other continents in the 17th century by humans. Now found worldwide, including East Asia, Australia & North & South America.
- ▶ Adaptable to meadows, gardens, open forests, grasslands, wetlands.

Features

- ▶ Reddish-brown to yellow color with black bands & orange-yellow rings.
- ▶ Eusocial insects – one queen, thousands of worker bees, some male drones.
- ▶ Nests in cavities, forming hives with hexagonal beeswax combs.
- ▶ Workers have barbed stingers that detach after stinging.

Cold tolerance of *Apis mellifera* reduces migration costs, improves colony survival, boosts honey production, and supports better pollination services.

A recent breakthrough by the CSIR-Indian Institute of Integrative Medicine has demonstrated that *Apis mellifera* can survive sub-zero temperatures. This development is particularly significant for beekeepers in cold regions such as Jammu & Kashmir, where traditionally hives are migrated to plains during winter to avoid colony loss. The finding can reduce migration costs, minimize stress on bee colonies, and enhance honey production efficiency, thereby strengthening the apiculture sector and rural livelihoods.

ABOUT APIS MELLIFERA

- *Apis mellifera*, commonly known as the Western or European honey bee, is the most widely distributed species of honey bee in the world.

- It is the most extensively domesticated insect species due to its economic and ecological importance.
- The species is commercially exploited for products such as honey, beeswax, royal jelly, and propolis.
- It plays a crucial role in pollination, supporting agricultural productivity and maintaining ecological balance.
- A large proportion of global food crops, including fruits, vegetables, and oilseeds, depend on pollinators like *Apis mellifera*.

APIS MELLIFERA HABITAT AND DISTRIBUTION

- Native to Europe, Western Asia, and Africa.
- Introduced to other continents by humans beginning in the 17th century.
- Currently found across all continents except Antarctica, including East Asia, Australia, and North and South America.
- Prefers habitats with abundant flowering plants such as meadows, orchards, open forests, and agricultural fields.
- Can adapt to varied environments like grasslands, wetlands, and even semi-arid regions, provided adequate nectar, pollen, and water sources are available.
- Requires nesting cavities such as hollow tree trunks, rock crevices, or artificial beehives for colony establishment.

APIS MELLIFERA FEATURES

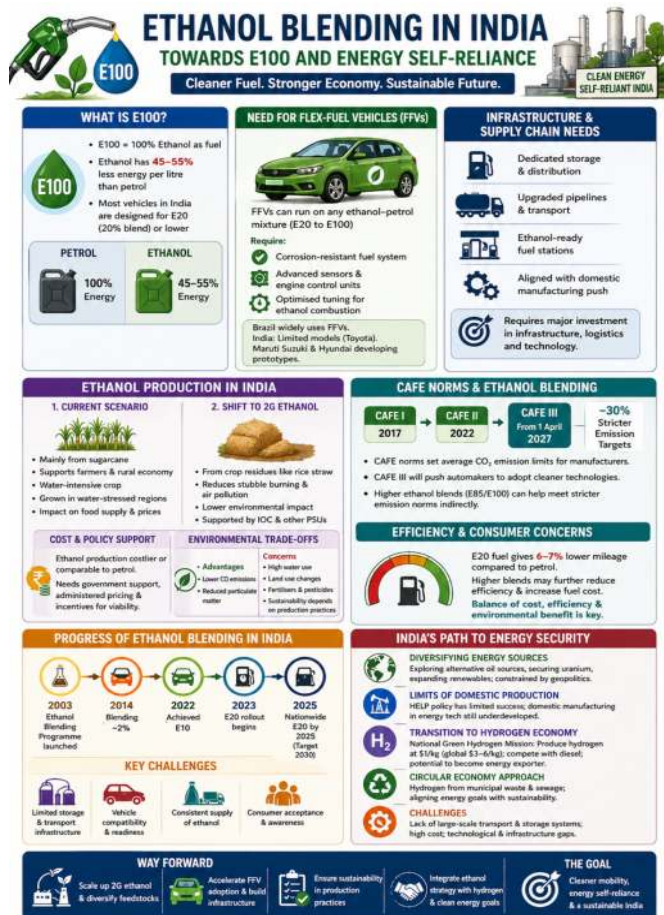
- Typically reddish-brown to yellow in colour with distinct black bands and orange-yellow rings on the abdomen.
- Possesses two pairs of transparent wings and a characteristic narrow waist.
- The body is covered with branched hairs that help in effective pollen collection and transfer.
- Exhibits eusocial behavior, forming highly organized colonies with division of labour:
 - One queen responsible for reproduction
 - Thousands of worker bees performing tasks like foraging, nursing, and hive maintenance
 - A smaller number of drones whose primary function is mating
- Colonies can consist of tens of thousands of individuals, showcasing advanced social organization.

- Workers possess barbed stingers that detach after stinging, leading to their death, while the queen has a smooth stinger used primarily for intra-species competition.
- Nests are constructed using beeswax in the form of hexagonal combs, known for their efficiency and strength.
- Communication within the colony occurs through complex behaviors like the “waggle dance,” which conveys information about food sources.

CONCLUSION

The recent findings regarding the cold tolerance of *Apis mellifera* have far-reaching implications for sustainable beekeeping in colder climates. By reducing the need for seasonal migration, the discovery can lower operational costs, improve colony survival rates, and enhance honey yield. Additionally, stronger and stable bee populations will contribute to improved pollination services, thereby boosting agricultural productivity and supporting food security. Promoting scientific interventions alongside traditional beekeeping practices can play a vital role in strengthening India’s apiculture sector.

ETHANOL BLENDING IN INDIA: PATHWAY TO ENERGY SECURITY AND SUSTAINABILITY



CONTEXT

The push for **100% ethanol blending (E100)** has gained momentum after the Union Minister for Road Transport and Highways advocated its adoption as part of India’s broader strategy for **energy self-reliance** and reduced dependence on fossil fuel imports. While India has made significant progress in ethanol blending, moving towards E100 raises important technological, economic, and environmental considerations.

UNDERSTANDING ETHANOL BLENDING (E100)

Ethanol blending involves mixing ethanol with petrol. **E100** refers to the use of pure ethanol as fuel. However, ethanol has a **lower energy density** than petrol—approximately **45-55% less energy per litre**—which directly impacts mileage and vehicle performance.

Currently, most vehicles in India are compatible with **E20 (20% ethanol blend)** or lower. Higher blends such as **E85 or E100** require **flex-fuel vehicles (FFVs)** that can operate on varying ethanol-petrol mixtures.

NEED FOR FLEX-FUEL VEHICLES (FFVS)

Transitioning to E100 requires a shift in automobile technology. FFVs are equipped with:

- Corrosion-resistant fuel systems
- Advanced sensors and engine control units
- Optimised combustion systems for ethanol

Countries like Brazil have successfully adopted FFVs at scale. In India, adoption is still nascent, though companies like Toyota are introducing compatible models, and others such as Maruti Suzuki and Hyundai are developing prototypes.

INFRASTRUCTURE AND SUPPLY CHAIN REQUIREMENTS

Achieving E100 is not merely a technological challenge but also an infrastructural one. It requires:

- Dedicated storage and distribution systems
- Modifications in fuel stations
- Efficient logistics for ethanol transport

These changes must align with India’s broader push for domestic manufacturing and energy transition.

ETHANOL PRODUCTION IN INDIA: OPPORTUNITIES AND CHALLENGES

India primarily produces ethanol from **sugarcane**, making it the dominant feedstock. While this supports the agricultural economy, it raises concerns:

- Sugarcane is **water-intensive**
- Cultivation often occurs in **water-stressed regions**
- Potential impact on **food security and crop prices**

SHIFT TOWARDS SECOND-GENERATION (2G) ETHANOL

To address sustainability concerns, India is promoting **2G ethanol**, produced from crop residues like rice straw.

Benefits include:

- Reducing **stubble burning** in North India
- Lower environmental impact
- Diversification of feedstock sources

Public sector entities like Indian Oil Corporation are actively investing in 2G ethanol plants.

COST AND POLICY SUPPORT

Ethanol production is often **costlier or comparable to petrol**, requiring government intervention through:

- Administered pricing
- Subsidies and incentives
- Policy support for industry expansion

Without such measures, large-scale adoption may not be economically viable.

ENVIRONMENTAL TRADE-OFFS

Ethanol is often seen as a cleaner alternative, but its environmental impact is mixed:

Advantages:

- Lower emissions of carbon monoxide
- Reduced particulate matter

Concerns:

- High water consumption
- Land use changes
- Increased use of fertilisers and pesticides

Thus, sustainability depends on production practices rather than fuel use alone.

CAFE NORMS AND ETHANOL BLENDING

India introduced **Corporate Average Fuel Efficiency (CAFE)** norms in 2017 to regulate vehicle emissions.

- **CAFE I (2017)** and **CAFE II (2022)** improved fuel efficiency
- **CAFE III (2027)** will impose ~30% stricter emission targets

While CAFE norms do not mandate ethanol use, they **indirectly incentivise higher ethanol blends** as automakers seek to meet emission targets.

CONSUMER CONCERNS AND EFFICIENCY

Ethanol-blended fuels present challenges for consumers:

- **E20 fuel reduces mileage by 6-7%**

- Higher blends may further reduce efficiency
- Potential increase in fuel costs

Adoption will depend on balancing affordability, efficiency, and environmental benefits.

PROGRESS OF ETHANOL BLENDING IN INDIA

India's Ethanol Blending Programme (launched in 2003) has seen rapid progress:

- ~2% blending in 2014
- Achieved **E10 by 2022**
- **E20 rollout from 2023**, targeted nationwide by 2025

This accelerated progress reflects strong policy support.

INFRASTRUCTURE AND INDUSTRY CHALLENGES

Despite progress, key bottlenecks remain:

- Limited vehicle compatibility
- Inadequate fuel storage and distribution systems
- Supply constraints of ethanol

These challenges must be addressed before scaling up to E100.

ETHANOL AND INDIA'S ENERGY SECURITY STRATEGY

Ethanol blending is part of a broader strategy to reduce import dependence. However, India is also exploring:

1. Diversification of Energy Sources

- Alternative oil suppliers
- Expansion of renewable energy

2. Hydrogen Economy

Under the National Green Hydrogen Mission, India aims to:

- Produce hydrogen at **\$1/kg**
- Compete with fossil fuels
- Become a global energy exporter

3. Circular Economy Approach

- Producing hydrogen from **municipal waste and sewage**
- Integrating sustainability with energy production

CHALLENGES IN ENERGY TRANSITION

- Limited domestic production of oil and gas
- Technological gaps in hydrogen storage and transport
- Infrastructure constraints
- Geopolitical uncertainties

WAY FORWARD

- Promote sustainable feedstocks like 2G ethanol
- Expand FFV adoption and infrastructure
- Balance environmental and economic considerations
- Integrate ethanol strategy with broader clean energy goals

CONCLUSION

Ethanol blending represents a significant step towards **energy security and cleaner fuels** in India. However, achieving 100% blending requires overcoming challenges related to technology, infrastructure, cost, and sustainability. A balanced and phased approach—combined with innovations like green hydrogen—will be crucial for India’s long-term energy transition.

FIREFLIES OF MEGHALAYA: DISCOVERY OF DIAPHANES MEGHALAYANUS AND DIAPHANES MAWLYNNONG

FIREFLIES OF MEGHALAYA
Discovery of Two New Species in East Khasi Hills
First formal documentation of fireflies from Meghalaya

Scientists have discovered two previously unknown species of fireflies—*Diaphanes meghalayanus* and *Diaphanes mawlynnong*—in Meghalaya’s East Khasi Hills.

ABOUT THE NEWLY DISCOVERED SPECIES

- 1. *Diaphanes meghalayanus***
 - Named after Meghalaya to indicate its broader distribution in the region.
 - Found in semi-evergreen forests and dense betel nut plantations with bamboo patches.
 - Typically observed during February.

HABITAT CONDITIONS

 - Temperature: 18–20°C
 - Humidity: 77–80%
 - Environment: Cool, dark & humid

BEHAVIOUR

 - Males fly at heights of 10–15 metres.
 - Emits a soft glow while flying in the dark.
- 2. *Diaphanes mawlynnong***
 - Named after Mawlynnong village, acknowledging the local Khasi community.
 - Males fly ~15 metres above ground.
 - Inhabits dense forests with thick bamboo growth and rocky streams.
 - Wingless female found beneath a boulder.

BEHAVIOUR

 - Males fly about 15 metres above the ground.
 - Females emit a slower, longer pulsating glow compared to males.

The discovery of a wingless female and its habitat provides rare insights into the species’ life cycle.

WHAT ARE FIREFLIES?
Fireflies (or lightning bugs) are bioluminescent beetles belonging to the family Lampyridae. Found mostly in humid tropical and temperate regions. They use flashing patterns for:
• Mating communication
• Species identification
• Predator deterrence

BIOLUMINESCENCE IN FIREFLIES
Fireflies produce light through a chemical reaction involving:
Luciferin (light compound) + Luciferase enzyme + Oxygen (O₂) → ATP (Energy) + CO₂
Produces “cold light” with minimal heat loss.

ECOLOGICAL IMPORTANCE
Indicators of ecosystem health. Sensitive to light pollution, habitat destruction, pesticides and climate change. Role in food chains: Predators of small insects and snails; prey for birds, amphibians and reptiles. Presence indicates healthy forests, stable humidity and low human disturbance.

SIGNIFICANCE OF THE DISCOVERY

- Biodiversity Documentation:** Enriches India’s insect biodiversity, especially in the ecologically sensitive Northeast region.
- Value of Meghalaya’s Ecosystems:** High rainfall, dense forests and unique microclimates make East Khasi Hills a biodiversity hotspot.
- Scientific Importance:** Unique behaviours such as wingless females and distinct glow patterns offer rare ecological insights.
- Community Significance:** Honours the local Khasi community and highlights the need for community-based conservation.

