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A half-hearted climate change verdict (7 May) (GS Paper III: Environment)

In *M.K. Ranjitsinh and Ors. vs Union of India and Ors.*, the top court has not looked into several problematic aspects of India's proposed energy transition

- The Supreme Court of India's extension of the **constitutional rights to life and equality, to the right to be free of ill-effects of climate change**, is a potential ray of hope in the midst of a gloomy ecological scenario.
- The world is staring at multiple collapses with historically unprecedented impacts on humans and the rest of life, as we race towards a 1.5° (and who knows how much more) Celsius rise in average temperatures.
- Governments across the planet have failed to act on the overwhelming scientific evidence of this scenario.
- The judgment has significant potential to be converted into actions that can undo, mitigate, or help adaptation to the ill-impacts of the climate crisis. The Court's observations regarding

the disproportionate share of impacts felt by already marginalised sections of society, can be the basis for much-needed corrective action.

The flaws in the judgment

- But the judgment also contains deep flaws that could undermine such potential. We will not go into its orders regarding the conservation of the **Great Indian Bustard**, the threat to whose habitat by **mega-energy in western India** was the core matter of the petition. Here, we deal with the power and climate aspects. The Court states that harnessing solar and wind power is crucial to meet India's climate commitments, made by the Prime Minister, Narendra Modi, at the 26th session of the **Conference of the Parties in 2021**. These include **net zero carbon emissions by 2070, generation of 500 GW by non-fossil fuel sources and a 50% share of total power generation to renewable energy by 2030**. Any obstructions to these, the judgment says, will lead to greater coal-based production, with dire consequences for the climate.
- The Court has tried to balance the need for land (and airspace) for solar and wind energy production in Rajasthan and Gujarat, with the imperative of protecting the bustard. In doing so, however, **it has not interrogated several problematic aspects of India's proposed energy transition**.
- For one, the government includes, in 'non-fossil-fuel' and 'renewable' energy, **large hydropower and nuclear plants**. There is nothing benign about these. **Construction of mega-dams in the Himalaya has caused destabilisation, biodiversity loss, and displacement of communities. Nuclear power has led to forced displacement, curtailment of democratic rights as it is shrouded in secrecy, and the fear of centuries of contamination by untreatable nuclear wastes.**
- Second, **mega-solar and wind projects too have huge adverse impacts**. For instance, the huge **Pavagada Solar Park in Karnataka**, has taken away grazing and agricultural land, and destroyed wildlife. In Changthang, **Ladakh, a proposed 13 GW solar project will take up over 20,000 acres of fragile ecosystem, crucial for unique wildlife and nomadic pastoralism that produces the famous Pashmina wool.**
- Another one, proposed **over 1,400 acres next to the Chhari Dhand Conservation Reserve in Kachchh, Gujarat, could destroy an important bird area as also the livelihoods of Maldhari pastoralists**. Unfortunately, such **renewable energy projects are excluded from environmental impact assessment (EIA)** and clearance procedures, so their impacts are not even assessed.

Environment Impact Assessment

- Developmental projects eg. Infrastructure, Highways, Railways, Mining, Hydropower projects, etc are bound to impact air, water, and soil.
- They can also impact the health of human beings and other living organisms.
- EIA is a decision-making tool to assess all kinds of impacts on the environment due to proposed economic activities.
- It looks for mitigating those impacts with the help of Environment Management Plans.
- EIA is based on the principle of Sustainable development where protection of the environment together with socio-economic development shall take place.

Environmental Impact Assessment or EIA is the process or study which

- **predicts the effect of a proposed industrial/infrastructural project on the environment.**

- prevents the proposed activity/project from being approved without proper oversight or taking adverse consequences into account
- compares various alternatives for a project and
- seeks to identify the one which represents the best combination of economic and environmental costs and benefits.
- Any project requiring environmental clearance first needs to undergo a thorough **screening and scoping process by the regulatory authorities.**
- Thereafter a draft EIA report is sent for public consultation.
- Under the existing 2006 law, projects are categorized into categories A and B.
- All projects in category A need to undergo the process of EIA.
- Category B projects are further classified into categories B1 and B2, on the basis of their scope and potential impact.
- Only the projects under B2 are exempted from the cumbersome process.

Stages:

- Screening
- Scoping
- Public hearing
- Appraisal

Screening:

- Projects are divided into 2 categories:
- **Category A:**
- It includes big-size projects like hydropower projects.
- All such projects are approved by the Central EIA authority.
- This authority is under MoEFCC
- **Category B:**
- It includes smaller projects.
- eg. Tanneries, chemical factories, etc.
- Category B is further divided into **B1 and B2.**
- EIA study is mandatory for B1 projects.
- Projects under B2 are exempted from EIA Study.
- All category B projects are approved by the State EIA authority.
- This authority is under MoEFCC.
- Screening is required for category B Projects only.

Scoping:

- A detailed term of reference for the proposed project is determined.
- The scope of the EIA study is determined.
- **Based on Terms of Reference (ToR), a preliminary study will be conducted and an EIA report will be prepared.**
- **This report will be prepared by a third-party EIA consultant.**
- Third-party EIA consultant is paid by the project developer.
- These **EIA Consultants are certified** to do this work.
- The certification is by the MoEFCC.

Public consultation/Public hearing:

- A public hearing is conducted on the EIA report which is prepared by the consultant on behalf of the project developer.
- Here local communities affected by the project are invited to participate.
- This is done by the district administration.
- There is an advertisement of the venue and time of the public consultation and it is given by the district administration.
- This public hearing is conducted under the supervision of State Pollution Control Board/ or CPCB in case of UT.

- A video recording of the hearing, with the written opinion of participating people, is taken for final review by the concerned authority.
- Some projects are exempted from Public hearing.

Appraisal:

- It refers to the review of the EIA report along with all documents of the public hearing.
- Based on the approval of EAC, the project is either approved or rejected.
- When the project is approved, the project shall start within 2 years of approval.
- Otherwise, the approval will be canceled and the entire process should be repeated again.

