



Weekly Current Affairs

Weekly Current Affairs 10 June 2024 to 16 June 2024



The Indian **EXPRESS**



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CONTENTS

Polity and Governance 1

Uniform Civil Code.....1

Law Ministry Plans To Place A Simultaneous
Poll Before The Cabinet 2

Prelims Questions..... 4

Mains Questions..... 4

Science and Technology 5

Development Of Affordable Mri Technology
Enhances Diagnostic Accessibility In India 5

Prelims Questions..... 7

Mains Questions..... 7

Ecology and Environment 7

Critical Indian Ocean To Understand Earth's
Overall Response to GHGS and Global
Warming..... 7

India Ranked 2nd Largest Nitrous Oxide
Emitter After China..... 9

Prelims Questions..... 11

Mains Questions..... 11

Economy 11

China Has Options If China-Europe Trade-War
Could Occur 11

Prelims Questions..... 13

Mains Questions..... 13

POLITY AND GOVERNANCE

“UNIFORM CIVIL CODE”.

THIS ARTICLE COVERS “DAILY CURRENT AFFAIRS” AND THE TOPIC DETAILS OF “UNIFORM CIVIL CODE”. THIS TOPIC IS RELEVANT IN THE “POLITY AND GOVERNANCE” SECTION OF THE UPSC- CSE EXAM.

WHY IN THE NEWS?

Union Law Minister Arjun Ram Meghwal stated on Tuesday that the government’s agenda includes the implementation of the Uniform Civil Code (UCC).

WHAT IS THE UNIFORM CIVIL CODE (UCC)?

The Uniform Civil Code (UCC) is a legal framework in India aimed at replacing personal laws based on religions, customs, and traditions with a common set of laws applicable to all citizens equally, regardless of their religion, caste, creed, sexual orientation, and gender. The UCC aims to ensure equality and justice for all citizens and promote national unity and secularism. It covers areas such as marriage, divorce, inheritance, adoption, and maintenance.

The concept of UCC is rooted in **Article 44** of the Indian Constitution, which directs the state to endeavour to implement a Uniform Civil Code for all citizens, irrespective of background, throughout the territory of India.

ADVANTAGES OF A UNIFORM CIVIL CODE:

- **Promoting Gender Equality:** A UCC could foster gender equality by establishing uniform legal rights for both men and women in areas such as marriage, divorce, and inheritance, thereby addressing discriminatory provisions found in current personal laws.
- **Upholding Secularism:** Aligning with the principles of secularism, a UCC would apply a common civil law to all citizens regardless of their religious backgrounds, fostering inclusivity and secular values in society.
- **Simplifying Legal Processes:** Harmonizing personal laws under a UCC would streamline legal procedures related to personal matters, making them more straightforward and efficient for individuals navigating the legal system.
- **Ensuring Social Justice:** By ensuring equal legal treatment for all citizens, irrespective of their religious or cultural affiliations, a UCC would contribute to promoting social justice and eliminating discrimination based

on religious or customary practices.

- **Modernising Legal Frameworks:** Updating personal laws to reflect contemporary values and societal norms is crucial, and a UCC would serve as a mechanism for modernising legal frameworks to better align with current societal realities.



CHALLENGES TO IMPLEMENTING A UNIFORM CIVIL CODE:

- **Challenges Stemming from Religious Groups:** Various religious factions, including Muslim and Christian organisations, oppose the notion of a UCC due to concerns regarding religious freedom and autonomy. Garnering their support and cooperation is imperative for the successful implementation of such a code.
- **Political Complexity:** The UCC is fraught with political sensitivity and is often exploited for electoral purposes. Pursuing a UCC without bipartisan support risks polarisation and resistance, hindering its enactment.
- **Lack of Consensus:** Attaining consensus among diverse stakeholders, including religious leaders, legal experts, and policymakers, proves arduous. Differing interpretations of religious texts and traditions impede agreement on crucial matters.
- **Gender Dynamics:** While anticipated to enhance gender equality, a UCC must confront entrenched patriarchal norms inherent in personal laws. Striking a balance between women’s rights and religious/cultural sensitivities poses a multifaceted challenge.
- **Reforming Legal Frameworks:** Transitioning from a mosaic of personal laws to a singular UCC necessitates substantial legal reforms. As existing laws govern various familial aspects, amending or repealing them entails a time-intensive process.
- **Educational Campaigns:** Successful UCC implementation may hinge on extensive educational initiatives to elucidate citizens on the impending changes and ram-

ifications. A lack of awareness may breed confusion and resistance.

- **Enforcement Challenges:** Ensuring the effective enforcement of a UCC, particularly in remote and rural locales, presents logistical hurdles. The legal system may necessitate adaptation to handle cases under the new code effectively.
- **Social and Cultural Implications:** The rollout of a UCC may trigger profound social and cultural shifts, inviting resistance from conservative quarters and necessitating measures to mitigate potential disruptions.
- **Navigating Legal Complexity:** Crafting a comprehensive UCC that navigates the intricate nuances of diverse personal laws while ensuring coherence and lucidity poses a substantial legal hurdle.
- **Regional Dynamics:** India's federal structure grants states autonomy in personal law matters, introducing a balancing act between a uniform code and states' rights, which can be contentious.
- **Judicial Adaptation:** Transitioning to a UCC may necessitate the judiciary to recalibrate its approach and rulings, plays a important role in interpreting and upholding personal laws.