THREATS TO FIREFLIES

- Habitat Loss:** Deforestation and land-use change reduce suitable breeding and feeding habitats.
- Light Pollution:** Artificial lighting disrupts mating signals and communication.
- Climate Change:** Changes in temperature and humidity affect survival and reproduction.
- Pesticides:** Chemical pollution harms larvae and reduces insect prey availability.

CONSERVATION: WHAT CAN BE DONE?

- Conserve natural forests and fragile habitats.
- Reduce light pollution in rural and forest areas.
- Protect mist niches/habitats like streams, bamboo patches and leaf litter.
- Promote community participation and awareness, especially among local communities.
- Encourage sustainable land-use and avoid chemical pesticides.
- Support research and long-term monitoring of locally populations.

DID YOU KNOW?
India is home to more than 100 known species of fireflies, but many regions remain underexplored!

THE TAKE AWAY
The discovery of *Diaphanes meghalayanus* and *Diaphanes mawlynnong* underscores the hidden wonders of Meghalaya’s forests and the urgent need to protect our natural heritage for future generations.

INTRODUCTION

Scientists have recently discovered two previously unknown species of fireflies in the East Khasi Hills of Meghalaya. The newly identified species — *Diaphanes meghalayanus* and *Diaphanes mawlynnong* — mark the first formal scientific documentation of such fireflies from the state.

The discovery highlights the rich biodiversity of Northeast India and underlines the ecological importance of Meghalaya’s forest ecosystems.

ABOUT THE NEWLY DISCOVERED SPECIES

1. *Diaphanes meghalayanus*

- Named after the state of Meghalaya to reflect its broader regional distribution.
- Found in:
 - Semi-evergreen forests
 - Dense betel nut plantations
 - Bamboo-dominated patches

Habitat Conditions

The species thrives in:

- Cool temperatures: **18–20°C**
- High humidity: **77–80%**
- Dark, minimally disturbed environments

Behaviour

- Males fly at heights of around **10–15 metres**
- Emit a soft glowing light during flight
- Mostly observed during February

2. *Diaphanes mawlynnong*

- Named after Mawlynnong village, recognising the local Khasi community.
- Appears to be habitat-specific.

Habitat

Found in:

- Dense bamboo forests
- Rocky stream ecosystems
- Moist forest interiors

Behaviour

- Males fly around 15 metres above ground level
- Wingless female discovered beneath a boulder

This behaviour is considered unusual and provides valuable insights into the species’ reproductive ecology and life cycle.

Bioluminescence

- Females emit slower and longer pulsating glows than males.

What are Fireflies?

Fireflies, also known as lightning bugs, are bioluminescent beetles belonging to the family Lampyridae.

Key Characteristics

- Produce light through bioluminescence
- Found mostly in humid tropical and temperate regions
- Use flashing patterns for:
 - Mating communication
 - Species identification
 - Predator deterrence

Bioluminescence in Fireflies

Fireflies produce light through a chemical reaction involving:

- Luciferin (light-emitting compound)
- Luciferase enzyme
- Oxygen
- ATP (energy molecule)

The reaction generates:

- "Cold light" with minimal heat loss

This makes firefly bioluminescence highly energy efficient.

ECOLOGICAL IMPORTANCE OF FIREFLIES

Indicators of Ecosystem Health

Fireflies are sensitive to:

- Light pollution
- Habitat destruction
- Pesticides
- Climate change

Their presence often indicates:

- Healthy forest ecosystems
- Stable humidity levels
- Low human disturbance

Role in Food Chains

Fireflies contribute to ecosystem functioning by:

- Acting as predators of small insects and snails
- Serving as prey for birds, amphibians, and reptiles

SIGNIFICANCE OF THE DISCOVERY

Biodiversity Documentation

The discovery enriches India's documented insect biodiversity, especially in the ecologically sensitive Northeast region.

Importance of Meghalaya's Ecosystems

The East Khasi Hills represent a biodiversity hotspot with:

- High rainfall
- Dense forests
- Unique microclimatic conditions

The finding demonstrates the ecological value of conserving such habitats.

Scientific Importance

The observation of wingless females and distinct glowing behaviour provides rare insights into:

- Reproductive strategies
- Species evolution
- Behavioural ecology

THREATS TO FIREFLIES

Despite their ecological importance, fireflies face several threats:

1. Habitat Loss

Deforestation and land-use change reduce suitable breeding and feeding habitats.

2. Light Pollution

Artificial lighting disrupts mating signals and communication.

3. Climate Change

Changes in temperature and humidity affect survival and reproduction.

4. Pesticide Use

Chemical pollution harms larvae and reduces insect prey availability.

CONSERVATION IMPORTANCE

The discovery reinforces the need for:

- Forest conservation
- Reduction in light pollution
- Protection of moist microhabitats
- Sustainable land-use practices

Community participation, especially among indigenous groups such as the Khasi community, will be critical for long-term conservation.

CONCLUSION

The discovery of *Diaphanes meghalayanus* and *Diaphanes mawlynnong* in Meghalaya highlights the immense but still underexplored biodiversity of India's Northeast region. Beyond scientific significance, these fireflies serve as indicators of healthy ecosystems and remind us of the urgent need to conserve fragile forest habitats amid growing environmental pressures.

Protecting such species is essential not only for biodiversity conservation but also for preserving ecological balance and understanding the complex evolutionary processes of nature.

INDIA'S MARINE BIODIVERSITY CONSERVATION FRAMEWORK

INDIA'S MARINE BIODIVERSITY CONSERVATION FRAMEWORK
PROTECTING OCEAN LIFE, POWERING THE BLUE ECONOMY

India's mission-mode approach through science, policy and partnerships for healthy oceans and a sustainable future.

LEGAL & INSTITUTIONAL FRAMEWORK

- LEGAL PROTECTION:** Wildlife (Protection) Act, 1972 protects marine species under Schedules I and II. The 2022 amendment empowered the Indian Coast Guard with search, seizure and arrest powers for marine wildlife crimes.
- MARINE PROTECTED AREAS (MPAs):** 132 Coastal & Marine Protected Areas notified, including 6 Marine National Parks. Conserve critical habitats: Coral reefs, Mangroves, Seagrass beds, Marine fauna & breeding habitats.
- KEY INSTITUTION:** Centre for Marine Living Resources and Ecology (CMLRE). Uses eDNA metabarcoding to monitor deep-sea biodiversity and maintain a national marine fauna repository.

DEEP OCEAN MISSION (DOM)

Launched in 2021 under the Ministry of Earth Sciences, DOM aims to explore ocean resources and develop sustainable deep-sea technologies.

- SAMUDRAYAAN MISSION:** India's first human deep-sea mission to 6,000 metres using the Matsya-6000 submersible with a three-person crew.
- TECHNOLOGICAL EXCELLENCE:** Matsya-6000 uses a titanium-alloy spherical hull developed with ISRO, enabling survival under extreme deep-sea pressure.
- RESOURCE TARGET:** Exploration of polymetallic nodules in the Central Indian Ocean Basin (CIOB) rich in cobalt, nickel, copper and manganese – vital for energy transition and electronics sectors.
- SIGNIFICANCE:** Advances Blue Economy goals and will place India among elite nations with crewed deep-sea capabilities – USA, Russia, China, France and Japan.

KEY ACHIEVEMENTS & IMPACT

- GLOBAL RANKING:** India is the third largest country in renewable energy installed capacity.
- CAPACITY ADDITION:** Record 35,29 GW non-fossil capacity added in FY 2025-26, nearly double of FY 2024-25.
- TOTAL INSTALLED CAPACITY:** 283.46 GW non-fossil capacity, of which 274.68 GW is from renewable energy.
- NOE TARGET ACHIEVED:** Achieved 50% installed electric power from non-fossil sources, 5 years ahead of 2030 deadline.
- FOSSIL FUEL GENERATION:** Negative growth, down by 3.6%.
- IMPORT REDUCTION:** Solar module imports fell by USD 2.15 billion to USD 758 million.
- CLIMATE FUTURE:** Strengthening energy security, reducing emissions and advancing sustainable development.

OTHER MAJOR INITIATIVES FOR MARINE BIODIVERSITY CONSERVATION

- PROJECT DOLPHIN (2020):** Focuses on habitat conservation and systematic population monitoring of both riverine and marine dolphins.
- NATIONAL MARINE TURTLE ACTION PLAN (2021):** Targets Olive Ridley conservation by reducing fishing threats and curbing coastal poaching activities.
- INTEGRATED COASTAL ZONE MANAGEMENT (ICZM):** Promotes sustainable coastal resource use in states like Gujarat, Odisha and West Bengal.
- MISHTI SCHEME (2023):** Promotes mangrove restoration covering ~27,561 hectares across 13 States and Union Territories.
- BBNJ AGREEMENT (2024):** India commits to conserve marine biodiversity in areas beyond national jurisdiction under the BBNJ Agreement.
- MARINE POLLUTION & HABITAT PROTECTION:** Strengthening efforts against plastic pollution, oil spills, coastal erosion and habitat degradation.

CHALLENGES AHEAD

- Marine pollution and plastic waste
- Overfishing and illegal, unreported and unregulated (IUU) fishing
- Habitat degradation and coastal erosion
- Climate change impacts on coral reefs and marine ecosystems
- Technological, financial and capacity limitations in deep-sea exploration

WAY FORWARD

- Strengthen marine governance and inter-agency coordination
- Expand scientific research, mapping and long-term monitoring
- Promote community participation and coastal livelihood security
- Invest in technology, innovation and sustainable blue economy
- Enhance international cooperation and ocean diplomacy

CONCLUSION India's integrated conservation framework, strong institutions and mission-mode initiatives like the Deep Ocean Mission safeguard marine biodiversity while unlocking the immense potential of our oceans for a sustainable, inclusive and resilient future.

India, with a coastline of over 7,500 km and a vast Exclusive Economic Zone (EEZ), possesses rich marine biodiversity comprising coral reefs, mangroves, seagrasses, marine mammals, turtles, and deep-sea ecosystems. Recognising the ecological and economic importance of oceans, India has adopted a mission-mode approach toward marine conservation through legal safeguards, institutional mechanisms, and scientific initiatives such as the Deep Ocean Mission (DOM).

The framework reflects India's commitment toward sustainable use of marine resources, biodiversity protection, and strengthening the blue economy.

LEGAL AND INSTITUTIONAL FRAMEWORK

Wildlife Protection Measures

The Wildlife (Protection) Act, 1972 provides legal protection to several marine species under Schedules I and II.

The 2022 amendment strengthened enforcement by

granting the Indian Coast Guard powers of search, seizure, and arrest in marine wildlife crime cases.

Marine Protected Areas (MPAs)

India has established 132 Coastal and Marine Protected Areas, including:

- 6 Marine National Parks
- Marine sanctuaries
- Protected mangrove and coral ecosystems

These protected areas help conserve:

- Coral reefs
- Mangroves
- Seagrass beds
- Marine fauna and breeding habitats

Scientific Institutions

The Centre for Marine Living Resources and Ecology (CMLRE) plays a major role in marine biodiversity assessment.

It uses advanced tools such as environmental DNA (eDNA) metabarcoding to monitor deep-sea biodiversity and maintain a national marine fauna repository.

Deep Ocean Mission (DOM)

Launched in 2021 under the Ministry of Earth Sciences, the Deep Ocean Mission aims to explore ocean resources and develop technologies for sustainable deep-sea operations.

Samudrayaan Mission

A flagship component of DOM is the Samudrayaan project, which seeks to undertake India's first human deep-sea mission to a depth of 6,000 metres.

The mission will use the Matsya 6000 submersible capable of carrying a three-member crew.

Technological Significance

Matsya-6000 uses a titanium-alloy spherical hull developed with support from Indian Space Research Organisation (ISRO), enabling survival under extreme underwater pressure.

Resource Exploration

The mission focuses on exploring polymetallic nodules in the Central Indian Ocean Basin containing:

- Cobalt
- Nickel
- Copper
- Manganese

These minerals are strategically important for renewable energy technologies, batteries, and electronics manufacturing.

Strategic Importance

Successful implementation would place India among a select group of countries — including the United States, Russia, China, France, and Japan — possessing human deep-sea exploration capabilities.

OTHER MAJOR CONSERVATION INITIATIVES

Project Dolphin

Launched in 2020, the project focuses on habitat conservation and population monitoring of both marine and river dolphins.

National Marine Turtle Action Plan

Introduced in 2021, the plan seeks to conserve Olive Ridley turtles by reducing fishing-related threats and coastal poaching.

Integrated Coastal Zone Management (ICZM)

ICZM promotes sustainable coastal development and resource management in states such as:

- Gujarat
- Odisha
- West Bengal

MISHTI Scheme

Launched in 2023, MISHTI promotes mangrove restoration across 13 states and Union Territories, covering over 22,000 hectares.

BBNJ Agreement

India joined the Biodiversity Beyond National Jurisdiction Agreement (BBNJ) in 2024 to support conservation of marine biodiversity in areas beyond national jurisdiction.

Challenges

Despite significant progress, several challenges persist:

- Marine pollution and plastic waste
- Coastal erosion and habitat degradation
- Overfishing and illegal fishing
- Climate change impacts on coral reefs and marine ecosystems
- Technological and financial limitations in deep-sea exploration

WAY FORWARD

Strengthen Marine Governance

Improve coordination among environmental, fisheries, coastal, and maritime agencies.

Expand Scientific Research

Enhance oceanographic research, biodiversity mapping, and climate resilience studies.

Community Participation

Promote participation of coastal communities in conservation and sustainable resource management.