Comparative analysis of EIA Act:

Particulars	EIA 1994	EIA 2006	EIA 2020
Period for public consultation	30 days	45 days	40 days
Monitoring period	6 Months	6 Months	Annual
Environmental clearance	The onus of providing environmental clearance is on the Central government.	The onus of providing environmental clearance is on the Central Government and State government.	The onus of providing environmental clearance is on the Central Government and State government.
Environmental clearance process	Screening Public hearing Obtaining NOC Evaluation Recommendations	Screening Scoping Public hearing Appraisal	The process is different for category A and B1 and Category 2 projects.
Provision of appeal	Not applicable	Not applicable	An appeal can be made to NGT

Issues/problems/challenges with EIA:

Challenges	Solutions
EIA Report is a very technical report and it is hard to be understood by the common people.	A comprehensive EIA report has to be drafted in regional language for local communities to understand.
Project developer-EIA Consultant nexus	Check and balances should be there. Blacklisting of EIA Consultants involved in malpractices can be adopted.
Lengthy process (6 to 8 months to complete the entire work)	A shortened time for a public hearing and other time-consuming processes.
Bureaucratic delay (Red tape)	The use of ICT can prove helpful.
Lack of participation in the appraisal process	Involvement of all stakeholders like NGO/ Civil society representatives in the appraisal process.

Exemption of projects in schedule 1	Scrutiny of all projects by the government and all such projects which require EIA should be added to Schedule 1.
Lack of transparency in the review process	Eligibility and qualification of EAC members to be laid out.

- Third, despite significant investment in renewable energy, the government is not reducing investments in coal.
- New coal mining blocks continue to be given a green signal, including in some of the country's most biologically diverse and socially sensitive (indigenous/ Adivasi) areas.

Maldhari Pastoralists: Guardians of the Herds

Maldharis are a unique community of pastoralists found primarily in Gujarat, Rajasthan, Maharashtra, and Madhya Pradesh, India. Here's a glimpse into their lives based on official sources:



Lifestyle:

- Traditionally nomadic or semi-nomadic
- Migrate with their herds of sheep, goats, buffalo, and camels
- Deeply connected to their animals and environment
- Skilled in animal husbandry and veterinary practices
- Live in temporary shelters made of leaves and mud

Challenges:

- Encroachment on grazing lands due to urbanization and agriculture
- Climate change impacting traditional migration routes and availability of water and fodder
- Social marginalization and lack of access to education and healthcare

Government Initiatives:

- Schemes to provide veterinary care and fodder security
- Efforts to establish alternate grazing routes and pasture lands
- Educational programs to improve the socio-economic conditions of Maldharis

- In many of these, government agencies have enabled corporate entities, especially those closest to New Delhi's power corridors, to sidestep environmental laws.

Alternatives should have been considered

- The Court's blanket acceptance of such an energy transition undermines its own assertion regarding a clean and healthy environment being a fundamental human right.
- **To ensure such a right, it ought to consider the potential of alternatives to these mega-projects. For instance, rooftop and other decentralised renewable energy sources alone could yield over 600 GW.**
- The Court itself observed: "Decentralized and distributed solar applications have brought substantial benefits to millions of people in Indian villages, addressing their cooking, lighting, and other energy needs in an environmentally friendly manner."
- If the Constitution's provisions for equality are to be met, these may fit the bill much more than mega-projects.
- The Court could also have asked questions about **how much of produced energy is wasted in inefficient transmission and use (for example, kitchen and other appliances), and luxury consumption.**
- The **absence of demand management in India's energy plans** is shocking; its like any and all demand is justified. We need also to ask: what is the potential of power redistribution, from luxury consumption by the rich to poorer sections who do not get enough, thereby avoiding the need to produce that much new power?
- While quoting climate-related judgments from other countries and some international agreements that India is party to, the Court has ignored others such as the increasing jurisprudence and the United Nations' declarations on **rights of nature. One of the fastest-growing earth jurisprudence movements globally, it now has legal recognition in over 30 countries.**
- It is a crucial part of just climate action, especially where led by indigenous peoples and other local communities to safeguard nature, and their habitats for present and future generations. In India, **recognition of the rights of the Ganga and Yamuna by the Uttarakhand High Court in 2017 (stayed by the Supreme Court on a plea by Uttarakhand government that the order was not implementable), is also a potential bulwark against climate-damaging actions such as big dams and other mega-projects.**
- Compliance with global treaties on human rights (some of which the Court quotes) and on indigenous people's rights, would require critical appraisal of mega-renewable energy projects as much as of fossil-fuel sources.
- The Court could still expand the positive potential of the judgment, by adding these aspects to the mandate of the expert committee it has set up: **whether there are alternative, less damaging ways (including decentralised renewable energy) of generating (or obtaining, through reduction of waste and luxury consumption of already available capacity) the power to be produced by mega-projects in Rajasthan and Gujarat, or non-electricity means of meeting the same energy demand.**

The problem with the Indian model

- There are also broader issues of what climate rights should actually mean. **India's model of development, heavily focused on mega-industrial, infrastructural and extractive projects that cause deforestation and displacement of communities, is fundamentally violative of constitutional rights.**
- When the **government proposes an infrastructure project that will deforest 130 square kilometres of pristine rainforest and take up lands reserved for Scheduled Tribes in Great Nicobar, it clearly violates this line of the Court's judgment: "the tribal population in the Nicobar islands continues to lead a traditional life which is unconnected to and separate from any other part of the country or world. Indigenous communities often lead traditional lives The destruction of their lands and forests or their displacement from their homes may result in a permanent loss of their unique culture."**
- If the Court were to take such observations to their logical conclusion, and achieve the positive potential of declaring climate as a fundamental right, it should be directing the government to re-examine such projects. If it does, the judgment would have provided grounds for some fundamental shifts towards real sustainability and justice. If not, it has only reinforced the ecologically flawed, undemocratic and socially disruptive path to tackle climate change that the Government of India has been promoting.

MAINS PRACTICE QUESTIONS:

Question: Describe the stages involved in the Environment Impact Assessment (EIA) process for developmental projects. How does each stage contribute to ensuring environmental protection and public participation? (250 words/15 Marks)

ANSWER APPROACH

- Introduce the answer with a brief explanation of Environment Impact Assessment (EIA).
- Then bring the stages involved in the Environment Impact Assessment (EIA) process for developmental projects.
- Further bring the **Contribution of EIA to Environmental Protection and Public Participation.**
- Conclude by summarizing.