WAY FORWARD:

- **Unity and Diversity:** The Uniform Civil Code (UCC) reflect India's vibrant multiculturalism while celebrating its diversity. Emphasising unity over uniformity, it should be designed to accommodate the varied cultural identities within the nation.
- **Engagement with Stakeholders:** Inclusive discussions with a wide array of stakeholders, including religious leaders, legal experts, and community representatives, are essential in formulating and executing the UCC. This approach ensures that diverse perspectives and needs are considered, fostering a sense of fairness and legitimacy among all citizens.
- **Balancing Act:** The Law Commission's objective should be to eliminate practices that contravene constitutional standards while respecting cultural diversity. Cultural norms must align with principles of substantive **equality and gender justice**, with careful consideration given to avoid fostering reactionary cultural sentiments among different communities. Within the Muslim community, reform efforts should be spearheaded by the clergy, addressing discriminatory practices and embracing progressive viewpoints.
- **Constitutional Lens:** Aligned with the constitutional principles, the UCC should respect the right to cultural

autonomy while striving for cultural inclusivity. Article 29(1) safeguards the unique cultural heritage of all citizens. Muslims, in particular, should scrutinise practices like polygamy and unilateral divorce to ensure alignment with their cultural values. The paramount focus should be on crafting a just legal framework that champions equality and justice for all.

"LAW MINISTRY PLANS TO PLACE A SIMULTANEOUS POLL BEFORE THE CABINET."

THIS ARTICLE COVERS "DAILY CURRENT AFFAIRS" AND THE TOPIC DETAILS OF "LAW MINISTRY PLANS TO PLACE A SIMULTANEOUS POLL BEFORE THE CABINET." THIS TOPIC IS RELEVANT TO THE "POLITY AND GOVERNANCE" SECTION OF THE UPSC—CSE EXAM.

WHY IN THE NEWS?

The committee report chaired by former President Ram Nath Kovind on **"one nation, one election" or simultaneous elections** is set to be presented to the Union Cabinet as a key item on the Law Ministry's 100-day agenda.

Additionally, the **Law Commission** has prepared a report proposing simultaneous elections for the Lok Sabha, State Assemblies, and local bodies starting in 2029. The report suggests a mechanism for forming a coalition government in the event of a hung House or a no-confidence motion.

HISTORICAL BACKGROUND:

- Simultaneous elections to states and the Lok Sabha are not a new concept. They were conducted in India in 1952, 1957, 1962, and 1967. However, this practice was discontinued after the dissolution of some Legislative Assemblies between 1968-69.
- The idea of reintroducing simultaneous elections was first proposed in the Election Commission's annual report in 1983 and subsequently mentioned in the Law Commission's report in 1999.
- The BJP government, after assuming power in 2014, strongly advocated for simultaneous elections. The Law Commission in 2018 had submitted a draft report recommending the implementation of simultaneous polls, recommending amendments to electoral laws and relevant constitutional articles.
- It analysed legal and constitutional challenges and proposed that such elections could only be held through constitutional amendments by a Special majority and ratified by at least 50% of states.

SIMULTANEOUS ELECTIONS/ 'ONE NATION ONE ELECTION' SYSTEM MEANS:

- Currently, India conducts separate elections for the Lok Sabha and state Assemblies at different times, typically every five years or when an early dissolution occurs.
- State Assembly terms may not align with each other or with that of the Lok Sabha, resulting in elections being held throughout the year.
- The 'One Nation One Election' proposal aims to synchronise these elections to occur simultaneously every five years.
- This restructuring of the electoral cycle would involve voters casting their votes for both the Lok Sabha and state assemblies on the same day or in a phased manner.

IMPLEMENTATION/ IMPORTANT ARTICLES:

- Implementing simultaneous elections requires political consensus on electoral system changes and amendments to the Constitution.
- Key articles that would need amending include **Article 172** and **Article 83**, which deal with the duration of Parliament and state assemblies, **Article 85** regarding the President's powers in summoning Parliament sessions, and **Article 356** concerning the President's Rule.
- Amendments to the **Representation of the People Act, 1951**, and the **Anti-Defection Law** are also necessary for ensuring stability in both the Lok Sabha and state assemblies.

ARGUMENTS IN FAVOR OF SIMULTANEOUS ELECTIONS/ ONE NATION ONEELECTION:

- **Cost Reduction:** Conducting elections at different times incurs significant expenses in terms of time, labour, and finances. Costs include the movement of security personnel and the diversion of state machinery, among others, leading to substantial savings for the exchequer.
- **Boost in Voter Turnout:** Simultaneous polls are expected to increase voter turnout by reducing voter fatigue and streamlining the electoral process. This could lead to higher participation rates and enhanced democratic engagement.
- **Optimal Deployment of Security Forces:** Frequent elections demand continuous deployment of security forces, diverting them from other critical security duties. Simultaneous elections would allow for better utilisation of these forces, improving overall security management across the country.
- **Impact on Social Fabric:** Frequent elections often exacerbate societal divisions based on caste, religion,

and other identities. By reducing the frequency of elections, simultaneous polls could mitigate these polarising effects, fostering social cohesion.

- **Focus on Governance:** Constant electoral cycles divert political attention towards short-term electoral gains rather than long-term governance and policy-making. Simultaneous elections would provide longer periods of governance stability, enabling governments to focus more on developmental agendas.
- **Efficient Delivery of Essential Services:** Elections frequently involve the mobilisation of public servants, including teachers, affecting the delivery of essential services. Simultaneous elections would minimise disruptions, ensuring consistent public service delivery.
- **Promotion of Democratic Values:** Smaller parties often face financial constraints when competing with larger parties during elections, impacting the equity of the democratic process.