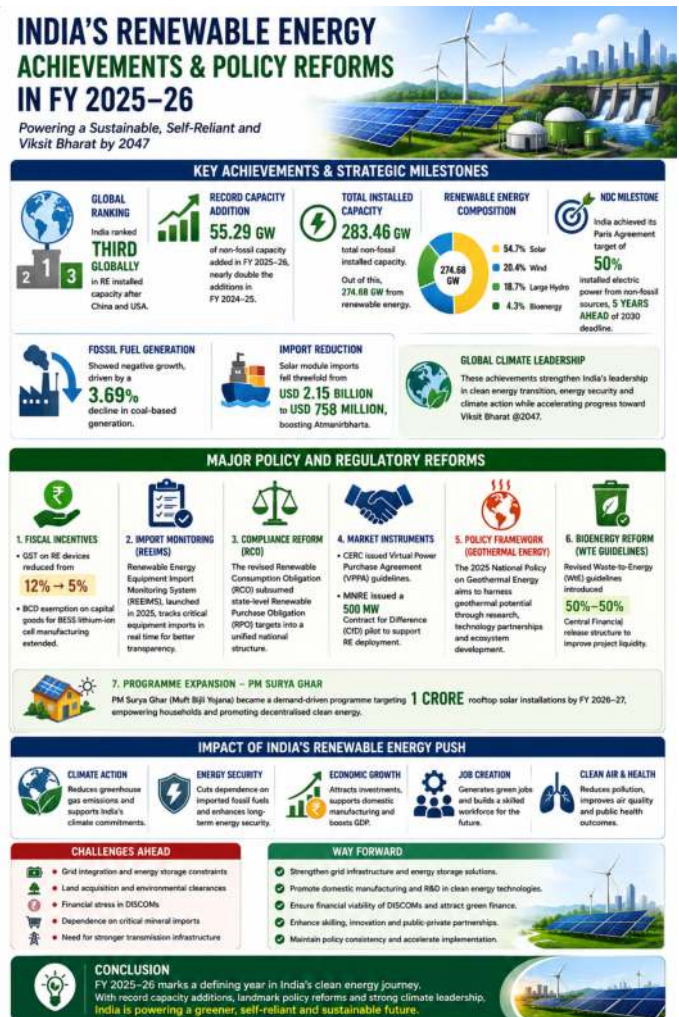
Sustainable Blue Economy

Balance resource extraction with ecological sustainability and biodiversity protection.

CONCLUSION

India's marine biodiversity conservation framework reflects a comprehensive approach combining legal protection, scientific innovation, and sustainable ocean governance. Initiatives such as the Deep Ocean Mission, marine protected areas, and mangrove restoration strengthen India's role in global marine conservation while advancing the blue economy. Long-term success will depend on balancing economic interests with ecological sustainability and international cooperation.

INDIA'S RENEWABLE ENERGY ACHIEVEMENTS AND POLICY REFORMS IN FY 2025-26



India has emerged as one of the world's fastest-growing renewable energy economies, driven by ambitious climate goals, policy reforms, and rapid expansion of clean energy infrastructure. Recently, the Ministry of New and Renewable Energy (MNRE) highlighted India's major renewable energy achievements and policy initiatives during FY 2025-26.

The progress reflects India's commitment toward energy transition, climate action, and sustainable economic growth while reducing dependence on fossil fuels.

MAJOR RENEWABLE ENERGY ACHIEVEMENTS

Global Renewable Energy Ranking

India became the world's third-largest country in renewable energy installed capacity after China and the United States.

Record Capacity Addition

India added a record 55.29 GW of non-fossil fuel capacity during FY 2025–26, nearly double the additions made in FY 2024–25.

Total Installed Capacity

The country's total non-fossil fuel installed capacity reached 283.46 GW, of which 274.68 GW came from renewable energy sources.

Renewable Energy Composition

The renewable energy mix included:

- Solar Energy – 54.7%
- Wind Energy – 20.4%
- Large Hydro – 18.7%
- Bioenergy – 4.3%

Solar energy continues to dominate India's clean energy transition due to declining costs and rapid rooftop and utility-scale expansion.

Paris Agreement Milestone

India achieved its Nationally Determined Contribution (NDC) target of obtaining 50% installed electricity capacity from non-fossil fuel sources five years ahead of the 2030 deadline under the Paris Agreement.

Decline in Fossil Fuel Dependence

Coal-based electricity generation witnessed a decline of 3.69%, leading to negative growth in fossil fuel generation. This indicates gradual decarbonisation of the power sector.

Reduced Import Dependence

Solar module imports reduced sharply from USD 2.15 billion to USD 758 million, reflecting growth in domestic manufacturing and self-reliance.

MAJOR POLICY AND REGULATORY REFORMS

Fiscal Incentives

The government reduced GST on renewable energy devices from 12% to 5%, lowering project costs and encouraging wider adoption.

Further, the Basic Customs Duty (BCD) exemption on capital goods for Battery Energy Storage System (BESS) lithium-ion cell manufacturing was extended to strengthen domestic energy storage capacity.

Renewable Energy Equipment Import Monitoring System (REEIMS)

Launched in 2025, REEIMS enables real-time tracking of critical renewable energy equipment imports, improving transparency and supply chain monitoring.

Renewable Consumption Obligation (RCO)

The revised Renewable Consumption Obligation subsumed state-level Renewable Purchase Obligations (RPOs) into a unified national framework, ensuring greater policy coherence and compliance.

Market-Based Instruments

The Central Electricity Regulatory Commission (CERC) issued guidelines for Virtual Power Purchase Agreements (VPPAs), enabling companies to purchase renewable energy virtually without direct physical delivery.

Additionally, the MNRE launched a 500 MW Contract for Difference (CfD) pilot to stabilise renewable energy pricing and encourage investment.

National Policy on Geothermal Energy

India introduced the 2025 National Policy on Geothermal Energy to promote research, international partnerships, and technological development for harnessing geothermal resources.

Waste-to-Energy Reforms

Revised Waste-to-Energy (WtE) guidelines introduced a 50%-50% Central Financial Assistance release structure to improve project liquidity and implementation efficiency.

Expansion of PM Surya Ghar

The PM Surya Ghar: Muft Bijli Yojana was expanded into a demand-driven programme targeting installation of one crore rooftop solar systems by FY 2026–27.

SIGNIFICANCE OF INDIA'S RENEWABLE ENERGY PUSH

Climate Change Mitigation

Renewable energy expansion supports India's climate commitments and helps reduce greenhouse gas emissions.

Energy Security

Reducing dependence on imported fossil fuels enhances long-term energy security and economic resilience.

Economic Growth and Employment

The renewable energy sector generates green jobs, supports domestic manufacturing, and attracts investment.

Sustainable Development

Clean energy contributes to improved air quality, reduced pollution, and sustainable industrial growth.

Challenges Ahead

Despite strong progress, India still faces several challenges:

- Grid integration and storage constraints
- Land acquisition issues
- Financial stress in DISCOMs
- Dependence on critical mineral imports
- Need for stronger transmission infrastructure

Addressing these challenges will be crucial for sustaining rapid renewable energy growth.

CONCLUSION

India’s renewable energy achievements in FY 2025–26 demonstrate its emergence as a global leader in clean energy transition. Through strong policy reforms, market innovation, and infrastructure expansion, India is steadily moving toward a low-carbon and energy-secure future. Sustained investment, technological innovation, and institutional coordination will remain essential for achieving long-term climate and energy goals.

KUALA LUMPUR DECLARATION ON CLIMATE JUSTICE

KUALA LUMPUR DECLARATION ON CLIMATE JUSTICE
A call for accelerated climate action and equity in the Global South

Adopted by civil society groups and climate experts from South and Southeast Asia.

BACKGROUND: Responds to geopolitical conflicts and energy shocks, highlighting risks of fossil fuel dependence.

Ahead of COP31 and the Santa Marta Conference in Colombia.

KEY DEMANDS OF THE KUALA LUMPUR DECLARATION

- 1. FOSSIL FUEL PHASE-OUT**
Calls for a clear global roadmap to phase out coal, oil and gas in a time-bound and equitable manner.
- 2. CLIMATE FINANCE**
• Demands \$5.1–6.8 trillion by 2030
• \$5 trillion annually to support energy transition in developing countries.
• Finance must be adequate, predictable and grant-based.
- 3. FOSSIL FUEL TREATY**
Advocates a global Fossil Fuel Treaty to complement the Paris Agreement.
• Halt new fossil fuel expansion
• Phase out existing production
• Ensure a fair transition to renewable energy
- 4. JUST TRANSITION**
Emphasises a people-centric transition. Prioritises vulnerable groups:
• Women
• Youth
• Indigenous communities
• Workers and local communities
- 5. ADAPTATION, LOSS & DAMAGE**
Calls for:
• Tripling adaptation finance
• Expanding the Loss and Damage Fund for climate-affected nations.

ABOUT SANTA MARTA CONFERENCE
An upcoming international climate conference in Santa Marta, Colombia.
Aims to build global consensus on the phase-out of fossil fuels and strengthen international cooperation.

CONFERENCE OF THE PARTIES (COP)
COP is the annual global meeting of countries under the UNFCCC.
It serves as a platform where nations negotiate policies on:
• Emissions reduction
• Climate finance
• Adaptation to tackle climate change.
COP31 will be held in Antalya, Türkiye, in November 2026.

INDIA'S POSITION (Aligned with Declaration)
• Supports equity, common but differentiated responsibilities and climate justice.
• Advocates lifestyle for environment (LIFE) and a just, inclusive transition.
• Stresses on enhanced, predictable and grant-based climate finance for developing countries.
• Strongly supports a global roadmap for fossil fuel phase-out in a fair and equitable manner.

Climate justice is not a choice, it is an obligation. Equity today, a sustainable tomorrow for all.

The Kuala Lumpur Declaration on Climate Justice was issued ahead of COP31 and the Santa Marta Conference, highlighting the urgent need for climate justice and accelerated climate action in the Global South. The declaration was adopted by civil society organisations, environmental activists, and climate experts from South and Southeast Asia.

The declaration emerged against the backdrop of rising geopolitical conflicts, energy insecurity, and continued dependence on fossil fuels. It argues that developing countries are disproportionately affected by climate change despite contributing minimally to global emissions.

KEY DEMANDS OF THE DECLARATION

1. Fossil Fuel Phase-Out

The declaration calls for a clear and time-bound global roadmap to phase out coal, oil, and gas in an equitable manner.

It stresses that developed nations, being historically responsible for higher emissions, should take the lead in reducing fossil fuel dependence while supporting developing economies in transition.

2. Climate Finance

A major demand is enhanced climate financing for developing countries.

- Estimated requirement: **\$5.1–6.8 trillion by 2030**
- Long-term demand: **\$5 trillion annually**

The declaration argues that climate finance should be:

- Adequate,
- Predictable,
- Grant-based rather than debt-driven.

3. Fossil Fuel Treaty

The declaration advocates a legally binding global Fossil Fuel Non-Proliferation Treaty to complement the Paris Agreement.

The proposed treaty seeks to:

- Halt new fossil fuel expansion,
- Gradually phase out existing production,
- Ensure a fair transition toward renewable energy.

4. Just Transition

The declaration promotes a people-centric “just transition” framework.

It emphasises protecting:

- Workers dependent on fossil fuel industries,
- Indigenous communities,
- Women and youth,
- Climate-vulnerable populations.

The focus is on balancing environmental sustainability with social justice and livelihood security.

5. Adaptation and Loss & Damage

The declaration calls for:

- Tripling adaptation finance,

- Strengthening the Loss and Damage Fund for climate-hit nations.

Developing countries argue that they require greater support to tackle extreme weather events, sea-level rise, droughts, and displacement.

CONFERENCE OF THE PARTIES (COP)

United Nations Framework Convention on Climate Change COP meetings are annual global climate summits where countries negotiate measures related to emissions reduction, adaptation, and climate finance. COP31 is scheduled to be held in Antalya in November 2026.

SIGNIFICANCE

The Kuala Lumpur Declaration reflects the growing assertion of the Global South in climate negotiations. It highlights the need for climate equity, financial responsibility of developed countries, and a faster transition away from fossil fuels while safeguarding developmental priorities.

KULSI RIVER HYDROPOWER PROJECT CONTROVERSY

ABOUT KULSI RIVER

- ✓ South-bank tributary of the Brahmaputra River
- ✓ Originates from the West Khasi Hills of Meghalaya
- ✓ Supports endangered Gangetic dolphins

ISSUE: HYDROPOWER PROJECT

PROS

- ✓ Promotes renewable energy
- ✓ Boosts regional development

CONTROVERSY & CONCERNS

- ✗ Threat to endangered Gangetic dolphins
- ✗ Loss of Livelihoods of local communities
- ✗ Ecological damage and imbalance

WAY FORWARD

- ✓ Conduct proper Environmental Impact Assessment
- ✓ Ensure community consultation in decision-making

INDIA Gangetic Dolphin Habitat

Map Details: MEGHALAYA (Khri, Umsiri, Krishniya), ASSAM (UKIUM, Kamrup, Kulsī), BRAHMAPUTRA. Total: 220 km (100 km in Meghalaya, 120 km in Assam).

Additional Recommendations:

- ✓ Conduct proper Environmental Impact Assessment
- ✓ Ensure community consultation in decision-making
- ✓ Ensure alternate sites & conservation measures

A proposed hydropower project on the Kulsī River, a south-bank tributary of the Brahmaputra River, has recently triggered widespread protests from local residents, environmental groups, and conservationists. The issue has gained prominence in current affairs as it highlights the ongoing conflict between development objectives and environmental sustainability in India, particularly in ecologically fragile regions such as the Northeast.

ABOUT KULSI RIVER

The Kulsī River originates in the **West Khasi Hills of Meghalaya** at elevations exceeding 1800 metres. It is formed by the confluence of three rivers—**Khri, Krishniya, and Umsiri**—which flow through the Khasi hill ranges. In its upper reaches, the river is locally known as **Khri**, and after merging with its tributaries, it flows northwest and takes the name Kulsī.

The river enters Assam near **Ukiūm** and continues through the fertile plains of **Kamrup district**, where it supports agriculture, fisheries, and local livelihoods. It eventually merges with the Brahmaputra near **Nagarbera**. The total length of the river is approximately **220 km**, with about **100 km in Meghalaya** and **120 km in Assam**. The river basin forms an important part of the Brahmaputra drainage system and plays a key role in sustaining both ecological and economic systems in the region.