ANSWER

EIA serves as a decision-making tool that assesses all kinds of impacts on the environment resulting from proposed economic activities. It aims to predict the effects of industrial or infrastructural projects on the environment, thereby preventing their approval without proper oversight or consideration of adverse consequences. This process is essential for ensuring that developmental projects are undertaken in a responsible and sustainable manner.

1. Screening:

- **Purpose:** The initial stage involves categorizing projects based on their size and potential impact.
- **Categories:** Projects are divided into Category A and Category B, further subdivided into B1 and B2.
- **Evaluation:** Category A projects, such as hydropower projects, undergo mandatory EIA by the Central EIA authority, while Category B projects are assessed by the State EIA authority.

- **Impact:** Ensures that all significant projects undergo thorough environmental scrutiny, preventing potential adverse effects on the environment.

2. Scoping:

- A detailed term of reference for the proposed project is determined.
- The scope of the EIA study is determined based on Terms of Reference (ToR), a preliminary study will be conducted and an EIA report will be prepared.
- This report will be prepared by a third-party EIA consultant.
- Third-party EIA consultant is paid by the project developer.
- These EIA Consultants are certified to do this work and the certification is by the MoEFCC.

3. Public Consultation/Public Hearing:

- It involves engaging local communities and stakeholders in the decision-making process.
- It provides an opportunity for affected communities to voice concerns and provide feedback on the EIA report.
- It is conducted under the supervision of regulatory authorities, ensuring transparency and accountability.
- It facilitates public participation, enhancing transparency and promoting informed decision-making.

4. Appraisal:

- Involves the review and evaluation of the EIA report and public feedback.
- Expert Appraisal Committees (EACs) assess the environmental implications and the adequacy of proposed mitigation measures.
- Based on EAC recommendations, projects are either approved, rejected, or require modifications.
- Ensures that projects are evaluated based on their environmental and socio-economic merits, promoting sustainable development and minimizing adverse impacts.

Contribution to Environmental Protection and Public Participation:

- The EIA process identifies potential environmental risks and proposes mitigation measures, ensuring that projects adhere to environmental regulations and standards.
- Through public consultation and hearings, affected communities have a voice in the decision-making process, promoting transparency, accountability, and social justice.

Thus, the EIA process for developmental projects plays a crucial role in safeguarding the environment and ensuring sustainable development by evaluating potential impacts, engaging stakeholders, and promoting informed decision-making.

Getting to a new level in India's online gaming sector (7 May) (GS Paper III: S&T)

There is much potential in India to shape the future of the gaming industry

- The Prime Minister aims to position India as a leading global gaming hub.
- He spent a day engaging with seven top gamers in April 2024 to understand the gaming industry's trajectory and challenges.
- The discussion focused on **distinguishing skill gaming from gambling** to establish a conducive regulatory environment.

- Online gaming is integral to the Digital India initiative, highlighting its importance.
- Key takeaways included the potential of Indian mythology-based games, promoting women's participation, fostering innovation, and addressing perceptions of gaming as a career in India

Rapid growth

- The online gaming industry in India has experienced rapid growth, with a **Compound Annual Growth Rate (CAGR) of 28% between FY20 and FY23.**
- Projections suggest further growth to **₹33,243 crore by FY28, maintaining a 15% CAGR.**
- This sector attracts significant foreign and domestic investments and creates both direct and indirect employment opportunities.
- Leveraging India's IT capabilities, the gaming industry holds significant potential for the country.
- **Despite global gaming industry revenues exceeding \$300 billion in 2021, India's online gaming segment only contributes 1.1% to global online gaming revenue, indicating substantial room for growth.**
- Online gaming presents a multi-billion-dollar opportunity for Indian startups and aligns with the goal of achieving a \$1 trillion digital economy.
- Positive developments include the establishment of a task force by the Ministry of Information and Broadcasting and the designation of the Ministry of Electronics and Information Technology as the nodal ministry.
- **Introduction of regulations such as the IT (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021, and clarification on tax deduction at source on winnings provide clarity and certainty for online gaming startups.**
- These measures contribute to fostering innovation driven by young Indians in the online gaming industry

Issues that need scrutiny

- Despite the **presence of self-regulatory bodies within the IT Rules of 2021**, their effective implementation is pending, undermining their intended impact on regulating the online gaming industry.
- Self-regulation plays a crucial role in an industry driven by innovation and rapidly evolving technology.
- NITI Aayog's discussion paper proposed a self-regulatory model for the online fantasy gaming sector, with a self-regulatory organization at its forefront.
- Recent revisions in taxation have raised concerns for the industry, particularly startups, as the **Goods and Services Tax (GST) Council decided to impose a 28% tax rate on the total face value of bets**, effective from October 1, 2023.
- Previously, online gaming firms in India were subjected to an 18% GST rate since the introduction of the indirect tax system in July 2017.
- **While the higher tax rate has initially boosted tax revenue for the government**, it poses sustainability concerns for the industry in the long term and may impact job creation in this sector

Soft power

- India has the opportunity to become a leading global gaming hub by addressing existing deficiencies in the industry.
- Leveraging India's rich cultural heritage, including stories, legends, and folklore, can attract both domestic and international audiences to games inspired by Indian mythology.
- Efforts are underway to encourage the participation of women in the gaming industry, promoting diversity and inclusivity.
- As perceptions about gaming as a career option change, India can benefit from a growing pool of talented individuals driving innovation in the gaming landscape.
- India is on the brink of a transformative era in the gaming industry, and by creating an enabling environment for skill gaming and capitalizing on cultural narratives, it can realize its vision of a \$1 trillion digital economy and shape the future of global gaming.