CHALLENGES:

- **Constitutional Concerns:** Opponents argue that simultaneous elections may pose constitutional challenges and undermine the federal structure of Indian politics. Concerns include logistical demands such as the scale of manpower and machinery required (like EVMs and VVPATs).
- **Dominance of National Issues:** Critics fear that national issues could overshadow local concerns in simultaneous elections, potentially sidelining regional issues that are crucial for state-level governance and development.
- **Accountability Issues:** Regular elections ensure that governments remain accountable to the electorate. Critics argue that fixed-term simultaneous elections might diminish this accountability, leading to complacency or even autocratic tendencies among elected officials.
- **Synchronisation Challenges:** Maintaining synchronisation in a diverse democracy like India poses significant logistical and operational challenges. The loss of confidence in any state assembly could disrupt the entire electoral schedule, leading to practical difficulties.
- **Preservation of Democratic Will:** The current system, with staggered elections, is seen as a deliberate choice to uphold democratic principles, allowing people to express their will through periodic voting. Changing this system could be seen as tampering with democratic traditions.

WAY FORWARD:

- The concept of simultaneous elections is timely and

deserves thorough **discussion and debate across all political parties** to address concerns related to the federal structure of the Constitution. This **inclusive approach** is crucial for facilitating the smooth implementation of the idea nationwide.

- Implementing the 'one nation, one election' system aims to streamline the electoral process, saving significant time, energy, and resources. By reducing the duration of electoral cycles, political parties would have more opportunities to focus on national issues and enhance governance.
- The Law Commission's recommendations indicate a feasible path to revisiting and potentially reinstating the concept of simultaneous elections, reminiscent of its practice during the early decades of India's independence.

PRELIMS QUESTION:

Q1. Uniform civil code(UCC) enshrined in the constitution deals with:

1. It intends to replace personal laws with uniform laws applicable to all citizens irrespective of background.
2. No state has implemented the Uniform Civil Code (UCC) in india.

Which of the following above statement/s is/are correct?

- (a) 1 Only
- (b) 2 Only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Q2. Consider the following statements:

1. An eligible voter can become a minister without membership in the state assembly/ Parliament for 3 months.
2. Non-residents of India(NRI) can contest elections.

Which of the following statements is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answers

S. No.	Answers
1.	A
2.	C

MAINS QUESTION:

Q1. Critically Analyse. Simultaneous elections (One Nation, One Election) for the Lok Sabha and State Assemblies have the potential to curtail the extensive time and financial resources allocated to electoral processes but it will diminish the government's accountability to the people.

Q2. Implementation of the Uniform Civil Code (UCC) in india is a progressive step in society to ensure gender justice and secularism. Discuss how to overcome the hurdle in the implementation of the UCC.

SCIENCE AND TECHNOLOGY

“DEVELOPMENT OF AFFORDABLE MRI TECHNOLOGY ENHANCES DIAGNOSTIC ACCESSIBILITY IN INDIA”

THIS ARTICLE COVERS “DAILY CURRENT AFFAIRS” AND THE TOPIC DETAILS OF “DEVELOPMENT OF AFFORDABLE MRI TECHNOLOGY ENHANCES DIAGNOSTIC ACCESSIBILITY IN INDIA”. THIS TOPIC IS RELEVANT IN THE “SCIENCE AND TECHNOLOGY” SECTION OF THE UPSC- CSE EXAM.

WHY IN THE NEWS?

Researchers have pioneered an innovative magnetic resonance imaging (MRI) scanner with significantly reduced costs compared to current models. This breakthrough promises to revolutionise access to this essential diagnostic tool. MRIs are invaluable for visualising intricate details within the human body, aiding in the diagnosis and treatment selection for many conditions, including brain disorders, cardiac issues, various cancers, and orthopaedic ailments. Operating on the principle of strong magnetic fields, measured in units known as tesla (T) and radio waves, these scanners produce detailed images of internal organs. Clinical MRI setups typically employ magnetic fields ranging from 1.5 T to 3 T, which are significantly more powerful—4 to 8 times—than the magnetic fields observed in sunspots on the Sun.

ABOUT MRI:

- MRI, short for Magnetic Resonance Imaging, represents a pivotal medical imaging technique renowned for its ability to generate intricate images of the body's interior.
- Understanding how MRI functions is essential, and here are some key insights:
- MRI machines, resembling large tube-shaped structures, house potent magnets.
- Upon entering the scanner, the strong magnetic field prompts hydrogen atoms within the body to align in a specific orientation.
- Targeted radio waves are then directed towards particular body regions, disrupting the alignment of these atoms.
- When atoms return to their original alignment, they emit radio signals.

- Sensitive receivers capture these signals, which are subsequently amalgamated to construct highly detailed images of the body's organs and tissues.

50 TIMES CHEAPER :

- At a fraction of the cost, this groundbreaking medical technology remains beyond the reach of many, particularly in low- and middle-income nations like India.
- The prohibitive expenses stem from not only the initial purchase of the scanner but also the infrastructure essential for its operation.
- This encompasses constructing shielded rooms to contain the powerful magnets' effects, procuring liquid helium to cool the magnets during operation, and meeting the substantial electricity demands of the scanner.
- Mukul Mutatkar, an interventional radiology consultant from Pune, elucidates the staggering costs involved, citing figures ranging from 9 to 13 crore rupees for a 3-T MRI machine alone, exclusive of additional infrastructure expenses.
- In a concerted effort to mitigate this accessibility gap, a pioneering team spearheaded by Ed Wu at the University of Hong Kong devised and fabricated an MRI apparatus employing low-strength magnets and off-the-shelf hardware.
- Remarkably, this streamlined machine carries a price tag of approximately \$22,000, equivalent to about Rs 18.4 lakh. Unlike its conventional counterparts, this innovation operates on 0.05 T magnets, obviating the need for shielded rooms or helium coolant. Furthermore, it can be effortlessly connected to standard wall-power outlets.
- This leap in technology heralds the advent of a novel category of MRI scanners—economical, energy-efficient, and compact—poised to democratize access to this vital diagnostic tool.