ECOLOGICAL SIGNIFICANCE

The Kulsī River is considered one of the most ecologically important rivers in Assam due to its relatively undisturbed ecosystem. It is one of the last remaining habitats of the endangered Gangetic Dolphin, which is also India's National Aquatic Animal. These dolphins require clean, flowing freshwater and are highly sensitive to disturbances such as pollution, noise, and changes in water levels.

In addition to dolphins, the river supports diverse aquatic flora and fauna, including fish species that are vital for local fisheries. The river also contributes to groundwater recharge, regulates local microclimates, and plays an important role in flood moderation during the monsoon season. Its ecological richness makes it a critical natural asset that requires careful protection.

ISSUE: PROPOSED HYDROPOWER PROJECT

The proposed hydropower project aims to harness renewable energy from the river, aligning with India's commitments towards clean energy and reduced carbon emissions. However, the project has raised several concerns:

- **Habitat disruption:** Construction activities and altered water flow may threaten dolphin populations and other aquatic species.

- **Changes in river dynamics:** Dams can affect sediment transport, water temperature, and ecological balance.
- **Livelihood impacts:** Local communities dependent on fishing and agriculture may face economic losses.
- **Risk of long-term damage:** Ecological degradation in such fragile ecosystems may be irreversible.

ARGUMENTS IN FAVOUR

Supporters of the project argue that it will contribute significantly to **renewable energy generation**, reduce dependence on fossil fuels, and help India meet its climate targets. It can also promote **regional development**, improve infrastructure, and generate employment opportunities for local populations. Additionally, hydropower projects are often seen as a reliable and sustainable source of energy in the long term.

ARGUMENTS AGAINST

Opponents highlight that the project threatens **biodiversity conservation**, particularly the survival of the Gangetic dolphin. It may lead to **ecological imbalance** by altering natural river systems and disrupting aquatic ecosystems. Furthermore, it can adversely affect **traditional livelihoods** and cultural practices of local communities. Critics also argue that the environmental costs may outweigh the economic benefits in such sensitive regions.

WAY FORWARD

To address the issue effectively, a balanced and sustainable approach is required. This includes conducting **comprehensive and transparent Environmental Impact Assessments (EIA)**, ensuring **active participation of local communities**, and exploring **alternative or low-impact energy solutions**. Strengthening conservation measures for endangered species and implementing strict regulatory oversight are also essential. Continuous monitoring and adaptive management strategies can help minimise environmental damage.

CONCLUSION

The Kushi River controversy underscores the broader challenge of achieving sustainable development in India. While hydropower is crucial for meeting energy demands and climate goals, projects in ecologically sensitive areas must be approached with caution. Protecting rivers like the Kushi is vital for preserving biodiversity, ensuring sustainable livelihoods, and maintaining ecological balance. A science-based, inclusive, and precautionary approach is essential for reconciling development with environmental conservation.

LIMNONECTES MOTIJHEEL: A NEW AMPHIBIAN DISCOVERY FROM ARUNACHAL PRADESH

LIMNONECTES MOTIJHEEL

A NEW FANGED FROG FROM ARUNACHAL PRADESH

LATEST NEWS

Indian scientists recently discovered a rare, fanged mud-nesting frog, *Limnonectes motijheel*, in Namdapha Tiger Reserve, Arunachal Pradesh.



Fang-like projections in lower jaw of males

ABOUT LIMNONECTES MOTIJHEEL

						
New species of frog	Named after Motijheel Lake,	Belongs to 'Fanged Frogs'	Mud-nesting behaviour	Distinct appearance	Size	Genus
Discovered in Namdapha Tiger Reserve, Arunachal Pradesh	known for its rich amphibian diversity	Named for small, fang-like projections in lower jaw of males	Builds a nest out of mud beneath leaf litter on the forest floor – first record in India for this group	Dark-brown line between eyes, inverted 'Y' ridge on back, broken folds on sides	Medium-sized amphibian 2.3 to 3.5 cm as an adult	Now has six known species in India

KEY FACTS ABOUT NAMDAPHA TIGER RESERVE

Location: Changlang District, Arunachal Pradesh. On the international border between India and Myanmar.

Biogeographic Junction: At the junction of Indian Sub-Continent and Indo-China Bio-geographic regions.

Landform: Situated between Diphu Bum ridge of Mishmi Hills (NE Himalayas) and Patka ranges.

Boundaries: Shares a common boundary with Kamlang Wildlife Sanctuary.

River: Namdapha River (tributary of Hoo-Ging River) flows north-south through the reserve.

Vegetation: Includes Northern Tropical Evergreen Forest, North Indian Tropical Moist Deciduous Forests, East Himalayan Moist Temperate Forests, and Moist Alpine Scrub Forests.



ARUNACHAL PRADESH
MYANMAR
NAMDAPHA TIGER RESERVE

FLORA

- *Pinus merkusii* and *Abies delavayi* unique to the park
- Home to rare Blue Vanda (orchid)
- Medicinal plants like Mishimi Teeta (*Coptis teeta*) used by local tribes

FAUNA

- Elephants, Himalayan Black Bear, Himalayan Sun Bear, Hoolock Gibbon (only ape in India), Slow Loris, etc.
- Only park in the world with four big cat species:


Tiger (*Panthera tigris*)


Leopard (*Panthera pardus*)


Snow Leopard (*Panthera uncia*)


Clouded Leopard (*Neofelis nebulosa*)

- Rich in other lesser cats and diverse wildlife.

SIGNIFICANCE: The discovery of *Limnonectes motijheel* highlights the rich amphibian diversity of India's forests and the importance of conserving biodiversity in regions like Namdapha.

Word Count: 485

INTRODUCTION

In a significant boost to India's biodiversity records, Indian scientists have discovered a new species of frog, *Limnonectes motijheel*, in the Namdapha Tiger Reserve. This rare amphibian belongs to the group commonly known as "fanged frogs" and exhibits unique behavioural and morphological traits. The discovery highlights the ecological richness of Northeast India and reinforces the importance of conserving fragile forest ecosystems.

ABOUT LIMNONECTES MOTIJHEEL

Limnonectes motijheel is a newly identified species within the genus *Limnonectes*, which now includes six known species in India. The species is named after Motijheel Lake, known for its rich amphibian diversity.

One of its defining features is the presence of small, fang-like projections in the lower jaw of males, giving rise to the name "fanged frogs." These structures are

believed to assist in feeding or territorial combat. Unlike most frogs that depend on water bodies for reproduction, this species exhibits a rare behaviour—it constructs mud nests beneath leaf litter on the forest floor. This nesting strategy has not been previously recorded among Indian members of this group.

The frog has a distinctive physical appearance, including a dark-brown line between the eyes, an inverted “V”-shaped ridge along its back, and broken lateral folds. Adults are medium-sized, typically measuring between 2.3 to 3.5 cm.

KEY FEATURES AT A GLANCE (INFOGRAPHIC)

- Species:** *Limnonectes motijheel*
- Location:** Namdapha Tiger Reserve, Arunachal Pradesh
- Group:** Fanged frogs (*Limnonectes* genus)
- Unique Trait:** Mud-nesting under leaf litter
- Size:** 2.3–3.5 cm
- Distinct Traits:** Fang-like jaw projections, dorsal ridge, lateral folds

NAMDAPHA TIGER RESERVE: A BIODIVERSITY HOTSPOT

The Namdapha Tiger Reserve, located in Changlang district, lies along the India–Myanmar border. It is uniquely positioned at the confluence of the Indo-Malayan and Palearctic biogeographic realms, making it one of the most biologically diverse regions in the world.

The reserve is bounded by the Mishmi Hills and Patkai ranges and is traversed by the Namdapha River, a tributary of the Noa-Dihing River. It encompasses a wide range of forest types—from tropical evergreen and moist deciduous forests to temperate forests and alpine scrub.

Floral diversity includes rare species such as Blue Vanda orchids and endemic conifers like *Pinus merkusii* and *Abies delavayi*. Medicinal plants like Mishmi Teeta are also found here.

Faunal diversity is equally remarkable. The reserve is the only protected area globally that hosts all four big cat species: Tiger (*Panthera tigris*), Leopard (*Panthera pardus*), Snow Leopard (*Panthera uncia*), and Clouded Leopard (*Neofelis nebulosa*). Other species include the Hoolock Gibbon (India’s only ape), Slow Loris, and Himalayan bears.

SIGNIFICANCE OF THE DISCOVERY

The identification of *Limnonectes motijheel* is significant for several reasons. Firstly, it adds to India’s known amphibian diversity, a group often considered bioindicators of environmental health. Secondly, the unique nesting behaviour suggests evolutionary

adaptation to forest floor ecosystems, opening new avenues for ecological and behavioural studies.

Moreover, the discovery underscores the importance of unexplored and under-documented habitats like Namdapha. It highlights the urgent need for conservation efforts in biodiversity-rich regions, which are increasingly threatened by habitat loss, climate change, and human activities.

CONCLUSION

The discovery of *Limnonectes motijheel* is not merely an addition to taxonomy but a reminder of the hidden ecological wealth of India’s forests. Protecting such habitats is crucial for sustaining biodiversity and maintaining ecological balance. Continued scientific exploration, coupled with strong conservation policies, will be essential to preserve these natural treasures for future generations.

LOWER LAKE (BHOPAL) – ENVIRONMENTAL CONCERNS AND NGT INTERVENTION



LOWER LAKE LATEST NEWS

The central bench of National Green Tribunal (NGT) in its order directed the MP Pollution Control Board (MPPCB) to inspect the Lower Lake and present a detailed report with photographs with latitude and longitude details in support of its findings.



Lower Lake, also known as **Chhota Talaab**, is an integral part of Bhopal’s historic and ecological landscape. It forms a vital component of Bhoj Wetland, a Ramsar site recognised for its international importance.

ABOUT LOWER LAKE

Lower Lake, also known as **Chhota Talaab**, is a man-made lake located in Bhopal, Madhya Pradesh.

It was **built in 1794** by **Chote Khan**, a minister of Nawab Hayat Muhammad Khan Bahadur, to beautify the city. Several earlier wells were merged in this lake.

Chhota Talaab, along with the nearby **Upper Lake (Bada Talaab)**, constitutes **Bhoj Wetland**, which is now a Ramsar site.

The Lower Lake is positioned to the **east of the Upper Lake**. The two lakes are separated by an overbridge called **Pul Pukhta** or **Lower Lake Bridge**.

The two lakes are constructed in a **terraced way**; the lowest level of the Upper Lake is just underneath the highest stage of the Lower Lake.

Supplying water to almost **40%** of the residents in Bhopal, these lakes play a vital role in serving the city.

The Lower Lake has an **area of 1.29 sq. km** and a **catchment area of 9.6 sq. km**.

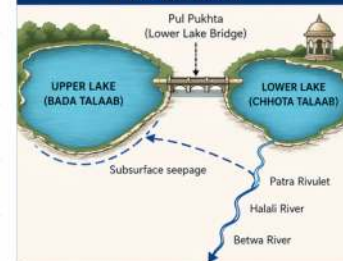
The Lower Lake does not have any sparkling water supply. The lake receives **subsurface seepage** from the Upper Lake.

It drains into the **Patra rivulet**, which joins the **Halali River**, a small tributary of the **Betwa River**.

LOWER LAKE AT A GLANCE

- Location:** Bhopal, Madhya Pradesh
- Built in:** 1794
- Area:** 1.29 sq. km
- Catchment Area:** 9.6 sq. km
- Water Source:** Subsurface seepage from Upper Lake (no direct sparkling water supply)
- Supplies Water to:** ~40% of Bhopal’s residents

THE LAKE SYSTEM



ECOLOGICAL SIGNIFICANCE

- Part of Bhoj Wetland
- Ramsar Site of International Importance
- Supports biodiversity and the water security of Bhopal

WHY IN NEWS

The central bench of the National Green Tribunal (NGT) has directed the Madhya Pradesh Pollution Control Board (MPPCB) to conduct a detailed inspection of the Lower Lake in Bhopal and submit a comprehensive report. The report must include photographic evidence with latitude and longitude details, indicating growing concerns over environmental degradation and pollution levels in the lake.

ABOUT LOWER LAKE

Lower Lake, locally known as *Chhota Talaab*, is a historic man-made water body situated in Bhopal, Madhya Pradesh. It was constructed in 1794 by Chote Khan, a minister under Nawab Hayat Muhammad Khan Bahadur, primarily to enhance the city's aesthetics and water management system. The lake was formed by merging several pre-existing wells and smaller water bodies.

Lower Lake forms an integral part of the **Bhoj Wetland**, along with the Upper Lake (*Bada Talaab*). This wetland complex has been designated as a Ramsar Site, highlighting its international ecological significance. Geographically, Lower Lake lies to the east of Upper Lake, and both are separated by the Pul Pukhta (Lower Lake Bridge).

A unique feature of this system is its **terraced structure**, where the water level of the Upper Lake is slightly higher than that of the Lower Lake, allowing subsurface seepage. Unlike many lakes, Lower Lake does not have a direct freshwater inflow; instead, it depends on seepage from Upper Lake.

HYDROLOGICAL AND ECOLOGICAL SIGNIFICANCE

Lower Lake plays a crucial role in Bhopal's urban ecosystem. Together with Upper Lake, it supplies drinking water to nearly 40% of the city's population. The lake spans an area of approximately 1.29 sq. km, with a catchment area of about 9.6 sq. km.

Hydrologically, the lake drains into the Patra rivulet, which eventually joins the Halali River, a tributary of the Betwa River. This connectivity makes it an important component of the regional river basin system.

Ecologically, the lake supports biodiversity, including aquatic flora and fauna, migratory birds, and wetland vegetation. Its Ramsar status underscores its importance in maintaining ecological balance, groundwater recharge, and climate moderation.