Time to talk: On Tamil Nadu, Kerala and the Mullaperiyar dam row (7May)

T.N., Kerala should discuss dam safety; legal recourse must be the last resort

- Tamil Nadu filed a request in the Supreme Court regarding the Mullaperiyar dam problem.
- Despite a previous court ruling allowing water storage up to 142 ft., issues between Tamil Nadu and Kerala remain unresolved.
- Tamil Nadu accuses Kerala of obstructing essential maintenance work on the dam while expressing concerns about its safety.
- Despite the formation of committees to address dam safety, no solution has been found.
- Tamil Nadu wants a comprehensive dam safety evaluation completed by December 30, 2026.
- Judicial intervention has led to the adoption of rules for dam operation during floods, despite Kerala's objections.
- A dispute also exists over Kerala's proposal for a mega car parking project near the dam.
- Both states need to resume bilateral negotiations to resolve pending issues, regardless of legal actions.
- Political leaders in both states should proactively address differences to prevent escalation of tensions.
- Talks between the states could help understand each other's perspectives and prevent vested interests from worsening the situation.

Twin towers: On China, India and badminton (7 May)

China dominated in both men's and women's team events in badminton

- China won both the Thomas and Uber Cup titles in badminton held in Chengdu.
- This marks China's second time achieving this feat, the first being in 2012.
- Indonesia was the runner-up in both the men's and women's divisions.
- China's victory positions them as strong contenders for the Paris Olympics.
- The men's victory is particularly significant for China after a recent decline in performance.
- Shi Yu Qi of China won all six of his singles matches, contributing to the team's success.
- In the women's category, China bounced back from a loss to South Korea in 2022 to win convincingly.
- India's performance was mixed, with the Thomas Cup serving as an evaluation before the Olympics.
- Satwiksairaj Rankireddy and Chirag Shetty faced defeats against high-profile opponents, while H.S. Prannoy and Lakshya Sen had notable wins.
- India's young women's team gained valuable experience despite losses to China and Japan.
- Players like Anmol Kharb, Isharani Baruah, Tanvi Sharma, and Ashmita Chaliha benefited from the competition, enhancing their skills for future tournaments.

What is carbon farming? (7 May) (GS Paper III: Environment)

What are some techniques within carbon farming which can reduce greenhouse gas emissions? What are the challenges in implementing such techniques, especially in developing countries such as India? What are some of the global initiatives?

- Carbon is an essential element found in all living organisms and many minerals.
- It plays a crucial role in various processes on Earth, including photosynthesis, respiration, and the carbon cycle.
- Farming involves activities like cultivating land, growing crops, and raising livestock for food, fiber, fuel, or other resources.
- Carbon farming combines farming practices with regenerative agricultural techniques aimed at restoring ecosystem health and improving agricultural productivity.
- It focuses on enhancing carbon storage in agricultural landscapes and reducing greenhouse gas emissions to mitigate climate change.
- Carbon farming practices are easy to adopt across different agro-climatic zones and can help address soil degradation, water scarcity, and challenges related to climate variability.

How can carbon farming help?

- Rotational grazing is a simple form of carbon farming that involves moving livestock between different pasture areas.
- Other carbon farming practices include agroforestry, conservation agriculture, integrated nutrient management, agro-ecology, livestock management, and land restoration.

- Agroforestry practices like **silvopasture and alley cropping** involve **planting trees and shrubs alongside crops or pasture to sequester carbon and diversify farm income.**
- Conservation agriculture techniques such as **zero tillage, crop rotation, cover cropping, and crop residue management** help **minimize soil disturbance and increase organic content in soil.**
- **Integrated nutrient management** involves using **organic fertilizers and compost** to **promote soil fertility and reduce emissions.**
- Agro-ecological approaches like **crop diversification and intercropping** contribute to **ecosystem resilience.**
- **Livestock management strategies** like **rotational grazing, optimizing feed quality, and managing animal waste** can **reduce methane emissions and increase carbon storage in pasture lands.**

What are the challenges to carbon farming?

- The effectiveness of carbon farming depends on various factors such as **geographical location, soil type, crop selection, water availability, biodiversity, and farm size.**
- Regions with **long growing seasons, sufficient rainfall, and irrigation** are **best suited for carbon farming** as they provide optimal conditions for carbon sequestration through vegetation growth.
- Practices like **agroforestry and conservation agriculture** may be particularly effective in **regions with adequate rainfall and fertile soil.**
- Carbon farming can be challenging in hot and dry areas with limited water availability, where water is prioritized for drinking and washing needs.
- Limited water availability can hinder plant growth and restrict the potential for carbon sequestration through photosynthesis.
- Some carbon farming practices, like cover cropping, may not be viable in arid environments due to additional water demands.
- **The selection of plant species is crucial, as not all species trap and store carbon equally effectively.** Fast-growing trees and deep-rooted perennial grasses are generally better at carbon sequestration.
- Financial assistance may be necessary for farmers, especially in developing countries like India, to overcome the costs associated with implementing carbon farming practices.
- Addressing these challenges is essential to realize the full potential of carbon farming as a strategy to combat climate change.

What are some carbon farming schemes worldwide?

- Carbon trading in agriculture has gained importance globally, especially in countries like the U.S., Australia, New Zealand, and Canada, where voluntary carbon markets have emerged.
- Initiatives such as the **Chicago Climate Exchange** and the **Carbon Farming Initiative in Australia** aim to incentivize carbon mitigation activities in agriculture.
- Practices like **no-till farming and reforestation** are examples of activities promoted through carbon trading to reduce carbon emissions.

- **Kenya's Agricultural Carbon Project, supported by the World Bank**, showcases the potential of carbon farming to address climate mitigation, adaptation, and food security challenges in economically developing countries.
- The '4 per 1000' initiative, launched during the COP21 climate talks in 2015 in Paris, emphasizes the role of carbon sinks in mitigating greenhouse gas emissions.
- Managing the remaining carbon budget of approximately 390 billion tonnes wisely is crucial as the oceans and atmosphere approach their saturation points with carbon

What are the opportunities in India?