30 VOLUNTEER TESTED WITH MORE PRECISION:

- In the 1970s, initial experimentation with 0.05 T machines for image generation. However, during the 1980s, the preference shifted towards 1.5 T magnets due to their ability to produce higher-quality images.
- The relationship is clear: the stronger the magnetic

field, the finer the resulting image. A 1.5-T scanner is capable of detecting tissue damage as minute as 1 mm, whereas the minimum detectable damage at 0.05 T is 4 mm.

- To address the challenge of lower resolution, employed a sophisticated deep-learning algorithm. Trained on datasets comprising high-resolution images of human organs, this algorithm effectively mitigated background noise, enhancing image clarity.
- Their methodology underwent rigorous testing involving 30 healthy adult volunteers. Impressively, the scans captured clear images of various anatomical structures, including brain tissue, spinal cord, cerebrospinal fluid, liver, kidneys, spleen, lungs, heart, and knee cartilage.
- Notably, the images obtained from the 0.05-T machine coupled with AI demonstrated comparable quality to those from a 3-T scanner.
- The research team highlighted another significant advantage: reduced operational noise of their machine. This feature renders it suitable for use with pediatric patients, expanding its applicability and potential impact on healthcare accessibility.



HOW WILL IT IMPROVE ACCESS AND EMERGENCIES:

- A machine of this nature presents numerous advan-

tages. Its lightweight design, portability, and reliance on standard power sources, such as a wall socket, make it a practical solution for regions where access to high-power MRI machines is limited.

- Acknowledging the potential of such machines while also recognising that they cannot entirely replace standard high-field magnets due to the superior resolution the latter offers.
- The ultra-low field scanner may not replace high-field scanners, but it can effectively complement them within radiology departments, highlighting the disparity in MRI costs, which can range from Rs 7,000 to Rs 15,000, with some facilities offering scans for as low as Rs 2,000 albeit with extensive waiting periods.
- The utility of such scanners in emergency situations. By eliminating the need for appointments, they facilitate swift medical interventions, aiding first responders in making well-informed decisions.
- In cases of acute events like strokes or traumatic accidents, low-cost scanners can be instrumental in assessing injuries promptly at the scene. This timely evaluation enables healthcare providers to determine the appropriate course of action, including whether immediate hospital transfer is necessary and the most suitable mode of transportation.

HOW ARE BASIC THINGS DONE?

- The importance of employing lower power magnets for MRI machines emphasises the crucial aspect of safety.
- Unlike conventional machines, which pose a persistent risk of pulling metal items like oxygen cylinders, wheelchairs, and stethoscopes into the MRI machine, lower power magnets mitigate this danger. While such incidents are rare, they can result in harm to both the patient and the machine.
- Another advantage of MRI machines with low-strength magnets is the potential reduction in artifacts caused by implants or prosthetics in the final image.
- These artefacts, often arising from materials like titanium, which exhibit weak paramagnetic properties, can occasionally mislead doctors regarding the original tissue anatomy.
- This risk underscores the importance of opting for lower power magnets, ensuring greater accuracy and safety in diagnostic imaging procedures.

IMPORTANCE OF MRI:

DIAGNOSTIC VALUE:

- MRI is widely used to diagnose a variety of conditions, including brain and spinal cord anomalies, tumours, heart disease, liver disease, and kidney disease.
- It is particularly valuable for examining the brain and spinal cord, as it can detect aneurysms, multiple sclerosis, stroke, tumours, and brain injuries.
- MRI is used in the diagnosis of rectal and prostate cancer.
- **Treatment Planning and Monitoring:**
 - MRI images help doctors plan treatments by providing detailed information about the location and extent of a disease or injury.
 - It is used to monitor the progression of diseases and the effectiveness of treatments.
 - MRI is S stereotactic surgery and radiosurgery for the treatment of intracranial tumours, arteriovenous malformations, and other surgically treatable conditions.

VERSATILITY AND ADVANTAGES:

- MRI can examine almost any part of the body, including the brain, spinal cord, bones, joints, heart, and internal organs.
- It provides better contrast in images of soft tissues compared to CT scans.
- MRI is a noninvasive procedure that does not use ionising radiation, making it safer than CT scans and X-rays.

RESEARCH APPLICATIONS:

- MRI is an important research tool for studying the mechanistic underpinning of body function and dysfunction.
- MRI (fMRI) detect brain activity by detecting changes in blood flow, helping researchers assess brain function and detect anomalies in activity.

PRELIMS QUESTIONS

Q1. Consider the following statement related to MRI:

1. MRI is run by the magnetic field produced by electricity.
2. Electrons are stimulated by radiofrequency current in the MRI.

Which of the following statement/s is/are correct?

- (a) 1 Only
- (b) 2 Only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answers

S. No.	Answers
1.	D

MAINS QUESTION:

Q1. Innovation led to the origin of new-age technology to cater to the people better. How can we ensure the accessibility and affordability of health by open area in the Research & Development?

