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THE HINDU

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DownToEarth
FORTNIGHTLY ON POLITICS OF DEVELOPMENT, ENVIRONMENT AND HEALTH

Science Reporter

सत्यमेव जयते
विज्ञान एवं प्रौद्योगिकी मंत्रालय
MINISTRY OF SCIENCE AND TECHNOLOGY

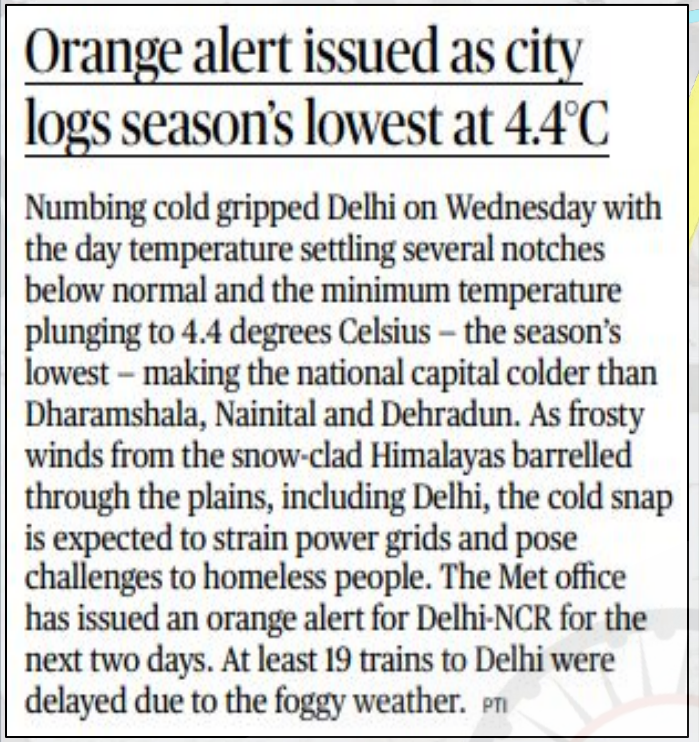
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THE HINDU Page 2

COLOUR- CODED WEATHER WARNING

(Syllabus: GS Paper 1 - Geography)



Orange alert issued as city logs season's lowest at 4.4°C

Numbing cold gripped Delhi on Wednesday with the day temperature settling several notches below normal and the minimum temperature plunging to 4.4 degrees Celsius – the season's lowest – making the national capital colder than Dharamshala, Nainital and Dehradun. As frosty winds from the snow-clad Himalayas barrelled through the plains, including Delhi, the cold snap is expected to strain power grids and pose challenges to homeless people. The Met office has issued an orange alert for Delhi-NCR for the next two days. At least 19 trains to Delhi were delayed due to the foggy weather. PTI



No severe weather concerns, carry on as normal

Be aware of possible bad weather including strong winds, heavy rain and maybe even snow. Watch the latest weather forecast

Be prepared for severe weather such as summer storms, gale-force winds and heatwaves. Watch weather forecasts, check travel conditions and keep an eye on elderly relatives and friends. In the case of extreme heat, drink plenty of water and keep your house cool

Take action, contact your local council and the Environment Agency, move valuable objects upstairs and be prepared for "extraordinary measures" such as evacuating your home. Warning used for events similar to the July floods, Boscastle and February 2007's record snowfall

Context: **Orange alert issued for Delhi** over next two days; national capital logs season's lowest of 4.4°C.

Colour- Coded Weather Warning

- **About**: Colour codes are used in weather warnings for bringing out the severity of the weather phenomena expected as per the **Indian Meteorological Department (IMD).**
  - These alerts are **universal in nature** and are also issued during floods, depending on the amount of water rising above land/in a river as a result of torrential rainfall.
  - Warnings are **updated daily.**
- **The IMD uses 4 colour codes**:
  - **Green (All is well)**: No advisory is issued.
  - **Yellow (Be Aware)**: Yellow indicates severely bad weather spanning across several days. It also suggests that the weather could change for the worse, causing disruption in day-to-day activities.
  - **Orange/Amber (Be prepared):** The orange alert is issued as a warning of extremely bad weather with the potential of disruption in commute with road and rail closures, and interruption of power supply.
  - **Red (Take Action):** When the extremely bad weather conditions are certainly going to disrupt travel and power and have significant risk to life, the red alert is issued.

India Meteorological Department

- **About**: It is the principal agency responsible for **meteorological observations, weather forecasting and seismology.**
- **Origin**: It was **established in 1875.**
- **Nodal Ministry**: Ministry of Earth Sciences.
- **Headquarters**: Delhi.
  - It operates **hundreds of observation stations** across India and Antarctica.
  - **Regional offices** are at Chennai, Mumbai, Kolkata, Nagpur, Guwahati and New Delhi.
- **Part of WMO:** IMD is also **one of the six Regional Specialised Meteorological Centres** of the World Meteorological Organisation.
  - It has the **responsibility for forecasting, naming and distribution of warnings for tropical cyclones** in the Northern Indian Ocean region, including the Malacca Straits, the Bay of Bengal, the Arabian Sea and the Persian Gulf.