ISSUES AND CONCERNS

Despite its significance, Lower Lake faces multiple environmental challenges:

- **Pollution Load:** Untreated sewage discharge, urban runoff, and solid waste dumping have degraded water quality.
- **Eutrophication:** Excess nutrients have led to algal blooms, reducing oxygen levels and affecting aquatic life.
- **Encroachment:** Urban expansion has led to shrinking catchment areas and loss of natural buffers.
- **Declining Water Quality:** Dependence on seepage rather than direct inflow makes it vulnerable to contamination from Upper Lake.

These issues prompted intervention by the NGT, reflecting the urgency of restoring the lake's ecological health.

SIGNIFICANCE OF NGT'S DIRECTIVE

The NGT's order emphasizes **scientific monitoring and accountability**. By mandating geo-tagged photographic evidence, it ensures transparency and accuracy in environmental assessment. This step is crucial for identifying pollution sources, enforcing regulatory compliance, and planning restoration measures.

WAY FORWARD

To ensure sustainable conservation of Lower Lake:

- **Strengthening Sewage Treatment Infrastructure** to prevent untreated discharge.
- **Catchment Area Protection** through strict regulation of construction and encroachment.
- **Community Participation** in lake conservation and awareness campaigns.
- **Integrated Wetland Management** aligned with Ramsar guidelines.
- **Regular Monitoring** using GIS and remote sensing tools.

CONCLUSION

Lower Lake is not merely a historical water body but a vital ecological and urban asset for Bhopal. The intervention by the National Green Tribunal highlights the need for immediate and sustained conservation efforts. Protecting such wetlands is essential for ensuring water security, biodiversity conservation, and sustainable urban development in India.

MARINE SPATIAL PLANNING IN INDIA: ODISHA LEADS THE WAY

Marine Spatial Planning in India: Odisha Leads the Way

The Odisha government has partnered with the National Centre for Coastal Research (NCCR), Ministry of Earth Sciences, to launch a Marine Spatial Plan (MSP) for integrated coastal and marine management.



Sustainable ocean planning in India began in 2019 through a partnership with Norway. The initial phase covered Puducherry and Lakshadweep. Odisha is the first state to implement Marine Spatial Planning in the second phase.

NATIONAL CENTRE FOR COASTAL RESEARCH (NCCR)

- Established in 1998 in Chennai under the Ministry of Earth Sciences.
- Originally known as ICMAM-PD.
- Key institution for scientific research, monitoring and sustainable coastal management.

KEY FUNCTIONS

- Shoreline Management:** Tracks coastal erosion and changes using satellite and field data; maps for all Indian states and UTs.
- Pollution & Water Quality Monitoring:** Assesses coastal water health; studies microplastics and heavy metals.
- Hazard Mitigation:** Develops tools like coastal flood warning systems and shoreline assessment systems for tsunamis and storm surges.
- Ecosystem Research:** Conducts studies on coastal habitats to support sustainable resource management.
- Capacity Building:** Promotes awareness and training through internships, lab visits, and educational initiatives.

MARINE SPATIAL PLANNING (MSP)

- Strategic tool for integrated and sustainable management of ocean resources.
- Enables planned use of marine spaces for energy, ports and industries, fisheries, aquaculture, tourism and conservation.
- Experts map coastal and marine areas to allocate specific zones for different activities, balancing ecology with economic and social goals.
- In India, MSP is part of the Indo-Norway Integrated Ocean Initiative launched in 2019.

MARINE SPATIAL PLANNING IN ODISHA

- Odisha has a coastline of over 550 km with lagoons, mangroves and estuaries supporting biodiversity, livelihoods and economic activities.
- Scientific Mapping & Data-Driven Planning**
Studies on water characteristics, benthic mapping and identification of zones for tourism, fisheries & aquaculture, seagrass & seaweed cultivation and other economic activities.
- Boost to Coastal Economy & Livelihoods**
Supports fisheries, ports, tourism and ocean-based industries; benefits stakeholders dependent on coastal resources.
- Balanced & Sustainable Development**
Helps meet sectoral demands, protect marine ecosystems and ensure long-term environmental sustainability.

HOW MARINE SPATIAL PLANNING WORKS

SUPPORTING INITIATIVE: ODISHA MARINE BIOTECHNOLOGY CORRIDOR (OMBRIC)

Launched in August 2025 to harness biotechnology for marine conservation and economic development.

OMBRIC aims to:

- Promote marine biotechnology research
- Support startups and enterprises in the marine sector
- Enhance ecological protection
- Develop scientific tourism
- Strengthen livelihood opportunities for coastal communities

OMBRIC will reinforce MSP by integrating scientific innovation with sustainable coastal management.

Word Count: 498

The Government of Odisha, in partnership with the National Centre for Coastal Research (NCCR) under the Ministry of Earth Sciences, has launched a **Marine Spatial Plan (MSP)** for integrated coastal and marine management. This marks a major advancement in India's approach to sustainable ocean governance. Odisha is the **first state** to implement MSP in Phase II of the Indo-Norway Integrated Ocean Initiative, reflecting a growing emphasis on the Blue Economy and climate-resilient development.

NATIONAL CENTRE FOR COASTAL RESEARCH (NCCR)

Established in 1998 in Chennai (formerly ICMAM-PD), NCCR is a premier institute for coastal and marine research in India.

Key Functions:

- Shoreline Management:** Monitors coastal erosion, accretion, and shoreline shifts using satellite imagery and field surveys across India's coastline.

- Pollution Monitoring:** Tracks coastal water quality and studies emerging pollutants such as microplastics and heavy metals.
- Hazard Mitigation:** Develops decision-support systems, including coastal flood warning tools and shoreline vulnerability assessments.
- Ecosystem Research:** Studies mangroves, coral reefs, and other coastal ecosystems for conservation and sustainable use.
- Capacity Building:** Conducts training, awareness programmes, and scientific outreach to strengthen ocean literacy.

MARINE SPATIAL PLANNING (MSP): CONCEPT AND FEATURES

Marine Spatial Planning is a **data-driven and participatory framework** that organizes the use of marine space to reduce conflicts and enhance sustainability.

Key Features:

- Zonation of Marine Areas:** Allocates zones for fisheries, tourism, ports, renewable energy, conservation, and other activities.
- Ecosystem-Based Approach:** Integrates ecological considerations with economic planning.
- Stakeholder Participation:** Involves local communities, industries, and policymakers in decision-making.
- Climate Adaptation Tool:** Helps address risks like sea-level rise, coastal erosion, and extreme weather events.

In India, MSP was initiated in 2019 under the Indo-Norway collaboration, initially covering Puducherry and Lakshadweep, before expanding to Odisha.

MARINE SPATIAL PLANNING IN ODISHA: KEY ASPECTS

Odisha's coastline, extending over **550 km**, includes ecologically rich features such as lagoons, mangroves, estuaries, and nesting grounds for marine species. These ecosystems are vital for biodiversity, disaster protection, and livelihoods.

Major Components of MSP in Odisha:

- Scientific Mapping and Data Collection:**
 - Ocean parameters like salinity, temperature, and currents
 - Benthic habitat mapping (seafloor vegetation and organisms)
- Identification of Suitable Zones:**
 - Fisheries and aquaculture
 - Tourism and recreation

- Seaweed and seagrass cultivation
- Port-led and industrial development
- **Policy Integration:** Data generated will guide coastal regulation, zoning laws, and sustainable development strategies.

SIGNIFICANCE OF MSP FOR ODISHA AND INDIA

- **Economic Growth:** Boosts sectors like fisheries, ports, shipping, tourism, and marine-based industries.
- **Livelihood Security:** Supports coastal communities, especially fishers and small-scale entrepreneurs.
- **Environmental Sustainability:** Prevents overexploitation, protects biodiversity, and ensures ecosystem health.
- **Disaster Risk Reduction:** Enhances preparedness against cyclones, storm surges, and coastal flooding.
- **Conflict Reduction:** Minimizes conflicts among competing users of marine resources.

SUPPORTING INITIATIVE: OMBRIC

The **Odisha Marine Biotechnology Research and Innovation Corridor (OMBRIC)**, launched in 2025, complements MSP by integrating science and innovation.

Objectives:

- Promote marine biotechnology research and development
- Support startups and marine-based enterprises
- Enhance conservation through scientific solutions
- Develop eco-tourism and scientific tourism
- Improve livelihood opportunities for coastal communities

OMBRIC strengthens MSP by ensuring that economic development is aligned with technological advancement and ecological sustainability.

CONCLUSION

Marine Spatial Planning represents a **transformative step in India's ocean governance framework**. Odisha's initiative demonstrates how scientific data, institutional support, and stakeholder participation can be combined to achieve sustainable coastal development. As India advances its Blue Economy vision, MSP can serve as a scalable model for other coastal states, ensuring that economic growth, environmental protection, and social equity progress together.

STATE OF GLOBAL MARINE CONSERVATION AS PER WDPCA



The latest findings from the World Database on Protected and Conserved Areas (WDPCA) highlight both progress and persistent gaps in global marine conservation efforts. According to recent data, nearly 10% of the world's oceans are now under some form of protection, marking an increase of 1.41% since 2024. However, experts warn that current conservation efforts remain insufficient to achieve global biodiversity targets under the Kunming-Montreal Global Biodiversity Framework (KMGBF).

The report underscores the urgent need for stronger marine governance, protection of high seas biodiversity, and expansion of highly protected marine ecosystems.

ABOUT WDPCA

The World Database on Protected and Conserved Areas is a joint initiative of:

- United Nations Environment Programme (UNEP)
- International Union for Conservation of Nature (IUCN)

It is managed by the UNEP World Conservation Monitoring Centre (UNEP-WCMC) based in Cambridge.

Objectives

The database:

- Tracks terrestrial and marine protected areas globally
- Monitors progress toward biodiversity conservation goals
- Supports implementation of the Kunming-Montreal Global Biodiversity Framework

Monthly Updates

The WDPCA is updated monthly to reflect:

- Newly designated protected areas
- Changes in conservation status
- Governance and management updates

KEY FINDINGS ON MARINE CONSERVATION

Global Marine Protection Reaches 10%

Around 10.01% of the global ocean is now covered under protected and conserved areas.

This represents progress compared to previous years but remains significantly below the global “30×30” target.

Importance of High Seas

The report highlights that:

- Around 95% of Earth’s habitable space by volume lies within the oceans and high seas.

Despite their ecological importance:

- Only 1.66% of high seas areas beyond national jurisdiction are currently under conservation management.

This reflects a major governance and conservation gap.

Largest Marine Protected Area

In 2025, Tainui Atea became the world’s largest Marine Protected Area (MPA), covering around 4.5 million square kilometres.

The creation of such mega-MPAs demonstrates increasing global recognition of ocean conservation priorities.

The 30×30 Global Target

Under the Kunming-Montreal Global Biodiversity Framework, countries committed to conserving:

- 30% of the Earth’s land and oceans by 2030.

Current marine protection levels indicate that:

- Ocean protection must nearly triple within this decade to achieve the target.

Quality of Protection Remains Weak

A major concern highlighted by WDPCA is that only:

- Around 2.8%–3.3% of oceans are categorised as “fully or highly protected.”

In such zones:

- Industrial fishing
- Deep-sea mining
- Extractive activities are either heavily restricted or completely prohibited.

Thus, mere designation of protected areas does not always ensure effective biodiversity conservation.

Key Biodiversity Areas (KBAs)

The report also highlights conservation gaps concerning Key Biodiversity Areas (KBAs).

What are KBAs?

Key Biodiversity Areas are ecologically important sites that contribute significantly to the persistence of global biodiversity.

Existing Gaps

Around:

- 30%–34% of identified marine KBAs still lie outside protected or conserved areas.

This exposes vulnerable ecosystems and species to overexploitation and habitat degradation.

RELATION WITH GLOBAL BIODIVERSITY TARGETS

Aichi Biodiversity Targets

Target 11 of the Aichi Biodiversity Targets (2011–2020) aimed to conserve at least 10% of coastal and marine areas.

Although the world has now crossed this threshold, conservation experts argue that:

- Quantity alone is insufficient
- Effective management and ecological representation are equally important

CHALLENGES IN MARINE CONSERVATION

Weak High Seas Governance

Areas beyond national jurisdiction lack strong enforcement mechanisms.

Overfishing and Deep-Sea Exploitation

Industrial fishing and emerging deep-sea mining activities threaten marine ecosystems.

Climate Change

Ocean warming, acidification, and coral bleaching continue to damage marine biodiversity.

Limited Enforcement Capacity

Several marine protected areas exist only “on paper” without effective monitoring or implementation.

WAY FORWARD

Expand Highly Protected MPAs

Increase strict no-take marine reserves with stronger ecological safeguards.

Strengthen BBNJ Agreement Implementation

Operationalise the Biodiversity Beyond National Jurisdiction Agreement for high seas governance.

Improve Scientific Monitoring

Use satellite tracking, AI, and marine biodiversity mapping for effective conservation.

Promote International Cooperation

Marine ecosystems are transboundary in nature and require collaborative governance frameworks.

CONCLUSION

The WDPCA findings reveal that global marine conservation is progressing but remains far below the scale required to protect ocean ecosystems effectively. While crossing the 10% threshold is an important milestone, achieving the 30x30 target will require rapid expansion of protected areas, stronger enforcement, and improved protection quality. Sustainable ocean governance is essential not only for biodiversity conservation but also for climate stability, food security, and the future of the blue economy.

TRIBAL ECOLOGICAL COMMUNITARIANISM AS A SUSTAINABLE DEVELOPMENT MODEL

TRIBAL ECOLOGICAL COMMUNITARIANISM AS A SUSTAINABLE DEVELOPMENT MODEL

CONTEXT
Tribal Ecological Communitarianism (TEC) offers a sustainable alternative to mainstream economic models driven by capital accumulation and profit maximisation. It combines collective ownership, cooperative labour and equitable resource distribution with deep ecological embeddedness.