- As climate change becomes more severe, agricultural practices that are resilient to climate impacts and reduce emissions are crucial.
- Grassroots initiatives and research in India show that organic farming can effectively sequester carbon, providing economic benefits.
- Agro-ecological practices in India have the potential to generate \$63 billion in value from approximately 170 million hectares of arable land.
- **Farmers adopting sustainable agricultural practices could receive annual payments of around ₹5,000-6,000 per acre for providing climate services.**
- **Regions like the Indo-Gangetic plains and the Deccan Plateau are well-suited for carbon farming, while the Himalayan region and coastal areas face challenges.**
- Carbon credit systems can incentivize farmers by providing additional income through environmental services.
- **Agricultural soils have the capacity to absorb 3-8 billion tonnes of CO₂-equivalent annually over 20-30 years, contributing to climate stabilization.**
- Scaling up carbon farming requires addressing challenges such as limited awareness, inadequate policy support, technological barriers, and creating an enabling adoption environment.
- **Promoting carbon farming in India can help mitigate climate change, improve soil health, enhance biodiversity, and create economic opportunities for farmers.**

Understanding the science behind magnetic resonance imaging (7 May) (GS Paper III: S&T)

MRI scans are used to obtain images of soft tissues within the body. It is a non-invasive diagnostic procedure widely used to image the brain, the cardiovascular system, the spinal cord and joints, various muscles, the liver, arteries, etc

- Magnetic resonance imaging (MRI) is a non-invasive medical imaging technique used to look inside the human body.
- The techniques underlying MRI were developed in the early 1970s.
- Paul Lauterbur and Peter Mansfield further refined these techniques in the late 1970s, making them commercially viable.
- Their contributions to MRI earned them the **Nobel Prize in Medicine in 2003.**

- MRI has become an indispensable tool in modern medical diagnostics, allowing for detailed imaging of internal body structures without the need for surgery.

What is magnetic resonance imaging?

- Magnetic Resonance Imaging (MRI) is a diagnostic procedure used to obtain images of soft tissues in the body.
- Soft tissues are those that haven't become hardened through calcification.
- MRI is non-invasive and widely used to image various parts of the body, including the brain, cardiovascular system, spinal cord, joints, muscles, liver, and arteries.
- It's particularly important in diagnosing and treating certain cancers like prostate and rectal cancer, and in tracking neurological conditions such as Alzheimer's, dementia, epilepsy, and stroke.
- Researchers also use MRI to study changes in blood flow to understand brain activity, a method known as functional MRI.
- However, individuals with embedded metallic objects or implants, like shrapnel or pacemakers, may not be able to undergo MRI scans due to the strong magnetic fields used.
- Even having a credit card with a magnetic strip in the pocket during an MRI can cause it to be wiped clean due to the magnetic fields.

How does MRI work?

- An MRI procedure creates images of body parts using the hydrogen atoms present in those parts.
- Hydrogen atoms consist of a single proton with one electron spinning around it.
- These atoms are abundant in fat and water, which are found throughout the body.
- The MRI machine comprises four essential components, resembling a giant doughnut.
- The central hole, called the bore, is where the person being scanned is inserted.
- Inside the doughnut is a powerful superconducting magnet that generates a strong and stable magnetic field around the body.
- When the body part to be scanned is positioned at the center of the bore, the magnetic field is activated.
- The magnetic field causes the spin axes of hydrogen atoms in the body part to align along its direction.
- A small population of atoms may remain unmatched, pointing in different directions.
- A device emits a radiofrequency pulse at the scanned area, causing the excess atoms to absorb the radiation and become excited.
- When the pulse ends, these atoms release the absorbed energy and return to their original states.
- The frequency of the pulse the excess atoms absorb is called the Larmor frequency, determined by the magnetic field strength and tissue type.
- A detector receives the emitted signals and sends them to a computer, which reconstructs two- or three-dimensional images of the body part.

What are the pros of MRI?

- After the main magnetic field is activated in an MRI machine, three smaller magnets produce weaker magnetic fields that are about 80 times weaker than the main field.
- These smaller fields have gradients, meaning they are not uniform, which helps highlight specific portions of the body to be scanned.
- By turning the gradient magnets on and off in specific sequences, the MRI machine can scan portions as narrow as a few millimeters wide without requiring the individual to move inside the machine.
- The machine can scan different parts of the body without the need for the person being scanned to change positions.
- MRI scans can practically image the body from various useful directions and in very small increments due to the machine's design and magnet organization.
- When excess atoms emit absorbed energy

What are the cons of MRI?

- MRI machines are expensive, ranging from a few tens of lakhs to several crores depending on specifications like magnetic field strength and imaging quality.
- Diagnostic facilities pass on these costs to patients, making MRI scans costly, often priced at ₹10,000 or more each.
- Patients may require multiple MRI scans, further increasing the financial burden, especially for those without insurance.
- Patients must remain still during MRI scans, which can last tens of minutes. Any movement can distort the image and necessitate a repeat scan.
- Claustrophobic individuals may find the confined space of the MRI machine uncomfortable, although some "open-bore" MRI designs can alleviate this issue.
- MRI machines generate a magnetic field of at least 1 tesla using superconducting wire coils cooled with liquid helium.
- Maintaining the superconducting setup is energy-intensive and expensive.
- The switching of heavy currents within the machine, particularly in the gradient coils, produces loud noises during operation, which can be uncomfortable for patients.

MRI (Magnetic Resonance Imaging): Uses strong magnetic fields and radio waves to create detailed images of organs, soft tissues, bones, and even biochemical activity.



MRI



CT-scan

- **CT Scan (Computed Tomography):** Uses X-rays to capture multiple images from different angles. These images are then combined to create a detailed cross-sectional view of your body.

Applications:

- **MRI:** Often preferred for examining soft tissues like muscles, ligaments, the brain, and the spinal cord. It can also detect certain cancers and abnormalities in blood flow.
- **CT Scan:** Well-suited for visualizing bones, blood vessels, internal injuries, and certain infections. It's also faster and may be preferable for patients who are claustrophobic or have metal implants that can interfere with MRI scans.

Safety Considerations:

- **MRI:** Generally considered safe, but the strong magnetic fields may not be suitable for people with certain medical implants or claustrophobia.
- **CT Scan:** Involves exposure to ionizing radiation, which carries a small risk of cancer. However, the risk is generally considered low for most diagnostic scans.