BUSINESS STANDARD

Page 1

NATIONAL GREEN HYDROGEN MISSION

(Syllabus: GS Paper 3 - Economy & Infrastructure)

Cabinet approves ₹19,744 cr for National Green Hydrogen Mission

SHREYA JAI
New Delhi, 4 January

The Union Cabinet on Wednesday approved an initial outlay of ₹19,744 crore for the National Green Hydrogen Mission. Addressing the nation on its 75th Independence Day in 2021, Prime Minister Narendra Modi launched a national mission for green fuels in line with the Centre's stated target of making India energy-independent before completing 100 years of Independence. The mission will have four components that aim at enhancing domestic production of green hydrogen and promote the manufacturing of electrolysers — a key constituent for making green hydrogen.

The initial outlay for the mission will include ₹17,490 crore for strategic interventions for green hydrogen transition (SIGHT) programme, ₹1,466 crore for pilot projects, ₹400 crore for research and development (R&D), and ₹388 crore towards other mission components, the Centre said in a statement.

Turn to Page 6

'GREEN' REVOLUTION



- **Reliance, as part of its ₹75,000-crore green investment push,** will set up electrolysers for manufacturing green hydrogen. Aim: 1-1-1 = 1 kilogram (kg) hydrogen at $1 in 1 decade
- **Adani New Industries to invest $50 billion,** along with Total Energies, in building a green hydrogen ecosystem
- **ACME to invest $1.5 trillion in Tamil Nadu, Karnataka, and Oman** over the next seven years for green hydrogen production
- **Larsen & Toubro commissioned** its first green hydrogen manufacturing unit to produce 45 kg daily
- **ReNew Power to sign $8-billion pact** with Egypt for setting up green hydrogen manufacturing

Page 7

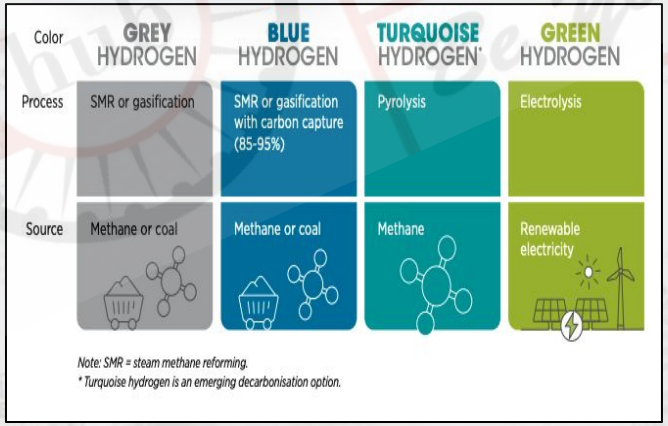
₹2,500-crore scheme for DD, AIR upgrade cleared

The Cabinet Committee on Economic Affairs (CCEA) on Wednesday approved a scheme worth ₹2,539.61 crore for Doordarshan (DD) and All India Radio (AIR), in a boost to public sector broadcasting. It is also the largest investment outlay by the government for the two public broadcasters under the BIND scheme, media experts said.

NTPC MULLS 50% GREEN HYDROGEN BLENDING AT GAS-POWER UNITS P4

Green hydrogen sector in India

- In 2021, a national green hydrogen policy was announced
- In 2020, India's hydrogen demand stood at 6 MT per year
- By 2050, demand is expected 28 MT per year
- By 2030, the hydrogen costs will be down by 50%



Context: The Union Cabinet approved an initial outlay of ₹ 19,744 crore for the **National Green Hydrogen Mission.**

National Green Hydrogen Mission (NGHM)

- **About:** National Green Hydrogen Mission is **part of National Hydrogen Mission (NHM)** which is an initiative to make the best use of Hydrogen, which is one of the most abundant elements on earth.
  - Green Hydrogen is generated from **renewable sources like wind and solar.**
  - During the process, **electricity splits water into hydrogen and water**.
  - By far this is the cleanest way of hydrogen generation.
- **Origin**: INHM was announced in the **Union Budget for 2021-2022** by the finance minister.
  - On the **75th independence day**, the Prime Minister of India announced the hydrogen policy.
  - Under this policy, India is **targeting 3/4th of its hydrogen** from renewable sources by 2050.
- **Nodal Ministry:** Ministry of New & Renewable Energy.
- **Significance of NGHM:**
  - The Hydrogen policy would be a crucial step that would help the government to meet the ta**rget of producing 5 million tonnes of Green Hydrogen by 2030.**
  - The **green hydrogen policy** would aid the government's efforts to achieve the commitments made at COP 26.

INDIAN EXPRESS

Page 1

RIGHTS TO FREEDOM OF SPEECH

(Syllabus: GS Paper 2 - Polity & Governance)

FREE SPEECH PROTECTION

SC expands Art. 19 ambit: Not just state, even pvt citizens can face challenge

APURVA VISHWANATH
NEW DELHI, JANUARY 4

BY RULING that a citizen can seek enforcement of the fundamental rights to freedom of speech not just against the state, the Supreme Court has, effectively, extended the ground for seeking these rights against other citizens.