ECOLOGY AND ENVIRONMENT

CRITICAL INDIAN OCEAN TO UNDERSTAND EARTH'S OVERALL RESPONSE TO GHGS AND GLOBAL WARMING

THE TOPIC DETAILS OF "CRITICAL INDIAN OCEAN TO UNDERSTAND EARTH'S OVERALL RESPONSE TO GHGS AND GLOBAL WARMING". THIS TOPIC IS RELEVANT IN THE "GEOGRAPHY" SECTION OF THE UPSC- CSE EXAM.

Why in the news?

June 8 is celebrated as World Oceans Day, a time to marvel at the intricate beauty of the Indian Ocean, one of the planet's three major oceans located right on our doorstep. Recent focus has turned towards this vast body of water due to its alarming rate of warming and its significant impact on neighbouring oceans. The Indian Ocean plays a role in elucidating how our oceans are responding to the escalating levels of greenhouse gases and global warming, making it imperative for us to delve deeper into its complexities.

The Indian Ocean is the centre of the deadliest storms:

- The Indian Ocean, renowned for its powerful **monsoon winds** and the life-giving rains they bring, has inspired literature and art for generations. With over a billion people relying on its nourishing moisture for

sustenance, fisheries, and agriculture, its significance cannot be overstated.

- During the warm summer months, the Arabian Sea, the Bay of Bengal, and the southern tropical Indian Ocean experience rapid warming, accompanied by a shift in wind direction from land to ocean.
- However, this season also brings the **looming threat of pre-monsoon cyclones**. While the North Indian Ocean generates fewer cyclones compared to the Pacific or Atlantic Oceans, their frequency and intensity have been on the rise.
- Despite their relatively smaller size, these cyclones pose a significant risk to the developing nations along the South Asian, East African, and West Asian coastlines, making them among the deadliest storms in terms of human casualties.
- Yet, amidst these challenges, the warm waters of the Indian Ocean sustain diverse fisheries, ranging from anchovies to tuna, and support marine life such as dolphins and, occasionally, whales.
- The region's breathtaking beaches and coral reefs, stretching from Lakshadweep to the Andaman-Nicobar Islands and beyond to places like Reunion Island and Madagascar, attract tourists seeking natural beauty and adventure.

The uniqueness of the Indian Ocean:

- The Indian Ocean boasts a distinctive geographical makeup, setting it apart from other oceans worldwide. To the north, it is enclosed by the vast Asian landmass, with only narrow connections to the Persian Gulf and the Red Sea.
- In the southern Indian Ocean, its uniqueness is further

underscored by the presence of two oceanic channels linking it to the Pacific and Southern Oceans.

- Through the first channel, known as the Indonesian seas, the Pacific Ocean channels a staggering volume of water—up to 20 million cubic meters per second—along with a significant amount of heat into the eastern Indian Ocean.
- This influx termed the Indonesian Throughflow, predominantly remains within the top 500 meters of the ocean, shaping circulation patterns and influencing temperature and salinity as it traverses towards Madagascar.
- The second channel facilitates a two-way exchange between the Indian Ocean and the Southern Ocean. Here, colder, saltier, and denser waters from the Southern Ocean flow into the Indian Ocean below approximately 1 kilometre in depth.
- Due to the Indian Ocean's closed northern boundary, these waters gradually mix upward, interacting with the Pacific waters. Ultimately, the mixed waters, spanning the top 1 kilometre, exit to the south.
- This intricate interplay of heat and water masses within the Indian Ocean confers significant influence over the global oceanic heat distribution, highlighting its pivotal role in the Earth's climate system.

SIMMERING WARM BATHTUB:

- Often overlooked, the Indian Ocean emerges as a powerhouse in global climate dynamics, earning its title as the "little ocean that could." Despite its relatively small size, its warming trends are undeniable, driven not only by the interplay of oceanic currents but also by atmospheric influences, particularly those stemming



from the Pacific Ocean.

- The atmospheric circulation patterns, centred around a significant rainfall zone over the Maritime Continent, predominantly foster sinking air masses over the Indian Ocean, gradually warming its waters year by year.
- This atmospheric interaction, coupled with increased heat transfer from the Pacific Ocean and a decline in the chilling effect of Southern Ocean currents, has propelled the Indian Ocean into one of the fastest-warming bodies of water on the planet.
- The repercussions of this warming trend are far-reaching, amplifying heatwaves and extreme rainfall events across the Indian subcontinent and posing significant threats to marine ecosystems, including corals and fisheries, through marine heatwaves.
- Moreover, the Indian Ocean's warming dynamics have triggered a ripple effect on global climate systems. By influencing wind patterns and, consequently, the Pacific Ocean's capacity to absorb heat, the Indian Ocean plays a crucial role in regulating global warming rates.
- Notably, recent research suggests that the Indian Ocean's warming trend may paradoxically enhance the sinking of heat in the North Atlantic, thereby aiding in mitigating global warming effects.
- In essence, despite its modest size, the Indian Ocean's impact on global climate dynamics is profound and undeniable. Its ability to absorb over 90% of the excess heat trapped by greenhouse gases underscores its pivotal role in the Earth's climate system, making it a force to be reckoned with on the world stage.