Here's a table summarizing the key differences:

Feature	MRI	CT Scan
Technology	Magnetic fields and radio waves	X-rays
Best for	Soft tissues, brain, spinal cord	Bones, blood vessels, internal injuries
Safety Considerations	Magnetic fields, claustrophobia	Radiation exposure (low risk)
Speed	Slower	Faster

**GST's pro-poor tack has aided people (7 May)
(GS Paper III: Environment)**

Finance Minister Sitharaman asserts that taxes on many essential items including soaps are lower than in pre-GST era; attributes the recent landmark gross GST collection of more than ₹2 lakh crore to 'heightened economic activity'

- Union Finance Minister Nirmala Sitharaman highlighted the benefits of the Goods and Services Tax (GST) regime, stating it has a pro-poor approach.
- She mentioned that the recent gross GST revenue exceeding ₹2 lakh crore is attributed to increased economic activity.
- Sitharaman noted that the effective weighted average GST rate has consistently decreased since 2017.
- The GST has reduced taxes on essential items compared to pre-GST rates, such as hair oil and soaps, which saw a tax cut from 28% to 18%, and electrical appliances, which were taxed at 12% instead of the previous 31.5%.
- Movie tickets also witnessed lower taxation under the GST regime.
- However, she didn't provide details on how the pre-GST rates were calculated.
- Sitharaman mentioned that rationalization efforts have been ongoing since 2017 under the GST regime.
- The **National Anti-profiteering Authority** ensures that companies pass on the benefits of reduced taxes to consumers.
- **GST has exempted many essential items and services**, including unbranded food items, life-saving drugs, healthcare, education, public transport, sanitary napkins, hearing aid parts, and agricultural services.
- She noted that the idea of GST was first proposed during the Atal Behari Vajpayee-led NDA government.
- Sitharaman attributed the successful implementation of GST to Prime Minister Narendra Modi's leadership, stating that the necessary consensus was built under his guidance.
- Before GST, India had a fragmented and complicated indirect tax system, with each state functioning as a distinct market with different rules and tax rates.

The complexity of the previous tax system made it difficult for businesses to avail inputs for central excise duty, leading to an increased tax burden for the common people.

The secularism of Indian science (7 May)

Science in India has historically been accommodative of the country's diverse religiosity

- Last month, a sunbeam ignited a debate regarding the role of science and religion in Indian society.
- Abhay Karandikar, the Secretary of the Department of Science and Technology (DST), shared a post on X on April 17 (Ram Navami).

- The post highlighted the Indian Institute of Astrophysics (IIA)'s involvement in the 'surya tilak' project at the Ram Mandir in Ayodhya.
- The 'surya tilak' involved focusing a beam of sunlight precisely on the forehead of Ram Lalla.
- The IIA, known for designing mirrors and lenses for capturing light from celestial bodies, helped design a system of lenses and mirrors for this purpose.
- This system manipulated the sunlight to fall accurately on the desired spot.
- The calculations by the IIA also accounted for the varying dates of Ram Navami each year, determined by the lunisolar calendar, ensuring precise alignment for the 'surya tilak'.

Primary objections

- Some scientists were concerned about the involvement of the Indian Institute of Astrophysics (IIA) in a religious ceremony.
- They argued that designing the 'surya tilak' system could have been done by college-level students, questioning the need for involvement of leading astrophysicists and astronomers.
- The deeper concern was that the involvement of IIA, a scientific institution, in a religious event contradicted the Constitution's commitment to 'scientific temper'.
- 'Scientific temper' refers to a commitment to rational investigation and evidence-based thinking, championed by figures like Raja Ram Mohan Roy and later scientists like Satish Dhawan and Abdur Rahman.
- This principle becomes particularly relevant in public discourse when science intersects with religious practices.
- The recent controversy highlighted that the IIA wasn't the only scientific institution involved in the Ayodhya project. The Central Building Research Institute (CBRI) also played a key role.
- The CBRI, under the Council of Scientific and Industrial Research (CSIR), handled aspects related to the structural integrity of the temple and set up the 'surya tilak' system.
- Interestingly, there were no objections raised regarding CBRI's participation, raising questions about the perceived conflict between science and religion.
- Craftsmanship and engineering have historically been viewed as independent of religion, as seen in the innovative design practices of ancient temples.

An accommodative version

- Astronomy, astrophysics, and space exploration are often associated with the European 'scientific revolution', which challenged Roman Catholic dogma like geocentrism.
- In India, historically, there has been accommodation of diverse religious beliefs alongside scientific pursuits.
- An example is the Calendar Reform Committee led by astrophysicist Meghnad Saha, which aimed to modernize India's local calendars in 1956.
- The Indian National Calendar was a product of this committee, correcting anomalies and defining Indian Standard Time.
- Despite being enforced by law, only Indian Standard Time has been widely adopted.
- The Calendar aimed to retain Indian cultural identity while modernizing time-keeping methods.

- The Positional Astronomy Centre (PAC), a department of the India Meteorological Department, releases annual documents listing public holidays, festival dates, and celestial positions to aid astronomers and astrologers.
- The Department of Science and Technology (DST) has funded research beyond traditional scientific disciplines, including projects like SATYAM and Scientific Validation and Research on Panchgavya.
- SATYAM focuses on science and technology related to yoga and meditation, while the Panchgavya project investigates the medicinal properties of cow products.
- Indian science, when in conflict with religion, tends to take a more tempered approach compared to the European separation of church and state

India an indispensable strategic partner: Australian Envoy (7 May)

Green said the Indo-Pacific region is experiencing superpower competition and boundary disputes are intensifying

- Australian Envoy to India, Philip Green, expressed confidence in the strong bilateral relationship between Australia and India.
- Green acknowledged the existence of occasional challenges but emphasized the overall strength of strategic, economic, and people-to-people partnerships.
- He avoided commenting on "intelligence matters" when questioned.
- Australian Foreign Minister Penny Wong affirmed Australia's commitment to upholding democratic values in response to reports of past Indian espionage activities on Australian soil.
- Reports by the Australian Broadcasting Corporation (ABC) alleged that Indian 'spies' had been expelled for attempting to gather sensitive information on defense projects and airport security.
- Wong's statement indicates Australia's stance against foreign interference and its resolve to protect national security interest

Strategic balance

- Australian Envoy to India, Mr. Green, emphasized India's crucial role in maintaining balance and stability in the Indian Ocean region.
- He highlighted India's significance beyond defense, citing its importance in economic security and supply chain resilience.
- Mr. Green spoke at the Observer Research Foundation, underlining India's role as a key partner in trade diversification efforts.
- Australia's new National Defence Strategy (NDS) 2024 designated India as a "top-tier security partner," reflecting the Comprehensive Strategic Partnership between the two countries.
- The NDS prioritizes practical cooperation with India to contribute to stability in the Indo-Pacific region.