"A fundamental right under Article 19/21 can be enforced even against persons other than the State or its instrumentalities," said the 4-1 majority ruling by the Constitution Bench Tuesday.

The court took this view while ruling that the right of free speech and expression guaranteed under the Article 19(1)(a) cannot be curbed by any additional grounds other than those already laid down in Article 19(2).

One of the questions before the court was whether "a fundamental right under Article 19 or 21 of the Constitution of India be claimed other than against the 'State' or its instrumentalities?"

Article 19 which guarantees freedom of speech and expression is a right invoked against the state. Some fundamental rights such as those prohibiting untouchability, trafficking and bonded labour are explicitly against both the state and other individuals.

CONTINUED ON PAGE 6

Context: By ruling that a citizen can seek enforcement of the **fundamental rights to freedom of speech** not just against the state, the Supreme Court has, effectively, extended the ground for seeking these rights against other citizens.

Highlights of the Judgment

- **Extending free speech against private citizens:** A fundamental right under **Article 19/21 can be enforced even against persons other than the State** or its instrumentalities.
  - The right of free speech and expression guaranteed under the Article 19(1)(a) **cannot be curbed by any additional grounds** other than those already laid down in Article 19(2).
  - This interpretation could **bring an obligation on the state** to ensure private entities also abide by Constitutional norms.
- **Relied on Puttaswamy verdict:** The Court relied on the 2017 verdict in Puttaswamy where a nine-judge bench unanimously **upheld privacy as a fundamental right.**
- **Referred to several foreign jurisdictions:** Referring to the landmark **New York Times vs. Sullivan**, in which the US Supreme Court found that defamation law, as applied by the state against The New York Times, was inconsistent with the Constitutional guarantee of the freedom of speech and expression, the SC noted a shift in US law from a "purely vertical approach" to a "horizontal approach."
  - A **vertical application of rights** would mean it can be enforced only against the state while a horizontal approach would mean it is enforceable against other citizens.

Rights to Freedom of Speech

- **Fundamental rights**: The Constitution of India guarantees freedom of speech and expression to all citizens which is enshrined in **Article 19(1)(a).**
  - This implies that **all citizens** have the right to express their views and opinions freely.
  - This includes not only words of mouth, but also a s**peech by way of writings, pictures, movies, banners, etc.**
  - The right to speech also **includes the right not to speak.**
- **Restrictions on the freedom of speech**: It may be placed as much by an action of the state as by its inaction.
  - This means that the **failure of the State to guarantee** this freedom to all classes of citizens will be a **violation of their fundamental rights.**
- **Not absolute: Article 19(2)** imposes restrictions on the right to freedom of speech and expression.
  - The reasons for such restrictions are in the interests of: **Security, Sovereignty and integrity of the country, Friendly relations with foreign countries, Public order, Decency or morality, Hate speech, Defamation and Contempt of court.**

LIVEMINT Page 2

RUPEE-DENOMINATED BOND

(Syllabus: GS Paper 3 - Economy)

Rupee bond sales to halt for platform upgrade

Bloomberg
feedback@livemint.com

Rupee-denominated bond sales are set to grind to a halt in a few days as India's government upgrades an online portal used by companies to file regulatory documents.

Starting 7 January, the Ministry of Corporate Affairs portal will be unavailable for companies to file a so-called PAS-3 form, or "return-of-allotment" form, as the administration migrates to a new version of its e-filing platform. The service will be unavailable until 22 January.

The move could delay new sales because issuers can't use funds raised through the sale of any bonds until they file the return-of-allotment form, which lists all security holders.

Context: **Rupee-denominated bond** sales are set to grind to a halt in a few days as India's government upgrades an online portal used by companies to file regulatory documents.

Rupee-denominated bond

- **About**: A rupee-denominated bond is also known as a **masala bond.**
  - It is a **debt instrument** issued by an Indian entity in foreign markets in Indian currency.
  - The **interest and principal amount are denominated in rupees** rather than in dollars or local currency.
- **Origin**: The masala bonds were **first issued in 2014** to fund infrastructure projects in India by the **International Finance Corporation (IFC),** backed by the World Bank.
  - The entire framework for issuing these bonds falls within the **External Commercial Borrowings (ECB).**
  - In India, Masala means spices. Thus, these bonds were **named masala bonds to give Indian flavour** to bonds on foreign platforms.
- **Objectives**: To **raise money in local currency** from foreign investors to fund infrastructure projects, increase internal growth and internationalise Indian Rupee.
- **Issuance Authority**: Both **government and private companies** can issue these bonds.
  - **Any corporate and Indian bank** is eligible to issue rupee denominated bonds overseas.
- **Limitations**: The rupee denominated bonds can **only be issued in a country and subscribed by a resident of such country that is a member of the financial action task force (FATF)** and whose securities market regulator is a member of the International Organisation of Securities Commission.
  - While residents of such countries can subscribe to the bonds, it **can also be subscribed by multilateral and regional financial institutions** where India is a member country.
  - The money raised through such bonds **cannot be used for real estate activities** other than for development of integrated township or affordable housing projects.
  - It also **cannot be used for investing in capital markets,** purchase of land and on-lending to other entities for such activities as stated above.
- **Maturity period**: The minimum maturity period for masala bonds raised up to rupee equivalent of USD 50 million in a financial year should be **3 years a**nd for bonds raised above USD 50 million equivalent in INR per financial year should be **5 years.**