Impact on human evolution:

- Approximately three million years ago, Australia and New Guinea were positioned far south of the equator, while the Indian Ocean directly connected with the Pacific Ocean, forming what scientists refer to as a 'permanent El Niño' state. This climatic condition was characterised by abundant rainfall and lush forests over East Africa, contrasting starkly with its current arid state.
- The gradual northward drift of Australia and New Guinea, an ongoing process, led to the separation of the Indian and Pacific Oceans around three million years ago. Consequently, the eastern Pacific Ocean cooled, transitioning the El Niño phenomenon from a permanent to an episodic occurrence.
- This climatic shift resulted in the aridification of East Africa, transforming its once-verdant rainforests into grasslands and savannahs.

- Researchers speculate that these environmental changes compelled our ancestors, including chimpanzees and gorillas, to adapt by moving longer distances and developing faster locomotion.
- The abundant rainforests had ample food and shelter, thus eliminating the need for extensive travel. This evolutionary pressure may have contributed to the emergence of bipedal movement, a more energy-efficient mode of locomotion over greater distances compared to quadrupedalism.

"INDIA RANKED 2ND LARGEST NITROUS OXIDE EMITTER AFTER CHINA."

THIS ARTICLE COVERS "DAILY CURRENT AFFAIRS" AND THE TOPIC DETAILS OF "INDIA RANKED 2ND LARGEST NITROUS OXIDE EMITTER AFTER CHINA.". THIS TOPIC IS RELEVANT IN THE "ENVIRONMENT AND ECOLOGY" SECTION OF THE UPSC- CSE EXAM.

WHY IN THE NEWS?

India ranks as the world's second-largest contributor to nitrous oxide (N₂O), a greenhouse gas with a significantly higher heat-trapping capacity compared to carbon dioxide. In 2020, approximately 11% of the world's human-induced N₂O emissions originated from India, placing it behind China, which accounted for 16%. The primary driver of these emissions is attributed to fertiliser application, as highlighted in a comprehensive global evaluation of N₂O emissions featured in the journal Earth System Science Data.

HIGHLIGHTS OF REPORTS?

- In 2022, **atmospheric levels of N₂O surged** to approximately **25% higher than pre-industrial levels**.
- In contrast, carbon dioxide concentrations reached 417 parts per million during the same period, indicating that CO₂ levels are a thousand times greater than those of nitrous oxide. Consequently, countries prioritising climate action have focused predominantly on reducing carbon dioxide emissions.
- However, due to its **prolonged atmospheric presence and escalating rates**, scientists have emphasised the urgent need to address nitrous oxide emissions.
- Over the past four decades, **human-induced N₂O emissions** have surged by **40%, equivalent** to an increase of **three million metric tonnes annually**.
- The growth rates observed between 2020 and 2022 surpass any recorded period since 1980, when reliable measurements began. Notably, agricultural activities utilising **nitrogen-based fertilisers and animal**

manure have contributed 74% of anthropogenic N₂O emissions in the last decade alone.

- **N₂O emissions, responsible for 6.4% of the effective radiative forcing of greenhouse gases, have exacerbated global warming by approximately 0.1 degrees Celsius.**
- The latest assessment of the nitrous oxide budget underscores the urgency of the situation. It signals a critical moment for India to heed this warning and implement substantial changes in cropping systems and production practices.

ABOUT NITROUS OXIDE:

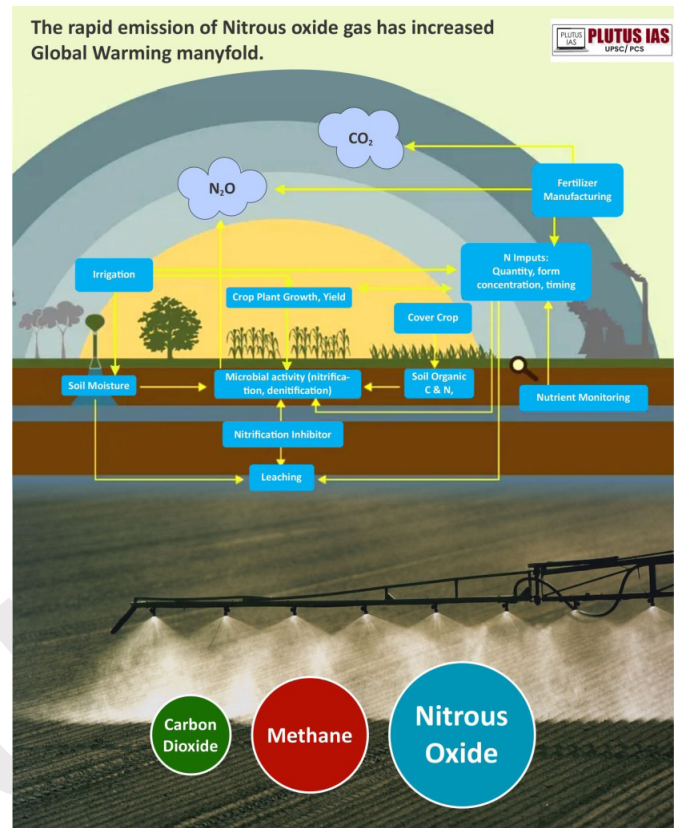
- Nitrous oxide(N₂O), commonly known as **laughing gas**, is a **colourless gas, slightly sweet odour and taste**. When inhaled, it produces a brief **euphoric effect** and can be **used as a recreational drug**.
- With a **potency 300 times greater than carbon dioxide (CO₂)**, nitrous oxide (N₂O) stands as a formidable greenhouse gas (GHG) contributing significantly to global warming.
- Ranking **third in atmospheric concentration among GHGs**, following CO₂ and methane (CH₄), N₂O poses a substantial threat to Earth's climate stability. Moreover, it represents the sole remaining peril to the ozone (O₃) layer, persisting in the atmosphere for extensive periods akin to CO₂.
- Its **longevity extends up to 125 years**, highlighting the critical need for mitigation efforts to curb its detrimental impact on both climate and ozone layer health.