CORE IDEA
Community at the centre, Living in harmony with nature, Well-being for all, now and future, Sustainable use, not exploitation.

FEATURES OF TRIBAL ECOLOGICAL COMMUNITARIANISM

- OWNERSHIP**: Land and natural resources are held as collective property by the community.
- STEWARDSHIP**: Humans are temporary guardians of the earth, with a moral duty to preserve ecosystems for future generations.
- LABOUR**: Tasks like farming and building are performed through traditional communal cooperation.
- REVERENCE**: Cultural taboos enforce the protection of 'sacred' natural elements from exploitation.
- EQUALITY**: Wealth and food are distributed equitably among members to ensure social and physical security.

SIGNIFICANCE OF TEC

- Resource Sovereignty**: Collective control over the Commons ensures local communities dictate the sustainable use of their forests and water.
- Climate Mitigation**: Traditional land management sequesters carbon through the protection of forests and pastures – a Natural Climate Solution.
- Knowledge Preservation**: Community-preserved ethno-ecological data is vital for discovering new medicines and drought-resistant crop varieties.
- Eco-Pedagogy**: Oral storytelling and ritual pass environmental literacy to children as a lived experience.
- Biomimetic Design**: Traditional building and irrigation techniques mimic natural water flows and forest structures that prevent habitat fragmentation.

CHALLENGES

- Scalability Gap**: Small-scale communal models struggle to maintain high-trust bonds within large, anonymous urban populations.
- Credit Inaccessibility**: Collective ownership prevents individuals from using ancestral land as collateral to secure formal bank loans.
- Labour Migration**: Educated youth increasingly abandon traditional cooperative work systems in favour of individualistic urban careers.
- Administrative Overlap**: Traditional village councils face legal doublets with state forest departments over the right to manage local resources.
- Market Volatility**: Commodity price fluctuations pressure communities to replace diverse, resilient food crops with high-yield industrial monocultures.

GOVERNMENT INITIATIVES SUPPORTING TEC

- Forest Rights Act (FRA)**: Grants Gram Sabhas the legal authority to manage, protect and regenerate communal forest resources.
- PESA Act**: Empowers tribal village councils to make all primary decisions regarding the use of land, water and local minerals.
- Van Dhan Yojana**: Creates community-owned clusters that process minor forest products, ensuring profits remain within the tribal collective.
- MSP for MFP Scheme**: Establishes a guaranteed minimum price for forest goods to protect tribal gatherers from predatory middlemen.
- Dharti Aba Jangtiya Gram Utkarsh Abhiyan**: Funds infrastructure in tribal villages to improve livelihoods while preserving their unique cultural heritage.
- Adi Karmayogi Abhiyan**: Trains 20 lakh tribal change-makers to lead bottom-up governance rooted in local tradition.

THE TEC WAY OF LIFE

Collective Living → Sustainable Use of Resources → Respect for All Life → Intergenerational Justice → Harmony with Nature

“When the last tree is cut, when the last river is poisoned, when the last fish is caught, only then will we realise that we cannot eat money.”
— Tribal Wisdom

WHY TEC MATTERS

- Offers a people-centric, nature-positive development path.
- Complements global goals: SDGs, Paris Agreement, Kunming-Montreal Global Biodiversity Framework.
- Strengthens climate resilience and biodiversity conservation.
- Promotes inclusive growth with dignity and cultural identity.

WAY FORWARD

- Recognise and respect tribal knowledge and rights.
- Strengthen community institutions and self-governance.
- Incorporate TEC principles in policies and planning.
- Promote sustainable markets for tribal products.
- Enable youth leadership within the tribal knowledge system.

TEC is not just a tradition; it is a timeless blueprint for a sustainable and just future.

Tribal Ecological Communitarianism (TEC) is emerging as an alternative model of sustainable development that challenges mainstream economic systems driven by excessive capital accumulation and profit maximisation. Rooted in indigenous traditions, TEC combines collective ownership, ecological stewardship, cooperative labour, and equitable resource distribution with a strong cultural relationship with nature.

The model highlights how tribal communities have historically maintained ecological balance while ensuring social security and sustainable livelihoods.

WHAT IS TRIBAL ECOLOGICAL COMMUNITARIANISM?

TEC is a socio-economic framework where communities collectively manage natural resources and organise economic activities in harmony with ecological systems. Unlike market-centric models focused on individual ownership and extraction, TEC emphasises:

- Collective welfare
- Ecological responsibility
- Intergenerational sustainability
- Community-based decision-making

FEATURES OF TRIBAL ECOLOGICAL COMMUNITARIANISM

Collective Ownership

Land, forests, water bodies, and natural resources are held collectively by the community rather than by private individuals.

Ecological Stewardship

Humans are viewed as custodians of nature with a moral responsibility to preserve ecosystems for future generations.

Cooperative Labour

Agriculture, irrigation, construction, and forest management are often carried out through communal cooperation instead of wage-based labour systems.

Sacred Relationship with Nature

Many tribal traditions protect forests, rivers, mountains, and wildlife through cultural taboos and sacred practices.

Equitable Distribution

Food, wealth, and community resources are distributed relatively equally to ensure collective social security and survival.

SIGNIFICANCE OF TEC

Resource Sovereignty

Community control over natural resources ensures sustainable management of forests, land, and water systems according to local needs.

Climate Mitigation

Traditional tribal conservation practices help protect forests and peatlands, which function as important carbon sinks and Natural Climate Solutions.

Preservation of Indigenous Knowledge

Tribal communities possess valuable ethno-ecological knowledge regarding medicinal plants, biodiversity, drought-resistant crops, and sustainable farming practices.

Eco-Pedagogy

Environmental literacy is transmitted through oral traditions, rituals, and lived cultural practices, promoting ecological consciousness from childhood.

Biomimetic Development

Traditional tribal housing and irrigation systems often imitate natural ecological patterns, reducing habitat fragmentation and environmental degradation.

CHALLENGES ASSOCIATED WITH TEC

Scalability Issues

Communal systems based on trust and close social ties become difficult to sustain in large urbanised societies.

Limited Access to Credit

Collective ownership structures often prevent individuals from using land as collateral for institutional loans.

Youth Migration

Educated tribal youth increasingly migrate toward urban centres and market-driven employment opportunities.

Administrative Conflicts

Traditional tribal governance institutions sometimes face jurisdictional conflicts with state forest departments and bureaucratic agencies.

Market Pressures

Commercial agriculture and market volatility encourage replacement of diverse traditional crops with monoculture cash crops.

GOVERNMENT INITIATIVES SUPPORTING TEC

Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (Forest Rights Act)

Empowers Gram Sabhas to protect and manage community forest resources.

Panchayats (Extension to Scheduled Areas) Act (PESA)

Strengthens tribal self-governance over land, water, forests, and local minerals.

Van Dhan Yojana

Promotes community-based value addition and marketing of minor forest produce.

MSP for Minor Forest Produce

Provides minimum price support to protect tribal gatherers from exploitation by middlemen.

Dharti Aba Janjatiya Gram Utkarsh Abhiyan

Supports tribal infrastructure development while preserving cultural heritage.

Adi Karmayogi Abhiyan

Trains tribal grassroots leaders for participatory governance rooted in indigenous traditions.

Relevance in Contemporary Development

TEC aligns closely with modern concepts such as:

- Sustainable development
- Climate resilience
- Circular economy
- Community-based conservation
- Environmental justice

At a time of climate change, biodiversity loss, and ecological degradation, tribal ecological practices offer important lessons for balancing development with environmental sustainability.

CONCLUSION

Tribal Ecological Communitarianism presents a holistic development framework rooted in sustainability, collective welfare, and ecological harmony. While challenges related to scalability, modernisation, and market integration remain significant, TEC provides valuable insights for creating inclusive and environmentally sustainable development pathways. Strengthening tribal rights, protecting indigenous knowledge, and integrating community-led conservation into national policies can contribute significantly to climate resilience and ecological security.

TUVALU – SINKING NATION AND CLIMATE CRISIS

TUVALU LATEST NEWS

As rising sea levels threaten to submerge large parts of Tuvalu by the end of this century, its citizens are working to safeguard their future and prepare for the worst impacts of climate change.

WHERE IS TUVALU?

Map showing Tuvalu's location in the Pacific Ocean, between Australia and Hawaii. It consists of nine islands: four reef islands and five coral atolls.

TUVALU AT A GLANCE

- Land Area:** 26 sq. km (4th smallest country)
- Highest Elevation:** 4.5 m above sea level
- Location:** West-central Pacific Ocean; midway between Australia and Hawaii
- Population:** ~11,000 (approx.) (Except Vatican City, fewest in the world)
- Currency:** Tuvalu dollar (equivalent to Australian dollar)
- Composition:** 9 islands (4 reef islands & 5 coral atolls)
- Rivers:** None
- Climate:** Hot and rainy
- Languages:** Tuvaluan (most spoken), English widely used

MAJOR ISLANDS: Nanumanga, Niutao, Niulakita

Capital: Funafuti Atoll (also the most populous among all 9 atolls)

POLITICAL SYSTEM

- Tuvalu became independent from the United Kingdom in October 1978.
- Parliamentary democracy under a constitutional monarchy.
- King Charles III is the King of Tuvalu, represented by a Governor-General appointed on the advice of the Prime Minister.
- No political parties: the Prime Minister is chosen by and from the legislature.

ECONOMY

- Most people are subsistence farmers and are aided by remittances from relatives working overseas.
- A small quantity of copra is produced for export.
- Sale of stamps and fees from foreign fishing fleets provide modest earnings.
- Heavily dependent on foreign aid.
- Imports most of its food, fuel and manufactured goods.

CLIMATE CHANGE THREAT: A NATION AT RISK

- SUBMERGENCE RISK:** Rising sea levels may submerge large parts of Tuvalu by the end of this century.
- SALTWATER INTRUSION:** Contaminates groundwater, affecting drinking water and agriculture.
- COASTAL EROSION:** Loss of land, infrastructure and habitats.
- EXTREME WEATHER:** Increasing intensity of cyclones, storms and flooding.

GLOBAL SIGNIFICANCE

- Tuvalu is a symbol of climate injustice—least responsible for emissions, but most affected.
- Raises critical questions on statehood, sovereignty and climate refugees.
- Advocates strongly for urgent climate action in global forums like the United Nations.

WHY IN NEWS

The Pacific island nation of Tuvalu is facing an existential threat due to rising sea levels caused by climate change. Large parts of the country risk submergence by the end of the 21st century, prompting efforts to secure livelihoods, preserve sovereignty, and plan for possible displacement.

ABOUT TUVALU

Tuvalu, formerly known as the *Ellice Islands*, is a small Polynesian island country located in the west-central Pacific Ocean. It lies roughly midway between Australia and Hawaii, with Kiribati to its north and Fiji to its south. With a total land area of just **26 sq. km**, Tuvalu is the **fourth smallest country in the world**. It consists of **nine islands**, including four reef islands and five coral atolls. The capital, Funafuti, is the most populous atoll and serves as the administrative and economic centre. A defining feature of Tuvalu is its **extremely low**

elevation—no point is higher than 4.5 metres above sea level. Additionally, the country has **no rivers**, and its climate is tropical, hot, and rainy.

POLITICAL SYSTEM

Tuvalu gained independence from the United Kingdom in 1978. It functions as a **parliamentary democracy under a constitutional monarchy** and is part of the Commonwealth Realm.

Charles III is recognized as the head of state and is represented by a Governor-General.

The political system is unique due to the **absence of formal political parties**. The Prime Minister is elected by members of the legislature.

ECONOMY

Tuvalu's economy is **fragile and aid-dependent**:

- Majority of people engage in **subsistence farming and fishing**
- Heavy reliance on **remittances** from overseas workers
- Limited exports such as **copra**
- Revenue from **fishing licenses** and **stamp sales**
- Significant dependence on **foreign aid and imports**

Due to limited natural resources and geographic isolation, economic diversification remains a challenge.

CLIMATE CHANGE THREAT

Tuvalu is considered one of the most vulnerable countries to **climate change and sea-level rise**:

- Submergence Risk:** Rising sea levels threaten to inundate large parts of the islands
- Saltwater Intrusion:** Contamination of groundwater affects drinking water and agriculture
- Coastal Erosion:** Loss of land and infrastructure
- Extreme Weather Events:** Increased frequency of cyclones and flooding

The country's very existence is under threat, raising serious concerns about **climate refugees** and loss of national sovereignty.

GLOBAL SIGNIFICANCE

Tuvalu represents a **symbol of climate injustice**:

- Contributes negligibly to global emissions but suffers disproportionately
- Raises legal and ethical questions about **statehood if territory disappears**
- Has advocated strongly in global forums like the United Nations for urgent climate action

It has also explored innovative solutions such as creating a **"digital nation"** to preserve its identity and governance even if physical land is lost.

WAY FORWARD

- **Global Climate Action:** Reduction in greenhouse gas emissions under international agreements
- **Climate Financing:** Support from developed nations for adaptation and resilience
- **Planned Relocation Policies:** Migration with dignity and legal safeguards
- **Technological Solutions:** Coastal protection, land

reclamation, and digital governance

CONCLUSION

Tuvalu's crisis is a stark reminder of the real and immediate impacts of climate change. It highlights the urgent need for collective global responsibility, equitable climate policies, and sustainable development to protect vulnerable nations and communities.

SECURITY & DISASTER MANAGEMENT

GS PAPER 3

ATLAS DRONE SWARM SYSTEM – A NEW ERA IN NETWORK-CENTRIC WARFARE

ATLAS DRONE SWARM SYSTEM
CHINA'S NEW FORCE MULTIPLIER

LATEST NEWS
The Chinese People's Liberation Army (PLA) unveiled its new Atlas Drone Swarm System (Atelasi).