ECONOMIC TIMES

Page 3

PARASNATH HILLS

(Syllabus: GS Paper 3 - Env & Eco)

AMID PROTESTS BY JAIN COMMUNITY ACROSS INDIA

Jharkhand Govt Plans to Seek Denotification of Parasnath Hill from Eco-sensitive Zone

State says it is committed to develop Parasnath as a Jain pilgrimage centre

Kumar.Anshuman@timesgroup.com

New Delhi: Amid protests by the Jain community across the country over the declaration of Parasnath hills as a tourist spot, the Jharkhand government is considering denotification of the area from the eco-sensitive zone (ESZ) tag.

Last week, the Union Environment ministry had taken cognisance of the representations it had received on the issue and had written to the state government to consider denotification of the ESZ area. It has been assessed that keeping just two of the affected village areas out of the ESZ notification will address the concerns of the protesters.

The central government had notified the area as eco-sensitive zone in August 2019 based on the state government's proposal. The notification also gave a mandate to the state government to prepare a tourism development plan for the area.

Sources told ET that the Jharkhand government led by chief minister Hemant Soren is likely to hold a meeting to take a decision and the state government will write to the Centre for the denotification.

"The state government is committed to preserve the sanctity of the place in consonance with the feelings of the Jain community. The government has already directed the local administration to not serve liquor and non-vegetarian food in the area. Besides, the state government in its Tourism Policy 2022 specifically mandates the tourism department to develop Parasnath hills as a Jain Pilgrimage centre," Vinay Choubey, secretary to Jharkhand chief minister, told ET.



Centre had notified the area as eco-sensitive zone in Aug 2019 based on the state govt proposal

"The central government has notified Parasnath hills as an eco-sensitive zone and has given the mandate to the state government to prepare a tourism development plan. But no action has been taken on ground by the state government and in future also no action will be taken which would be against the sensitivity of the Jain pilgrims." In February 2019, the earlier Jharkhand government announced a list of places as places of importance for international tourism.

Context: Amid protests by the Jain community across the country over the declaration of **Parasnath hills** as a tourist spot, the Jharkhand government is considering denotification of the area from the **eco-sensitive zone (ESZ) tag.**

- The **Eco-Sensitive Zone (ESZ)** are areas in India notified by the Ministry of Environment, Forest and Climate Change (MoEFCC), GoI around Protected Areas, National Park and Wildlife sanctuaries.

Parasnath hills

- **About**: A range of hills located in the **Giridih district of Jharkhand**, the highest of which is 1350 meters high.
  - **Sammed Sikharji, or just Sikharji,** as it is reverentially known locally is one of the most important pilgrimage sites for the Jains.
- **Historical Significance**: It is believed that **20 of the 24 Tirthankaras (enlightened beings) attained moksha** (salvation) here.
  - For each of these a **temple (Gumti or Tuk)** has been built on the hill.
  - The hill itself is **named after Parsvanath,** the 23rd Tirthankara.
- **Significance**: Every year thousands of **Jain pilgrims** from across the world undertake a 27-km-long trek to reach the summit.
  - The **Santhals call this hill Marang Buru**. They celebrate a hunting festival on the full moon day in Vaishakha (mid-April).

Parsvanath

- **About**: Parsvanath was the **23rd tirthankar.**
  - It is believed that he **existed two centuries before Vardhamana Mahavira**.
  - He was apparently **born in Banaras (Uttar Pradesh)** around 817 BCE.
  - He attained **Kaivalya on Mount Sammeta** (Parasnath) in Jharkhand.
- **Contribution**: He is said to have **propounded Jain religion** which was later revived by Mahavira.
  - According to Svetambaras Sect (White-Clad Sect of Jainism); Parsvnath founded four-fold restraints: **Ahimsa, Satya, Asteya and Aparigraha** (The fifth one, 'Brahmacharya' was added by Mahavira.)
- **Associated Temple:** Navagraha Jain Temple in Karnataka houses the **tallest statue of Parsvanath.**

TIMES OF INDIA

Page 7

MITOCHONDRIAL PROFILING

(Syllabus: GS Paper 3 - Sci & Tech)

‘Hair, bone samples from Mehrauli are Shraddha’s’

After Advanced DNA Test, Postmortem Of Bones At AIIMS

Rajshekhar.Jha
@timesgroup.com

New Delhi: In what conclusively proves that Shraddha Walkar was killed, one piece of bone and a bunch of hair recovered from the jungles of Mehrauli have matched with the samples taken from her brother and father. Delhi Police has received the result of an advanced DNA test, known as mitochondrial profiling or mtDNA test, which helps in human identification from biological samples where the DNA content is low.