SOURCES OF NITROUS OXIDE (N₂O) EMISSIONS ARE:

- **Agriculture:** This sector accounts for the largest share of N₂O emissions, primarily due to the use of artificial nitrogen fertilizers in crop production. Nitrogen fertilisation of agricultural soils and management of animal waste are significant contributors to agricultural emissions.
- **Energy Use:** Nitrous oxide emissions from energy sources include those from mobile sources, such as passenger cars and light trucks, as well as stationary sources like coal combustion at electric power plants.
- **Industrial Processes:** Industrial processes, particularly the production of adipic acid and nitric acid, are significant sources of N₂O emissions. The oxidation process involved in these productions releases nitrous oxide emissions.
- **Waste Management:** Waste management processes, including the treatment of residential and commercial

wastewater, also contribute to N₂O emissions.

- **Natural Sources:** Natural sources, such as marine and tropical forests, continue to account for a significant portion of N₂O emissions, although their share has decreased over time.



WAY FORWARD:

- **Improved Agricultural Practices:** Enhance nitrogen management in agriculture by promoting precision farming techniques, optimal fertiliser application, and efficient irrigation methods to minimise nitrogen runoff and leaching, thereby reducing N₂O emissions from fertilised soils.
- **Utilisation of Nitrogen-Fixing Crops:** Encourage the cultivation of leguminous crops and other nitrogen-fixing plants that naturally nitrogen enriched the soil with, reducing the need for synthetic nitrogen fertilisers and subsequently lowering N₂O emissions.
- **Integrated Crop-Livestock Systems:** Implement integrated farming systems where animal waste is recycled as organic fertiliser, reducing the dependency on synthetic fertilisers and mitigating N₂O emissions from manure management.
- **Innovative Fertilizer Technologies:** Promote the adoption of advanced fertiliser formulations, such as slow-release and nitrification inhibitors, to optimise

nutrient uptake by crops and minimise nitrogen losses to the atmosphere as N₂O.

- **Afforestation and Agroforestry:** Expand afforestation efforts and integrate agroforestry practices into agricultural landscapes to sequester carbon in soils and vegetation, which can indirectly mitigate N₂O emissions by improving soil health and reducing nitrogen inputs.
- **Education and Awareness:** Increase awareness among farmers, policymakers, and the public about the environmental impacts of nitrous oxide emissions and the importance of adopting sustainable agricultural practices such as cropping patterns and the use of bio-fertilisers to mitigate climate change and protect the ozone layer.
- **Policy Interventions and Incentives:** Implement regulatory measures, such as emissions standards and carbon pricing, to incentivise emission reductions and promote the adoption of low-emission agricultural practices. Additionally, provides financial incentives, subsidies, and technical support to farmers transitioning to sustainable farming methods.
- **Research and Innovation:** Invest in research and development initiatives to advance technologies for measuring, monitoring, and reducing nitrous oxide emissions from agricultural activities. Foster collaboration between scientists, policymakers, and stakeholders to develop effective mitigation strategies tailored to regional and local contexts.

PRELIMS QUESTION:

Q1. Regarding the Indian Ocean Dipole (IOD) and El Niño:

1. El Niño results in the warming of the surface of the Pacific Ocean, while IOD leads to warming in the Indian Ocean.
2. El Niño consistently brings deficient rainfall in India, while IOD consistently brings more rainfall in India.

Which of the above statements is/are correct?

- (a) 1 Only
- (b) 2 Only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

PRELIMS BASED QUESTION:

Q1. World's largest Nitrous Oxide(N₂O) emitter is:

- (a) EU
- (b) China
- (c) India
- (d) Bangladesh

ANSWER

S. No.	Answer
1.	B

MAINS BASED QUESTION

Q1. "The world must focus not only on carbon dioxide gas but also on the top three greenhouse gases (GHG) emitting gas contributing to the Global Warming." Discuss.

Q2. Rapid warming in the Indian Ocean may cause biodiversity loss and livelihood. How can we mitigate and adapt to rising sea levels and climate change?

ECONOMY

"CHINA HAS OPTIONS IF CHINA-EUROPE TRADE-WAR COULD OCCUR."

THIS ARTICLE COVERS "DAILY CURRENT AFFAIRS" AND THE TOPIC DETAILS OF "CHINA HAS OPTIONS IF A CHINA-EUROPE TRADE WAR COULD OCCUR." THIS TOPIC IS RELEVANT TO THE "ECONOMICS" SECTION OF THE UPSC—CSE EXAM.

WHY IN THE NEWS?

With Europe's recent tariffs on electric cars manufactured in China, there's anticipation regarding potential repercussions. The fear looms over the possibility of an intensifying trade conflict, which could lead to increased consumer costs and detrimental impacts on exporters and their workforce on both ends. Considering the significant market interdependence between China, a burgeoning economy boasting over 1 billion inhabitants, and Europe, home

to a comparatively substantial population of over 400 million, the stakes are high for both parties involved.