- Mr. Green noted India's rapid rise as a top-tier partner over the past five years, highlighting its growing significance in regional security dynamics.
- He pointed out increasing superpower competition and escalating boundary disputes in the Indo-Pacific, with China undergoing significant military buildup without transparency

Chinese arms build up

- Mr. Green highlighted China's territorial disputes and its management approach, expressing a desire for a region where smaller states can assert sovereignty without domination.
- Australia aims for a sustainable strategic balance and a region where states enjoy freedom and sovereignty.
- Australia is enhancing its military capability, with defense spending rising from 2.1% to 2.4% of GDP, and plans to double its surface combat fleet while transforming the Army into an amphibious force.
- Recent bilateral visits have helped improve relations with China, leading to a "new equilibrium." Despite differences, Australia can discuss problems with China privately and coexist alongside its important trade and economic partnership

Dissipated office spaces reshape post-COVID work environments (7 May)

The rise in the hybrid work models, capital intelligence, the need for flexibility in leases, and a shift in work culture have fuelled transformation towards flexible spaces; enhanced public infrastructure is another factor that has contributed to the increase in flexible office spaces

- The COVID-19 pandemic has caused significant changes in the office space landscape in India.
- Offices have had to adapt to new ways of operating, leading to innovative ideas in modern office designs.
- Traditional office setups are being reconsidered in favor of more agile and dynamic work environments.
- A notable trend post-COVID has been the increase in flexible office arrangements, with larger spaces being divided into smaller ones.
- This trend has become a staple of modern work culture, accommodating diverse working styles and introducing flexibility into the office real estate market.
- The rise of hybrid work models, increased capital intelligence, demand for flexibility in leases, and a shift in work culture have all contributed to the transition towards flexible spaces.
- Demand for flexible strategies has grown across startups, SMEs, and large corporations.
- According to a recent report by CBRE India Research, India is the fastest-growing flexible office market globally, with a total stock of about 68 million sq. ft.

- Tier-II cities are emerging as the next frontier for flexible spaces as they strive to meet the evolving needs of businesses.
- The report, covering the top nine cities in India, indicates a consistent increase in leasing demand from flexible operators and the share of flexible spaces in overall leasing between 2018 and 2023, with minor dips in 2020 and 2021.

Traffic fuels trend

- Sanjay Chugh, City Head and Director of Anarock Property Consultants Pvt. Ltd., notes that the demand for flexible office spaces in India after COVID-19 is fueled by employees' increasing frustration with worsening traffic congestion.
- Major cities like Mumbai, Delhi, and Bangalore face notorious traffic jams, causing significant time wastage for commuters.
- Daily commutes to the office have become stressful and inefficient, with some spending up to two hours navigating congested roads and crowded public transport.
- This extended commute negatively affects individuals' physical and mental well-being, as well as their productivity and work-life balance.
- The rise of remote and hybrid work culture has also contributed to the demand for flexible office spaces, with approximately 70% of companies adopting hybrid work models to alleviate the burden of daily commuting.
- Urban hubs in India, such as Mumbai, Delhi, and Bangalore, are known for their traffic jams, causing significant time wastage for commuters.
- Commuting to the office has become a major source of stress and inefficiency for employees, with some spending up to two hours navigating congested roads and crowded public transport systems.
- This prolonged commute not only adds physical and mental strain to individuals but also affects productivity and work-life balance.
- Sanjay Chugh highlights that the rise of remote work and hybrid work culture has led to an increased demand for flexible office spaces.
- Approximately 70% of companies have adopted hybrid work models, allowing employees to avoid the hassle of daily commuting.

Better infrastructure

- Enhanced public infrastructure has contributed to the increase in flexible office spaces by transforming once underdeveloped areas into bustling hubs with new malls and amenities.
- This transformation has reduced the need for long commutes to central areas, leading to the rise of coworking spaces in more accessible locations.
- Sanjay Chugh suggests that the shift towards flexible leasing models has accelerated the widespread adoption of coworking spaces.
- Coworking spaces, previously known as business centers, have become more popular and transformed into lively and colorful environments, catering especially to the growing Generation Z workforce.
- These spaces offer less formal atmospheres and provide opportunities for networking and collaboration among diverse businesses and professionals sharing the same workspaces.

- A report by myHQ by Anarock on New Age Flex Workspace indicates promising funding trends in the co-working sector.
- There has been a significant increase in funding post-COVID compared to the pre-COVID period, with a 3.3 times influx of funding (from ₹1,400 crore to ₹4,600 crore).
- Additionally, three out of four people believe that demand for coworking spaces will surpass demand for large office spaces by 2030.

Cost optimisation

- Flexible office arrangements like co-working spaces offer businesses the advantage of cost optimization.
- Businesses can pay for space and services based on actual usage, allowing them to scale up or down easily as per their changing needs.
- Unlike traditional office leases with long-term contracts, flexible arrangements don't lock businesses into fixed commitments that may not align with their evolving requirements.
- While costs to clients may be similar between traditional office spaces and co-working spaces, the key difference lies in the significant upfront capital investment required for interiors in traditional office spaces.
- Utkarsh Kawatra, CEO of myHQ by Anarock, emphasizes the importance of this cost difference.
- According to Mr. Chugh, the future of office spaces in India will prioritize innovation, flexibility, and adaptability.
- As organizations adopt remote and hybrid work models, the demand for flexible offices is expected to increase.
- This trend opens up opportunities for real estate developers, operators, and businesses to create innovative workspace solutions.
- These solutions aim to meet the evolving needs of the workforce, reflecting the changing dynamics of how and where work is conducted.