The central forensic laboratory had not been able to extract DNA from some of the bones because of the low DNA content in them. Delhi Police had then sent the samples of bones and hair – the ones from which DNA couldn't be extracted by CFSL– for "DNA mitochondrial profiling" to a lab in Hyderabad. These samples were later analysed by the experts from Centre for DNA Fingerprinting & Diagnostics, Hyderabad.

The cops said on Wednesday that they had received the report where one piece of bone and a bunch of hair had matched with the samples taken from Shraddha's family members.

"In the Shraddha murder case, the result of the mitochondrial examination has been received. One piece of bone and bunch of hair purported to be of the deceased have matched with that of her father and brother, which establishes the identity of the bone and hair to be that of Shraddha Walkar," said special commissioner (law and order, zone II) Sagar Preet Hooda. The bones will now be sent for postmortem examination to be conducted by a medical board in AIIMS, Hooda added.

Earlier, the CBI's CFSL had also conducted DNA tests and gave a report to the police, stating that the "DNA profiles were consistent" and matched with samples of her family members.

With the DNA reports proving that Shraddha had died, the police now have a strong case to allege that she was killed by her live-in partner Aaftab Poonawala. The forensic report also trashes his defence that she had left him and went somewhere.

Otherwise, the police were counting on circumstantial evidence and Aaftab's disclosures feebly backed by some technical proofs like his and Shraddha's mobile activity and CCTV footage.

With the receipt of these reports, Delhi Police has completed most of the documentation required for filing of a chargesheet against the alleged killer. The cops are likely to file a chargesheet by January end. Aaftab is currently lodged in jail number 4 of Tihar. He was arrested on November 12 on charges of murdering Shraddha.

TRACING DNA

What is mitochondrial DNA profiling

- **Mitochondria are cell organelles** that contain an extrachromosomal genome, which is separate from the nuclear genome
- Referred to as mtDNA test, it **helps in human identification** from biological samples where the DNA content is low
- MtDNA typing, based on genomic sequence analysis, is used to analyse a range of forensic samples like old bones, teeth, hair, etc
- **MtDNA is maternally inherited,** which justifies the fact that, apart from mutation, mtDNA sequence of siblings and all maternal relatives is identical
- **This characteristic is helpful in forensic cases,** such as in the analysis of the remains of a missing person, where the known maternal relatives can provide reference samples for a comparison



Shraddha Walkar

Context: In Shraddha Walkar case, Delhi Police has received the result of an advanced **Deoxyribonucleic acid (DNA) test**, known as **mitochondrial profiling or mtDNA test,** which helps in human identification from biological samples where the DNA content is low.

Mitochondrial Profiling (mtDNA test)

- **About**: Mitochondrial DNA (mtDNA) analysis is **used by forensic scientists** when samples such as **teeth, bones, and hairs without a follicle (root)** are collected from crime scenes or disaster areas.
  - MtDNA is also used when nuclear DNA is present in very low quantities or is highly degraded and does not provide a full **short tandem repeat (STR) profile (microsatellites or simple sequence repeats).**
- **Mitochondrial DNA (mtDNA or mDNA)**: It is the **DNA located in mitochondria**, cellular organelles within eukaryotic cells that convert chemical energy from food into a form that cells can use, such as adenosine triphosphate (ATP).
  - **Mitochondria are cell organelles** that contain an extrachromosomal genome, which is separate from the nuclear genome
  - Mitochondrial DNA is only **a small portion of the DNA in a eukaryotic cell;** most of the DNA can be found in the cell nucleus and, in plants and algae, also in plastids such as chloroplasts.
- **Significance of mtDNA test**: It **helps in human identification** from biological samples where the DNA content is low.
  - MtDNA typing, **based on genomic sequence analysis**, is used to analyse a range of forensic samples like old bones, teeth, hair, etc.
  - MtDNA is **maternally inherited**, which justifies the fact that, apart from mutation, mtDNA sequence of siblings and all maternal relatives is identical
  - This characteristic is **helpful in forensic cases**, such as in the analysis of the remains of a missing person, where the known maternal relatives can provide reference samples for a comparison.

PIB

JAN 5

INTELLIGENT TRAY RETRIEVAL SYSTEM

(Syllabus: GS Paper 3 - Economy & Infrastructure)

Shri Narayan Rane inaugurates virtually Intelligent Tray Retrieval System (ITRS) reiterating importance of made in India technology

Context: Union Minister for Micro, Small & Medium Enterprises inaugurated **Intelligent Tray Retrieval System (ITRS),** Manufactured by M/s SJK Innovations Pvt. Ltd, a MSME-Make in India Company at MOPA (GOA) International airport.