MORE ABOUT THE NEWS:

- China intends to file complaints with the **World Trade Organization** to address what it perceives as unjust practices. Earlier this year, China initiated an anti-dumping investigation targeting European brandy exports, including renowned French cognac, following France's support for the European Union's inquiry, which led to the recent imposition of tariffs on electric vehicles. Concurrently, the EU is probing subsidies granted to Chinese renewable energy companies and potential market access restrictions in the medical device sector.
- In response, Chinese companies are reportedly contemplating petitioning the government to initiate anti-dumping investigations into select EU pork products and scrutinising subsidies for specific dairy items. Concerns have been raised that the EU's tariffs on Chinese electric vehicles might exacerbate trade tensions, with accusations that the European Union's actions are fostering a trend towards **protectionism, nationalism, and isolationism**.
- In anticipation of potential retaliatory measures, China could levy tariffs on luxury goods, cosmetics, wine, chocolate, or furniture from France and Italy. Germany is apprehensive about potential repercussions targeting its automotive and chemical industries, whereas France and Italy have advocated for tariffs on electric vehicles within the EU.
- Notably, it's projected that five out of six models from BYD, China's largest electric vehicle manufacturer, would remain profitable even with a 30% tariff. In contrast, a Chinese-made Tesla Model 3 would incur losses.

WHAT IS A TRADE WAR?

- A trade war is a situation when countries **impose tariffs, trade barriers, or other restrictions** on each other's imports and exports in an attempt to gain economic advantages or retaliate against perceived **unfair trade practices**. These actions can escalate tensions between nations and have far-reaching consequences for global trade, businesses, and economies.
- Trade wars often begin with one country **implementing tariffs or trade restrictions on certain goods or industries**, prompting retaliatory measures from affected trading partners. This **tit-for-tat escalation** can lead to a cycle of increasing trade barriers, which may **result in higher consumer prices, reduced market access for businesses, disrupted supply chains, and overall economic uncertainty**.

- Governments may engage in trade wars **for various reasons, including protecting domestic industries, addressing trade imbalances, or responding to perceived unfair trade practices** such as intellectual property theft or currency manipulation. However, the **detrimental effect** of the trade war on all parties can be seen in the long-term impacts of trade wars, leading to decreased international cooperation, diminished economic growth, and potential geopolitical tensions.

SEVERAL CHALLENGES ARE POSED BY THE TRADE WAR BETWEEN CHINA AND THE EUROPEAN UNION (EU) AT THE GLOBAL LEVEL:

- **Disruption of Global Supply Chains:** A China-EU trade war could disrupt global supply chains, particularly in industries like electronics, electric vehicles, and renewable energy, where the two economies are deeply integrated. This could lead to supply shortages, price increases, and disruptions for businesses and consumers worldwide.
- **Threat to Global Economic Growth:** Increased tariffs, retaliatory measures, and uncertainty would likely reduce trade, investment, and consumer confidence, impacting the global economy.
- **The undermining of the Multilateral Trade System:** A protracted trade war could further undermine the rules-based order under the World Trade Organization (WTO). This could lead to more countries adopting protectionist policies, fragmenting global trade and investment flows.
- **Geopolitical Tensions:** The trade dispute could exacerbate geopolitical tensions between China and the European Union, potentially spilling over into other areas like technology, security, and human rights.
- **Retaliation and Escalation:** If the trade war escalates, both sides may resort to retaliatory measures, such as imposing tariffs on a wider range of products or restricting market access. This could lead to a cycle of retaliation and further escalation, causing significant harm to businesses and consumers on both sides.
- **Impact on Developing Countries:** A China-EU trade war could also negatively affect developing countries integrated into global supply chains or relying on trade with either China or the EU. These countries may face reduced export opportunities, lower commodity prices, and reduced investment flows.

WAY FORWARD:

- **Diversify Supply Chains:** Companies should diversify their supply chains by selecting multiple suppliers

from different regions to reduce dependence on a single country and mitigate the impact of tariffs.

- **Strategic Sourcing:** Implement strategic sourcing strategies prioritising cost savings, efficiency, and risk mitigation. This includes negotiating long-term contracts, volume discounts, and rebates.
- **Cooperation and Competition:** Encourage cooperation and competition between multinational companies to prevent decoupling and promote economic growth. This involves finding mutually beneficial solutions and fostering a spirit of cooperation.
- **Reciprocity and Market Access:** Ensure China adopts measures to guarantee reciprocity and market access for EU businesses. This includes increasing the volume of EU exports to China and reducing tariffs on EU goods.
- **Negotiations and Diplomacy:** Engage in diplomatic efforts to resolve trade disputes through negotiations and agreements. This includes addressing **intellectual property rights, tariffs, and market access.**
- **Global Economic Cooperation:** Foster global economic cooperation by promoting international agreements and organisations like the World Trade Organization (WTO) to establish a rules-based trading system and reduce the likelihood of trade wars.
- **Avoid Protectionism:** Avoid protectionist measures like tariffs and instead promote free trade and open markets. This helps maintain global economic stability and reduces the risk of retaliatory measures.
- **Economic Stimulus Packages:** Implement economic stimulus packages to minimise the impact of trade wars on businesses and consumers by supporting industries affected by tariffs and promoting economic growth through infrastructure development.

PRELIMS QUESTION

Q1. What following impacts can be observed during the trade war?

1. Increase in exports.
2. Expansion of all domestic industries.
3. Increase in the price of imported goods.

Which of the following statement/s is/are correct/s?

- (a) 1, 2 only
(b) 2, 3 only

(c) 3 only

(d) All of the above.

ANSWER

S. No.	Answers
1.	C

MAINS QUESTION

Q1. The cloud of the Trade War has been engulfing the more integrated economic world and ignoring the rule-based trade practices recommended by the WTO. Critically Analyse.