Gulf of Aqaba, Jordan



Market-based schemes not reducing deforestation, poverty (7 May)

- A scientific review published by the International Union of Forest Research Organizations (IUFRO) suggests that market-based approaches to forest conservation, such as carbon offsets and deforestation-free certification schemes, have largely failed.
- These initiatives, driven by trade and finance, have made limited progress in halting deforestation and, in some cases, exacerbated economic inequality.
- The review, drawn from years of academic and field work, involves the collaboration of 15,000 scientists from 120 countries.
- It will be presented at a high-level UN forum, advocating for a "radical rethink" of market-based approaches.
- Despite being promoted as effective at saving forests, curbing global warming, and improving living standards in developing nations, the review suggests a need for fundamental changes in these approaches
- Contributing author Maria Brockhaus from the University of Helsinki states that the evidence does not support the claim of "win-wins" or "triple wins" for the environment, economy, and people often associated with market mechanisms as a policy response to environmental issues.
- Cases reviewed in the report indicate that poverty and forest loss persist across different regions of the world despite market mechanisms being the main policy option for decades.
- Since the last assessment by IUFRO in 2010, there has been an increase in complex and overlapping market-based schemes.

- Financial actors and shareholders are more often focused on short-term profits rather than long-term just and sustainable forest governance.
- Lead author Constance McDermott from the University of Oxford suggests that while there may be individual success stories, overall, market-based approaches to forest conservation have not been highly successful.
- A \$120 million project in the Democratic Republic of Congo restricted local access to forests without addressing logging by powerful extractive businesses, reinforcing entrenched interests.
- In Malaysia, indigenous groups promised better livelihoods from a foreign-backed plantation venture on their land received no benefit.
- Ms. Brockhaus emphasizes that in many cases, the benefits of forest loss are gained elsewhere while local communities bear the burdens.
- In Ghana, despite sustainable cocoa standards, corporate pledges, and carbon offset projects, deforestation rates have risen, and farmers earn less today than decades ago.
- Green trade policies imposed by wealthy countries, such as the EU's ban on imports linked to deforestation, may not consider the knock-on effects, leading to accountability issues.
- Ms. McDermott highlights the lack of accountability, stating that failures or negative consequences do not directly affect consumers in wealthy countries who benefit from these policies.

Radical rethink

- Despite recent challenges, carbon markets are expected to expand significantly, becoming a multibillion-dollar industry.
- Corporations are increasingly using carbon credits to achieve their net-zero climate goals.
- These credits are purchased from projects, often in developing nations, that reduce or prevent the release of greenhouse gas emissions.
- Examples include projects aimed at protecting CO₂-absorbing rainforests or peat swamps.
- Kenya's President William Ruto views Africa's carbon sinks as an "unparalleled economic goldmine" capable of generating billions of dollars annually.
- Concerns are rising about how much of this revenue will benefit poor communities, with some actors accused of exploitation.

The International Union of Forest Research Organizations (IUFRO) is the world's leading network for researchers and organizations dedicated to forest science and related fields. Here's a breakdown of its key aspects based on official sources:

Mission:

- Promote international cooperation in forest-related research and knowledge exchange.
- Address global challenges related to forests and their sustainable management.

Structure:

- Voluntary, non-profit, non-governmental, and non-discriminatory organization established in 1892.
- Headquarters in Vienna, Austria.
- Membership of over 630 member organizations and hundreds of individual researchers from more than 115 countries.
- **Activities:**

- Organizes scientific meetings, conferences, and workshops.
- Facilitates collaboration among researchers from different countries and disciplines.
- Publishes scientific journals and reports.
- Develops international research standards and methodologies.

Significance:

- Plays a crucial role in advancing scientific understanding of forests and their role in the environment.
- Contributes to developing solutions for sustainable forest management, conservation, and utilization.
- Provides a platform for researchers to share knowledge, expertise, and best practices.

Europe's far-right parties abandon plans to leave EU (7 May)

Britain, which formally left the EU in 2020, remains the only country to have left so far

- Far-right parties, which were once vocal about leaving the European Union (EU), have changed their stance.
- Instead of prioritizing EU exit plans, these parties are now focusing more on issues like immigration to appeal to mainstream voters.
- This shift in focus was observed during the European Parliament elections held from June 6 to 9.
- Despite maintaining Eurosceptic views, many far-right parties have abandoned their radical discourse about leaving the EU.
- Thierry Chopin, a visiting professor at the College of Europe in Bruges, highlighted this change in strategy among far-right parties.
- Britain officially left the European Union (EU) in early 2020 after the Brexit referendum held in 2016.
- The Netherlands' Freedom Party (PVV), led by Geert Wilders, achieved significant success in the national elections held in November.
- Polls suggest that the PVV is likely to perform well in the upcoming European elections in the Netherlands.
- The PVV's manifesto for the November election included a call for a binding referendum on Nexit, which is the Netherlands leaving the EU.
- However, the pledge for a Nexit referendum is not mentioned in the party's European manifesto.
- Despite this, the European manifesto remains strongly Eurosceptic, emphasizing opposition to the idea of a European superstate and advocating for reforms within the EU.
- Leaders of France's National Rally have explicitly stated that they have no intention of following Britain's departure from the EU, as mentioned in their party manifesto unveiled in March.

- Alice Weidel, co-leader of the far-right Alternative for Germany (AfD) party, expressed in January 2024 that the Brexit referendum serves as a model for the EU's most populous country, Germany.
- Sweden Democrats' leader Jimmie Akesson and MEP Charlie Weimers stated in a press op-ed in February that Sweden is willing to leave the EU as a last resort. The party, previously in favor of "Swexit," abandoned the idea in 2019 due to insufficient public support, despite propping up Prime Minister Ulf Kristersson's government.
- In November 2023, thousands of far-right supporters in Warsaw, Poland, called for a "Polexit," indicating a desire for Poland to exit the EU.

Brazil pounded (7 May)

- Brazil's President Luiz Inacio Lula da Silva conducted an aerial survey of Porto Alegre, Brazil.
- The survey aimed to assess the areas affected by floods caused by torrential storms.
- Authorities are working to prevent further tragedy following the floods, which claimed the lives of 66 people.
- The floods have already caused significant damage and loss of life in the region.
- President Lula da Silva's visit highlights the government's response to the disaster and efforts to mitigate its impact.