Inaugurated Intelligent Tray Retrieval System (ITRS)

- **About**: The ITRS is an **Artificial Intelligence** based fully automatic machine that helps in providing enhanced passenger security with advanced screening technology.
- **Key Features**: The machine is equipped with **image analysis software** with advanced tools that makes it easy for the screener to take correct decisions against every baggage.
    - This in turn **helps the passenger to complete the screening** much faster and easier when compared to the conventional machines.
    - The machine also contains a dedicated **module for the high threat baggage** which needs immediate attention at the airport.

Immigration and Security Check | Proposals

Long Term Proposal - Automated Tray Retrieval System

To make Ahmedabad Airport a digital and smart airport - **Smart security lane with ATRS.**



Bangalore International Airport to Introduce Smart Security Lanes

Source: MacDonald Humfrey Automation



Indira Gandhi International Airport, Delhi: A system to return trays that could make T3 security check.

Source: The Indian Express



Source: https://www.icao.int/Meetings/AVSEC/Documents/AVSEC2017%20PROGRAMME.pdf









IATA rolled out its vision - 'Checkpoint of the Future' - of a more effective security screening process, offering enhanced passenger

Source: asi-mag.com

- ATRS is an extension of X-ray machine on both sides.
- It will automatically return empty trays for passengers to put their bags, effectively ending the hassle to look for one.
- And also prevent empty trays from piling up.

Passengers use a new checkpoint with **automated screening lanes** at Terminal 4 at **John F. Kennedy International Airport (JFK)**

Source: asi-mag.com

PIB

JAN 5

BIND SCHEME

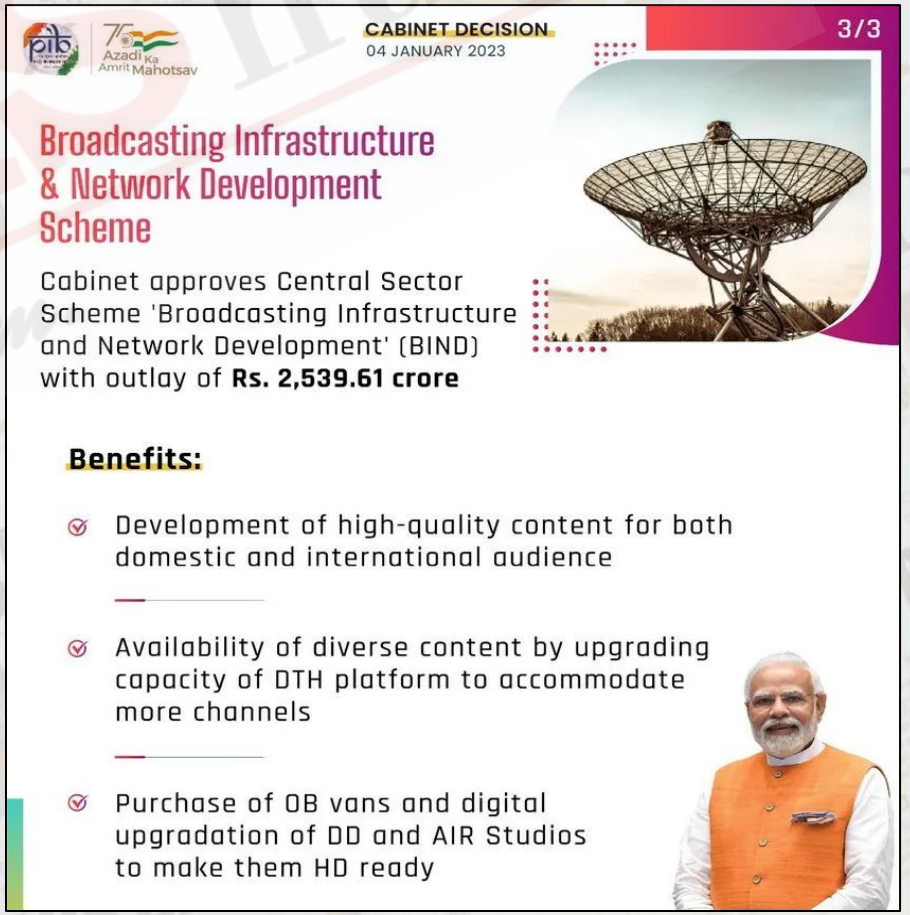
(Syllabus: GS Paper 3 - Economy & Infrastructure)

Major Boost for Public Service Broadcasting: Cabinet Committee on Economic Affairs approves Central Sector 'Broadcasting Infrastructure and Network Development (BIND)' Scheme with an outlay of Rs.2,539.61 crore up to 2025-26.

Context: The Cabinet Committee on Economic Affairs approved the proposal of the Ministry of Information and Broadcasting regarding **Central Sector Scheme "Broadcasting Infrastructure and Network Development" (BIND)** for infrastructure development of Prasar Bharati i.e. All India Radio (AIR) and Doordarshan (DD).