ABOUT THE SYSTEM
Mobile battlefield platform designed to deploy and coordinate large numbers of drones from a single command point.
Developed by China Electronic Technology Group Corporation (CETC), a state-owned defence electronics conglomerate working closely with the PLA.
Mounted on vehicles, the system is intended to launch up to 96 drones in a coordinated swarm, with control consolidated under one operator.
Built around a Swarm-2 combat vehicle, a command unit, and a support vehicle. Designed for reconnaissance, electronic disruption, and coordinated strikes.

SYSTEM COMPONENTS
SWARM-2 COMBAT VEHICLE: Carries and launches up to 48 fixed-wing drones.
COMMAND UNIT: Controls up to 96 drones simultaneously from a single command point.
SUPPORT VEHICLE: Provides logistics, maintenance and mission support.

KEY FEATURES
HIGH-VOLUME DEPLOYMENT: Launch and control up to 96 drones in a coordinated swarm.
RAPID LAUNCH CAPABILITY: Three-second launch sequencing deploys 96 drones in about 300 seconds.
SWARM-LEVEL COORDINATION: Drones operate collectively, adapt formations and execute tasks with autonomy.
FLEXIBLE OPERATIONAL FORMATIONS: Can form defensive shields, recon grids, precision strike clusters and other patterns.
MULTI-PAYLOAD CAPABILITY: Each drone can carry different payloads for multiple mission types.

PAYLOAD OPTIONS
Electro-optical Reconnaissance: Real-time surveillance and target acquisition.
Strike Munitions: Precision attack on enemy targets.
Relay Communications: Extend communication range and ensure robust connectivity.

STRATEGIC SIGNIFICANCE
Force Multiplier: Large numbers overwhelm enemy defenses and increase effectiveness.
Cost-Effective: Low-cost drones provide high operational impact compared to traditional platforms.
Autonomous Warfare: AI-enabled coordination reduces human workload and reaction time.
Electronic Warfare Advantage: Can disrupt enemy communications and sensors.

CHALLENGES & CONCERNS
Ethical Issues: Autonomous lethal systems raise concerns over accountability.
Countermeasures: Adversaries may develop jamming systems, EW tools and directed energy weapons.
Escalation Risks: Proliferation of assets may intensify global arms race.
Regulation Needs: Lack of global norms in autonomous weapon systems.

IMPLICATIONS FOR INDIA
Develop indigenous drone swarm technology.
Strengthen anti-drone and electronic warfare systems.
Invest in AI, automation and network-centric capabilities.
Enhance R&D, collaboration and force preparedness.

The Atlas Drone Swarm System represents a paradigm shift in modern warfare—towards automation, scalability and network-centric operations. Preparedness, innovation and ethical responsibility are key to the future battlefield.

WHY IN NEWS

Recently, the People's Liberation Army (PLA) unveiled the **Atlas Drone Swarm System (Atelasi)**, marking a significant advancement in autonomous warfare and swarm-based combat capabilities.

ABOUT ATLAS DRONE SWARM SYSTEM

The Atlas system is a mobile battlefield platform designed to deploy and coordinate large numbers of drones

from a single command point. It has been developed by the China Electronics Technology Group Corporation (CETC), a state-owned defence conglomerate closely associated with the PLA.

Mounted on vehicles, the system integrates multiple components, including a **Swarm-2 combat vehicle**, a **command unit**, and a **support vehicle**. It is capable of launching and managing drone swarms for diverse missions such as reconnaissance, electronic warfare, and precision strikes.

KEY FEATURES OF THE SYSTEM

1. High-Volume Drone Deployment

- The Swarm-2 platform can carry and launch up to **48 fixed-wing drones**.
- A single command unit can control up to **96 drones simultaneously** in a coordinated swarm.

2. Rapid Launch Capability

- Drones are launched in **three-second intervals**, enabling the deployment of 96 drones in about **300 seconds**.
- This ensures quick response in dynamic battlefield conditions.

3. Swarm Intelligence and Coordination

- The system uses **swarm-level coordination**, where drones operate collectively while retaining individual autonomy.
- Drones can adapt formations dynamically for attack, surveillance, or defense missions.

4. Flexible Operational Configurations

- Drones can be grouped into different formations such as:
 - Defensive shields
 - Reconnaissance grids
 - Precision strike clusters

5. Multi-Payload Capability

Each drone can be equipped with varied payloads, including:

- Electro-optical reconnaissance systems
- Strike munitions
- Communication relay packages

This allows the system to perform multiple roles such as:

- Surveillance and battlefield sensing
- Electronic disruption

- Communication extension in remote areas
- Coordinated offensive operations

STRATEGIC SIGNIFICANCE

1. Shift Towards Autonomous Warfare

The Atlas system represents a move toward **AI-driven warfare**, where human intervention is minimized, and decision-making is increasingly automated.

2. Force Multiplication

Drone swarms act as a **force multiplier**, enabling a single operator to control dozens of assets, overwhelming enemy defenses through sheer numbers.

3. Cost-Effective Combat

Compared to traditional platforms like fighter jets or missiles, swarm drones offer a **low-cost yet highly effective alternative** for both offensive and defensive roles.

4. Electronic Warfare Advantage

The ability to disrupt enemy communications and sensors enhances battlefield dominance.

CHALLENGES AND CONCERNS

- **Ethical Issues:** Autonomous lethal systems raise concerns about accountability and compliance with international humanitarian law.
- **Countermeasures:** Adversaries may develop anti-drone technologies such as jamming systems and directed-energy weapons.
- **Escalation Risks:** Proliferation of swarm technology could intensify global arms competition.

IMPLICATIONS FOR INDIA

For India, developments like Atlas highlight the need to:

- Invest in **indigenous drone swarm technology**
- Strengthen **electronic warfare and counter-drone systems**
- Enhance **AI integration in defence systems**

CONCLUSION

The Atlas Drone Swarm System underscores a paradigm shift in modern warfare toward automation, scalability, and network-centric operations. As such technologies evolve, nations must balance innovation with ethical considerations and strategic stability.

FIRECRACKER FACTORY EXPLOSIONS IN INDIA: A RECURRING SAFETY CRISIS

FIRECRACKER FACTORY EXPLOSIONS IN INDIA: A RECURRING SAFETY CRISIS

LATEST NEWS

- Thrissur, Kerala:** Blast in a fireworks unit ahead of Thrissur Pooram killed at least 14 people. Fireworks for the event cancelled.
- Virudhunagar, Tamil Nadu:** Major explosion in India's main fireworks hub (produces ~90% of the country's firecrackers) claimed at least 23 lives.

Recurring incidents due to systemic issues: combustible chemicals, climatic factors, safety lapses and weak enforcement.

HOW FIREWORKS WORK: CHEMISTRY & MECHANISM

OXIDISER	FUEL	STARS	BINDER
Supplies oxygen for combustion (nitrates, chlorates, perchlorates)	Black powder – sulfur, charcoal, potassium nitrate (releases energy)	Metal salts (barium, strontium, copper, etc.) produce colours	Holds the mixture together until ignition

IGNITION AND EXPLOSION PROCESS

- Fuse is lit. Heat travels through the firework shell inside a mortar.
- It ignites the lift charge. Gas pressure propels the shell into the air.
- At a set height, the timed fuse triggers the burst charge.
- Burst charge explodes and ignites the 'stars', creating bright patterns in the sky.

RISKS AND TOXIC EFFECTS

- Involves highly reactive chemicals and heavy metals.
- Release of toxic microscopic particles.
- Hazardous during manufacturing, storage and use.

CLIMATE AND FIRECRACKER SAFETY: HOW WEATHER INCREASES EXPLOSION RISKS

HEAT AND DRYNESS	MOISTURE & TEMPERATURE FLUCTUATIONS	FIRECRACKER HUBS CONDITIONS	TOXIC DUST ACCUMULATION
<ul style="list-style-type: none"> • High temperatures increase chemical instability. • Low humidity allows build-up of static electricity. Even small sparks can cause ignition. 	<ul style="list-style-type: none"> • Fluctuations bring moisture into chemicals. • Damp chemicals exposed to heat can undergo exothermic reactions or spontaneous combustion. 	<ul style="list-style-type: none"> • Regions like Virudhunagar have hot, semi-arid climate with low rainfall. • Creates an environment conducive to instability in chemical handling. 	<ul style="list-style-type: none"> • Stagnant summer heat traps toxic chemical dust near the ground. • Increases fire hazard and serious health risks for workers.

HUMAN FACTORS BEHIND FIRECRACKER ACCIDENTS: SYSTEMIC RISKS

PIECE-RATE WAGE SYSTEM	WEAK ENFORCEMENT & REGULATORY GAPS	DANGEROUS STORAGE PRACTICES	CHAIN REACTION RISK
<ul style="list-style-type: none"> • Workers paid based on output. • Pressure to prioritise speed over safety. • Shortcuts in handling volatile materials lead to accidents. 	<ul style="list-style-type: none"> • Regulated under the Explosives Act, 1984. • Enforcement is weak, non-compliance is widespread. 	<ul style="list-style-type: none"> • Stockpiling of raw chemicals and finished fireworks in confined, poorly ventilated spaces. • Often exceeds legal limits many times. 	<ul style="list-style-type: none"> • Small static spark – common in hot weather – can trigger ignition. • Leads to chain reaction and large-scale deadly explosions.

WAY FORWARD: PREVENT, PROTECT, SAVE LIVES

- Strict enforcement of safety norms and regular inspections.
- Limit quantity of chemicals stored per unit.
- Adapt safer technologies and automation.
- Worker training and safety awareness programs.
- Reform wage structures to reduce unsafe practices.
- Climate-sensitive safety protocols and monitoring.

SCIENCE, SAFETY AND STRONG GOVERNANCE ARE THE KEY TO PREVENTING TRAGEDIES AND BUILDING A SAFER FIRECRACKER INDUSTRY.

INTRODUCTION

Recent explosions in firecracker units in southern India have once again exposed the persistent safety crisis in the industry. In Thrissur, a blast ahead of the famous Thrissur Pooram claimed at least 14 lives, leading to cancellation of fireworks. Days earlier, an explosion in Virudhunagar—India's primary fireworks hub—killed at least 23 people. These incidents highlight systemic issues rather than isolated accidents.

HOW FIREWORKS WORK: CHEMISTRY AND MECHANISM

Fireworks operate through a controlled chemical reaction involving four key components:

- **Oxidiser:** Supplies oxygen (e.g., nitrates, perchlorates)

- **Fuel:** Usually black powder (sulfur, charcoal, potassium nitrate)
- **Stars:** Metal salts (barium, strontium, copper) that produce colours
- **Binder:** Holds the mixture together

Process:

When the fuse is ignited, it triggers the lift charge, propelling the shell upward. A timed fuse then ignites the burst charge at height, dispersing and lighting the ‘stars’ to create visual effects.

RISKS AND TOXIC EFFECTS

Firecracker manufacturing involves **highly reactive chemicals and heavy metals**, making it inherently dangerous:

- Release of toxic microscopic particles
- Fire and explosion hazards during handling
- Long-term health risks for workers

CLIMATE AND EXPLOSION RISKS

Role of Heat and Dryness

- High temperatures increase chemical instability
- Low humidity allows buildup of static electricity
- Even minor friction can generate sparks causing ignition

Moisture and Temperature Fluctuations

- Alternating humidity and heat can destabilize chemicals
- Damp chemicals exposed to heat may undergo **spontaneous combustion**
- Improper drying practices worsen risks

Conditions in Firecracker Hubs

Regions like Virudhunagar experience hot, semi-arid conditions, making chemical handling more hazardous and increasing accident frequency.

ADDITIONAL HAZARD: TOXIC DUST ACCUMULATION

- Fine chemical dust accumulates in factories
- Hot air traps these particles near ground level
- Increases both **fire risk and respiratory health hazards**

Human Factors Behind Accidents

Piece-Rate Wage System

Workers are paid based on output, leading to:

- Speed prioritized over safety
- Negligence in handling volatile chemicals
- Increased accident probability

Weak Enforcement of Laws

Despite regulation under the Explosives Act, 1884:

- Poor monitoring of safety compliance
- Violations in storage and handling norms
- Inadequate inspection mechanisms

Unsafe Storage Practices

- Excess stockpiling of chemicals in confined spaces
- Poor ventilation
- Ignition sources easily trigger chain reactions

Even a small spark from static electricity can escalate into a **large-scale explosion** due to dense accumulation of combustible materials.

KEY ISSUES IDENTIFIED

- Hazardous chemical composition
- Climatic vulnerability (heat, dryness, moisture changes)
- Weak regulatory enforcement
- Unsafe labour practices
- Poor storage and infrastructure

WAY FORWARD

- Strict enforcement of safety norms and periodic inspections
- Limiting quantity of chemicals stored per unit
- Adoption of safer technologies and automation
- Worker training and safety awareness programs
- Reforming wage structures to reduce unsafe practices
- Climate-sensitive safety protocols

CONCLUSION

Firecracker factory explosions are not accidental anomalies but symptoms of deeper systemic failures. While the industry plays a significant economic role—especially in regions like Virudhunagar—ensuring worker safety and regulatory compliance is non-negotiable. A balanced approach integrating **science, safety, and governance** is essential to prevent recurring tragedies.

R-37M MISSILE AND INDIA'S AIR SUPERIORITY

R-37M MISSILE: BOOSTING INDIA'S AIR SUPERIORITY

In a major development for India's air superiority, Moscow recently greenlit the sale of its formidable R-37M ultra-long-range air-to-air missile to New Delhi.

ABOUT R-37M MISSILE






- Developed by Russia; NATO reporting name: AA-13 Axehead.
- Designed to eliminate enemy fighter jets and drones beyond visual range (BVR).
- Known as an "AWACS Killer" as it can engage high-value airborne assets like AWACS, refuellers and jamming aircraft.
- Expected to integrate seamlessly with IAF's Su-30MKI; already cleared for Su-30SM.

ENGAGEMENT PROFILE





LAUNCH

Lofted trajectory – missile climbs high, then dives on target to maximise range and energy.