Key Points

- The BIND scheme is aimed at **providing financial support to the public broadcaster** in the expansion and upgradation of its infrastructure, content development and civil work.
- The BIND scheme will **enable the public broadcaster to undertake a major upgradation** of its facilities with better infrastructure which will widen its reach, including in the LWE - Left Wing Extremism, border and strategic areas and provide high quality content to the viewers.
- Another major priority area of the scheme is the **development of high-quality content for both domestic and international audience** and ensuring availability of diverse content to the viewers by upgradation of capacity of **DTH(Direct To Home) platform** to accommodate more channels.
- Purchase of **Outside Broadcasting vans and digital upgradation** of DD and AIR Studios to make them HD ready will be also be done as part of the project.
- The Scheme will **increase coverage of AIR FM transmitters** in the country to 66% by geographical area and 80% by population up from 59% and 68% respectively.
- The Scheme also envisages **free distribution of over 8 lakh DD Free Dish STBs** to people living in remote, tribal, LWE and border areas.



DTE

JAN 5

RUBBER PLANTATIONS

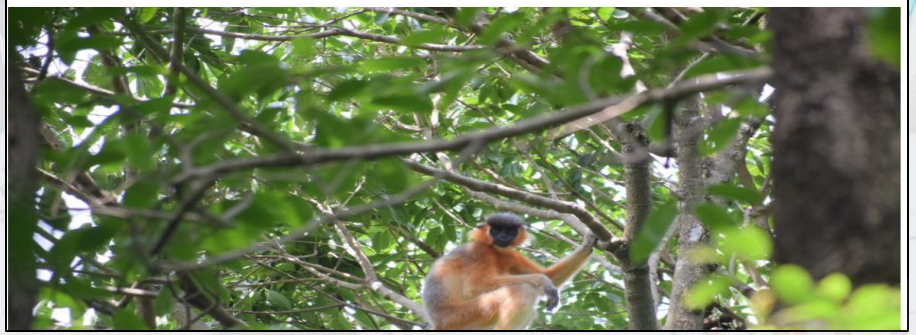
(Syllabus: GS Paper 1 - Geography)

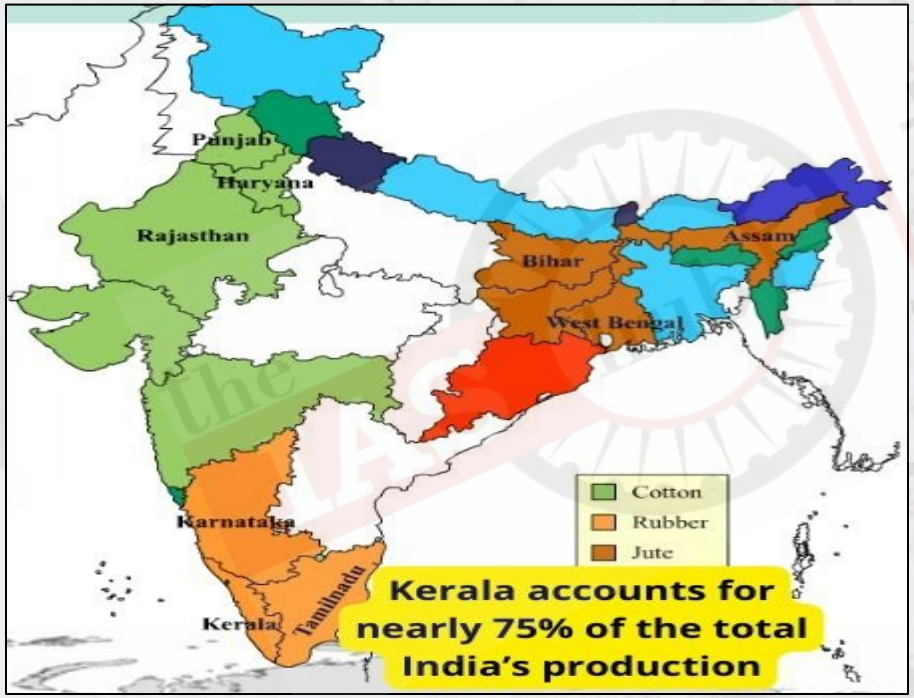
Rubber plantations in Tripura affecting monkeys, vegetation, suggests paper

Authors warn against monoculture farms, suggest eco-friendly measures to increase biodiversity

NEXT NEWS >

By Nandita Banerji
Published: Wednesday 04 January 2023





Context: Turning the **tropical forests into natural rubber plantations** in Tripura is negatively impacting non-human primate species and vegetation in the region, a recent report has found.

- Tropical forests are **closed canopy forests** growing within 28 degrees north or south of the equator.
- They are very **wet places, receiving more than 200 cm rainfall per year**, either seasonally or throughout the year.
- **Temperatures are uniformly high** - between 20°C and 35°C.

Natural Rubber

- Natural rubber is a polymer of the chemical molecule called **isoprene**.
- Rubber is a **cohesive elastic solid** derived from the latex of several tropical trees.
- It is a **native of the Amazon basin** and was introduced to countries in the tropical belts of Asia and Africa in the late nineteenth century.
- **Hevea brasiliensis**, often known as the Para rubber tree after the Brazilian port of Para, is a fast-growing, moderately strong, perennial tree that can reach a height of 25 to 30 metres.
- The rubber tree has a **straight trunk and thick, slightly soft, light brownish-grey bark.**
- It can live for a **hundred years or more.**
- Its **economic life period in plantations** is only around 32 years – 7 years of the immature phase and 25 years of the productive phase.

Rubber plantations in India

- **About**: India is the **world's largest producer** and the **third largest user** of natural rubber.
- **Rubber Growing Areas:**
  - **Traditional Areas:** Rubber growing in India has traditionally been limited to the hinterlands of the **southwest coast,** primarily in Tamil Nadu's Kanyakumari District and Kerala.
  - **Non-traditional regions**: Rubber is presently farmed in the hinterlands of coastal **Karnataka, Goa, Maharashtra's Konkan Region, coastal Andhra Pradesh and Orissa,** the northeastern provinces, and the Andaman and Nicobar Islands, among other places.
- **Climate requirements for Rubber Cultivation:** Rubber trees require **moist and humid climates** with heavy rainfall of more than 200 cm.
  - It grows well in e**quatorial climate** and temperature above 25-degree celsius.
  - Trees require **well-drained, weathered soils.**

SCIENCE REPORTER

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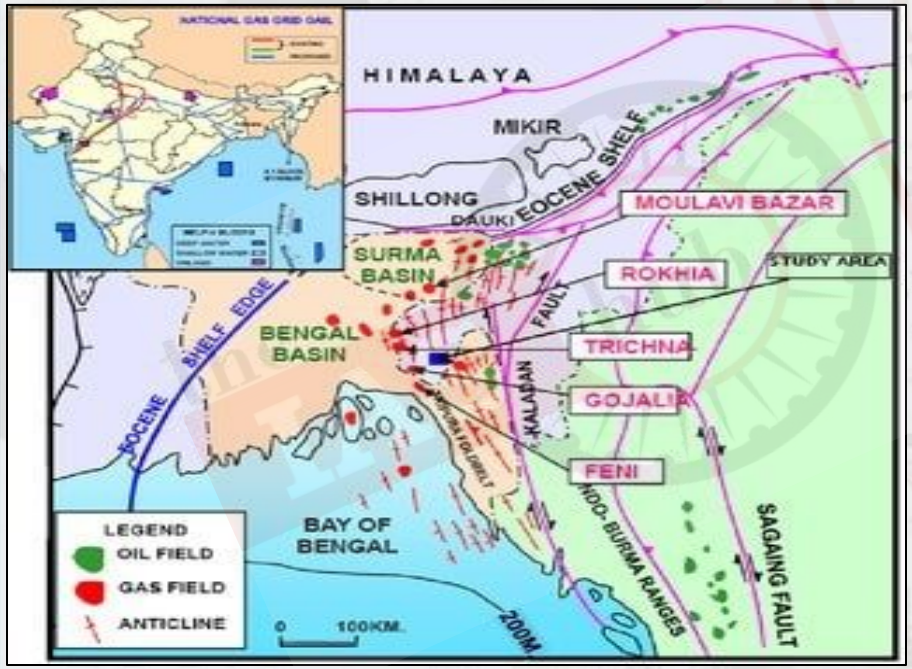
TIPAM FORMATION

(Syllabus: GS Paper 1 - Geography)

IIT Madras Researchers develop effective Data Analytics approach to detect petroleum in underground

Press Release





Context: Indian Institute of Technology Madras (IIT Madras) researchers have developed **a statistical approach that can characterise subsurface rock structure** and detect petroleum and hydrocarbon reserves.

- The method proposed was successful in providing critical information on the rock type distribution and hydrocarbon saturation zones in 'Tipam formation' located in the Upper Assam basin.

Key Points

- **Seismic inversion** is a process that is commonly used to transform the seismic reflection data into a quantitative rock-property description of a reservoir.
- Researchers used a type of seismic inversion, called '**Simultaneous Prestack Seismic Inversion' (SPSI).**
- The researchers also introduced a notable attribute named '**Poisson Impedance' (PI)** in their analysis.
- PI was used to identify the fluid content in the sandstone reservoir.
- Their findings also proved that '**Poisson Impedance' (PI) was more effective** in estimating hydrocarbon zone than conventional attributes.

Tipam formation

- The Tipam Sandstone Formation **belongs to Late Miocene to Early Pliocene age.**
- It is one of the main oil producing horizon of **Upper Assam Basin.**
- It varies widely in **thickness from area to area** owing to a major unconformity at the top.
- The **sandstones** are composed mainly of quartz, rock-fragments, and mica.
- Since the discovery of the **Digboi oilfield in Upper Assam** more than 100 years ago, the **Assam-Arakan** has come to be characterised as a 'category-I' basin to denote that they have significant amounts of hydrocarbon reserves.
- Petroleum is found in the p**ore space of hydrocarbon-bearing underground rock formations.**
- The identification of petroleum reservoirs in the **oil-rich basins of Assam** requires a survey of the rock structure of this region and the detection of hydrocarbon saturation zones in them.

THANK YOU!

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