R-37M MISSILE: KEY FEATURES

DIMENSIONS & WARHEAD	GUIDANCE SYSTEM	TRAJECTORY	RANGE	SPEED
 Length: ~4.2 m Weight: ~600 kg Warhead: 60 kg High-Explosive Fragmentation (for large airborne targets)	 Inertial navigation + mid-course data-link updates + active radar homing in terminal phase. Allows in-flight retargeting.	 Lofted trajectory profile – climbs before descending on target, conserving energy and extending range.	 Jettisonable rocket booster enables a range of 300 to 400 km – among the longest in service worldwide.	 Capable of hypersonic speeds up to Mach 6, making it the world's fastest known air-to-air missile class.

SIGNIFICANCE FOR INDIA

 Enhances India's long-range air dominance and deterrence.	 Strengthens IAF's ability to neutralise high-value airborne threats from stand-off distances.	 Boosts Su-30MKI's lethality in Beyond Visual Range (BVR) engagements.	 Deepens India–Russia defence ties and supports IAF's modernisation goals.
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Word Count: 497

CONTEXT

In a significant boost to India's air combat capability, Russia has reportedly approved the export of the advanced R-37M ultra-long-range air-to-air missile to India. The induction of this missile is expected to substantially enhance the Indian Air Force's (IAF) beyond-visual-range (BVR) combat capabilities and strategic deterrence.

ABOUT THE R-37M MISSILE

The R-37M, designated **AA-13 "Axehead"** by NATO, is one of the most advanced long-range air-to-air missiles developed by Russia. It is specifically designed to engage and destroy aerial targets at very long distances, far beyond the pilot's visual range.

A key feature of the missile is its ability to target high-value airborne assets such as Airborne Warning and Control Systems (AWACS), aerial refuelling tankers, and electronic warfare aircraft. Due to this capability, it is often referred to as an **"AWACS Killer."** These targets are crucial for enemy air operations, and their neutralisation can significantly degrade adversary capabilities.

The missile is expected to be integrated with India's Su-30MKI fighter aircraft. Since the R-37M is already compatible with the Russian Su-30SM platform, which shares design similarities with the Su-30MKI, integration is likely to be smooth with minimal modifications.

KEY FEATURES AND TECHNICAL SPECIFICATIONS

The R-37M stands out due to its impressive combination of range, speed, and guidance technology:

- **Dimensions & Warhead:** The missile is approximately 4.2 metres long and weighs around 600 kg. It carries a 60 kg high-explosive fragmentation warhead, optimised for destroying large airborne targets.
- **Range:** One of its most defining attributes is its range of **300–400 km**, making it among the longest-range air-to-air missiles currently operational in the world.

- **Speed:** The missile can achieve hypersonic speeds of up to **Mach 6**, enabling rapid interception of distant and fast-moving targets.
- **Guidance System:** It employs a sophisticated multi-stage guidance mechanism:
 - Inertial navigation during the initial phase
 - Mid-course updates via data-link from the launch aircraft
 - Active radar homing in the terminal phase
 This allows real-time retargeting and high precision.

- **Trajectory Profile:** The missile uses a **lofted trajectory**, wherein it climbs to a higher altitude after launch and then descends onto the target. This helps conserve energy and maximise range.

- **Propulsion:** A jettisonable rocket booster enhances its reach and speed, contributing to its long engagement envelope.

STRATEGIC SIGNIFICANCE FOR INDIA

The induction of the R-37M missile holds major strategic implications:

- **Enhanced BVR Dominance:** It significantly extends the IAF's engagement range, allowing Indian fighters to strike adversaries before entering hostile zones.
- **Neutralising High-Value Targets:** The ability to target AWACS and tanker aircraft can cripple enemy surveillance and logistics networks early in a conflict.
- **Force Multiplier Effect:** When paired with the Su-30MKI's advanced radar systems, the missile enhances the aircraft's lethality and operational flexibility.
- **Deterrence Capability:** The presence of such long-range weaponry strengthens India's deterrence posture, particularly in contested airspace.
- **Strengthening Defence Ties:** The deal further consolidates India-Russia defence cooperation, which remains a cornerstone of India's military procurement strategy.

CHALLENGES AND CONSIDERATIONS

Despite its advantages, certain aspects require attention:

- **Integration and Testing:** Ensuring seamless integration with Indian avionics and systems will require rigorous testing.
- **Cost and Maintenance:** Advanced missile systems involve high procurement and lifecycle costs.
- **Countermeasures:** Adversaries may develop electronic warfare systems and countermeasures to reduce effectiveness.

CONCLUSION

The R-37M missile represents a major leap in India's air combat capabilities. Its unparalleled range, speed,

and precision make it a critical asset for achieving air superiority in modern warfare. While operational challenges remain, its induction is poised to significantly enhance India's strategic and tactical air power.

VIKRAM VT 21: INDIA'S NEXT-GENERATION INFANTRY COMBAT VEHICLE

VIKRAM VT 21
INDIA'S NEXT-GENERATION INFANTRY COMBAT VEHICLE
DRDO Unveils Advanced Armoured Platform for a Futuristic Battlefield

The Vikram VT 21 project by DRDO features two advanced armoured platforms – wheeled and tracked – designed to meet the Indian Army's requirement for a Futuristic Infantry Combat Vehicle (FICV).
It aims to replace the ageing BMP-2 fleet with superior mobility, protection, firepower and adaptability across all terrains.

WHY INDIA NEEDS A FUTURISTIC INFANTRY COMBAT VEHICLE (FICV)

- BMP-2 fleet is in service since the 1980s and is ageing.
- Modern warfare demands better protection, mobility, firepower and digital integration.
- FICV is designed for Network-Centric Warfare – real-time information sharing, faster decision-making, improved coordination and situational awareness.
- Critical for operations in high-threat areas, especially along borders with China and Pakistan.
- Enables rapid deployment, combined arms operations and integration of advanced surveillance & communication systems.

COLLABORATIVE DEVELOPMENT
Co-developed by DRDO's Vehicles Research & Development Establishment (VRDE) with:

- BHARAT FORGE
- TATA ADVANCED SYSTEMS
- MSMEs & other DRDO units

~65% indigenous content achieved
Target: Increase to ~90% indigenisation

VIKRAM VT 21 – FEATURES AT A GLANCE

- ADVANCED WEAPON SYSTEMS**
 - Indigenous 30 mm crewless turret
 - 7.62 mm PKT machine gun
 - Third-generation Nag ATGAs
 - Can engage heavily armoured targets with precision
 - Crewless turret enhances protection & operational safety
- HIGH MOBILITY & AMPHIBIOUS CAPABILITY**
 - High-capacity engine & automatic transmission
 - High power-to-weight ratio
 - Climbs steep gradients & crosses trenches
 - Amphibious: Hydro jets & water propulsion allow seamless movement across rivers and water bodies
- STRONG ARMOUR PROTECTION**
 - STANAG Level 4 & 5 protection (NATO standard)
 - Resists heavy gunfire, blasts, artillery fragments
 - Modular blast & ballistic protection for enhanced survivability
- MODULAR DESIGN**
 - Modular & adaptable platform
 - Multiple roles:
 - Troop transport
 - Reconnaissance
 - Command & Control
 - Combat support
 - Medical evacuation
- INDIGENOUS & FUTURE-READY**
 - Built for modern battlefield requirements
 - Integrated surveillance, communication & battle management systems
 - Designed for future upgrades & technology integration

PERSISTING CHALLENGES (AS PER NSO HEALTH SURVEY PARADOX)

- Humanisation cost: Rising dependence on private care
- Out-of-Pocket Expenditure (OPE): 57% of insured individuals sought treatment in private facilities
- COPE on hospitalisation: has more than doubled between 2017-18 & 2020.
- Anticipation: beneficiaries, only 13% belong to the poorest income group.
- States like Haryana & West Bengal spend up to 15% of health budgets on OPE schemes.

WAY FORWARD: TRIALS & INDUCTION

Development Trials → User Trials → Indian Army Evaluation → Approval & Certification → Mass Production

DRDO aims to complete all stages and achieve induction within the next **THREE YEARS**.

STRATEGIC IMPORTANCE

- Enhances survivability and firepower of infantry troops
- Improves mobility in diverse terrains – mountains, deserts, rivers & urban areas
- Strengthens network-centric capabilities for future warfare
- Boosts self-reliance in defence production and technology
- A major step towards a modern, agile and future-ready Indian Army

THE BOTTOM LINE
Vikram VT 21 combines indigenous innovation, advanced protection, superior mobility and network-centric capabilities – a decisive leap for India's mechanised infantry forces and a cornerstone for future battlefield dominance.

INTRODUCTION

The Defence Research and Development Organisation has launched the Vikram VT 21 project, featuring advanced wheeled and tracked armoured platforms designed to meet the Indian Army's requirement for a Futuristic Infantry Combat Vehicle (FICV).

The project aims to replace the ageing BMP-2 infantry combat vehicle fleet and strengthen India's indigenous defence capabilities. With enhanced mobility, firepower, survivability, and digital warfare integration, Vikram VT 21 represents a major step toward modernising India's mechanised infantry forces.

WHAT IS VIKRAM VT 21?

Vikram VT 21 is an Advanced Armoured Platform (AAP) developed by DRDO as a next-generation infantry combat vehicle.

The platform is designed to:

- Transport infantry troops safely
- Provide battlefield fire support
- Operate across varied terrains
- Integrate with modern network-centric warfare systems

The vehicle combines:

- Advanced armour protection
- Modern weapon systems
- High mobility
- Surveillance and communication technologies

It is intended to address evolving battlefield requirements and future combat scenarios.

TWO VARIANTS OF VIKRAM VT 21

1. Wheeled Variant

The wheeled version operates on tyres and offers:

- Higher road speed
- Easier maintenance
- Better fuel efficiency
- Suitability for urban and semi-urban operations

It is ideal for:

- Rapid troop movement
- Highway mobility
- Peacekeeping operations

2. Tracked Variant

The tracked version operates on continuous tracks similar to tanks.

Key advantages:

- Better grip on rough terrain
- Improved stability
- Superior off-road mobility
- Ability to cross trenches and uneven surfaces

This variant is more suitable for:

- High-altitude regions
- Desert warfare
- Mountain operations
- Combat zones with difficult terrain

COLLABORATIVE INDIGENOUS DEVELOPMENT

The project has been jointly developed by:

- Vehicles Research and Development Establishment
- Bharat Forge
- Tata Advanced Systems

Several MSMEs and DRDO laboratories have also contributed.

Currently:

- Around 65% indigenous content has been achieved
- The target is to increase indigenisation to nearly 90%

This aligns with India's:

- Atmanirbhar Bharat initiative
- Defence manufacturing self-reliance goals

KEY FEATURES OF VIKRAM VT 21

1. Advanced Weapon Systems

The platform is equipped with:

- Indigenous 30 mm crewless turret
- 7.62 mm PKT machine gun
- Third-generation Nag Anti-Tank Guided Missiles (ATGMs)

Advantages of Crewless Turret

- Improved crew safety
- Reduced exposure during combat
- Enhanced precision targeting

The Nag ATGM capability allows the platform to engage heavily armoured enemy targets effectively.

2. High Mobility and Amphibious Capability

The vehicle is powered by:

- High-capacity engine
- Automatic transmission system

Mobility Features

- High power-to-weight ratio
- Excellent manoeuvrability
- Ability to climb steep gradients
- Cross-country mobility

Amphibious Capability

The vehicle can operate in water bodies using:

- Hydro jets
- Water propulsion systems

This enables seamless river-crossing operations during combat.

3. Strong Armour Protection

The platform provides:

- STANAG Level 4 and 5 protection

These NATO standards ensure resistance against:

- Heavy gunfire
- Explosions
- Artillery fragments
- Blast impacts

The vehicle also features:

- Modular ballistic protection
- Enhanced survivability systems

4. Modular Design

The Vikram VT 21 platform is modular and adaptable for multiple roles such as:

- Infantry transport
- Reconnaissance
- Command and control
- Combat support
- Medical evacuation

This flexibility improves operational efficiency and reduces logistical complexity.

Need for Futuristic Infantry Combat Vehicle (FICV)

The Indian Army currently relies heavily on the BMP-2 fleet, which entered service in the 1980s.

Limitations of BMP-2 Fleet

- Ageing technology
- Limited survivability
- Outdated sensors and communication systems
- Reduced effectiveness in modern warfare

The changing nature of warfare demands:

- Better situational awareness
- Integrated communication systems
- Greater mobility
- Precision firepower
- Digital battlefield integration

Role in Network-Centric Warfare

The FICV concept is based on network-centric warfare.

This involves digitally linking:

- Soldiers
- Vehicles
- Sensors
- Drones
- Command systems

Benefits

- Real-time information sharing
- Faster decision-making
- Improved battlefield coordination
- Enhanced situational awareness

Such integration significantly improves operational effectiveness during modern combat.

STRATEGIC IMPORTANCE FOR INDIA

The Vikram VT 21 holds major strategic significance for India.

Border Security

The platform will strengthen operations along:

- China border
- Pakistan border

Rapid Deployment

Enhanced mobility supports:

- Quick troop movement
- Combined arms operations
- Faster battlefield response

Defence Self-Reliance

The project boosts:

- Indigenous defence production
- Private sector participation
- MSME involvement
- Technological innovation

WAY FORWARD

Before induction into the Indian Army, the platform must undergo:

- Development trials
- User trials

- Army evaluation
- Operational certification

After approval, large-scale production will begin.

DRDO estimates that the process could be completed within the next three years.

CONCLUSION

Vikram VT 21 represents a significant advancement in India's defence modernisation efforts. By combining indigenous technology, advanced protection systems, high mobility, and modern network-centric warfare capabilities, the platform addresses the evolving needs of the Indian Army.

The project not only enhances India's military preparedness but also strengthens the country's long-term goal of achieving self-reliance in defence manufacturing. Successful induction of the Vikram VT 21 could mark a transformative step in the modernisation of India's mechanised infantry forces.