

ENVIRONMENT & CLIMATE CHANGE**Keeping tabs on carbon with an accounting system****Introduction:**

- The 'climate polycrisis' a term made popular by Adam Tooze refers to the interconnected and compounding crises related to climate change that are affecting the planet not just in a few sectors but across several sectors and domains.
- It encompasses the physical impacts of climate change (rising temperatures, sea level rise, and extreme weather events) and the social, economic, and political challenges that arise from these impacts.

In India

- The links between seemingly unrelated areas such as energy, infrastructure, health, migration, and agricultural production that are being influenced by climate change may be shown here.
- Recognizing the complexity and interconnectivity of the climate polycrisis is critical in establishing a comprehensive approach that takes into account the multiple perspectives and goals of various stakeholders while maintaining resilience, equity, and justice.
- We require a profound transition that will lay the groundwork for a new, environmentally conscious economy. Just as digital infrastructure enables new startups and public services, we must imagine 'carbon infrastructure' that creates opportunities for a flourishing future carbon regime that considers carbon flows in policy formulation at all levels: household, panchayat, district, state, and country.

Measurement as the first step

- The first step is to measure, because everything that cannot be measured cannot be accounted for. We need to track carbon emissions from individual residents to the nation as a whole, including everything in the flow.
- We can construct an accounting system to assist us balance our carbon books once we have a measurement method in place. Existing carbon accounting systems, such as those championed by Karthik Ramanna at Oxford, are already capable of tracking corporate carbon balance sheets.

A national carbon accounting (NCA) system

- It is both an evolutionary and a revolutionary generalisation of these ideas. It will bring the entire nation, starting from individuals and households, under one carbon accounting framework.
- Imagine a world in which we file carbon tax returns alongside our income tax returns, or maybe only the carbon tax returns. Take a moment to consider the revolution in public finance that will be triggered when carbon is recognised, captured, valued, accounted for and taxed.

Carbon accounting

- 'Money accounting' is an integrated system, all the way from the spending of individuals to the Reserve Bank of India that helps us keep track of the circulation of money within the system. The keeping of accounts makes money visible and makes public finance possible.
- In contrast, the stocks and flows of carbon are not tracked at a granular level anywhere in the world. As a result, there is no possibility for a progressive carbon tax that penalises large buyers of petrol more than the average consumer.
- A progressive carbon tax requires us to keep track of the inflows and outflows of carbon, i.e., national carbon accounting. Carbon accounting is a way for companies to keep track of the carbon they are producing, removing, storing and offsetting. It helps companies keep carbon books alongside their financial books.
- An NCA will bring the concept of carbon books to the nation and will make it mandatory for businesses and individuals to declare/report their carbon inflows and outflows. It will make the circulation of carbon visible, and just as with financial accounting, other goods and services can be 'financed' using carbon surpluses, especially if there is convertibility between the carbon accounts and the rupee accounts.

GDP based on carbon

- Once we have an NCA, we will be able to set targets, forecast future emission reductions, and track our progress toward those targets. We can fantasize about a future national carbon budget that will assist us in reimagining the entire economy, including new technology and new kinds of collective action. Instead of the singular goal of boosting economic GDP in monetary terms, as we already do, countries will strive to reduce carbon GDP.

The way forward

- In the form of a polysolution An NCA will not only assist India in meeting its objective to being net zero by 2070, but will also assist it and other countries (if globally embraced) in creating new livelihoods and new ways of organizing its economy and society. GDP growth and, more recently, other measurements such as Gross National Happiness (GNH) are well understood.

- We offer up the possibility of a new type of public debate and an alignment between development and ecological sustainability by making the carbon footprint of human activities transparent. An NCA, in a nutshell, is a polysolution to the climate polycrisis.

2023 CHEMISTRY NOBEL PRIZE**2023 CHEMISTRY NOBEL PRIZE**

Context: Mounji G. Bawendi, Louis E. Brus, and Alexei I. Ekimov were awarded the 2023 Nobel Prize in Chemistry for the discovery and production of quantum dots.

These nanoparticles have numerous applications in sectors as diverse as electronics, improved surgery, and quantum computing.

Quantum Dots**Background**

- The qualities of any element are determined by the number of electrons it possesses.
- When matter is tiny, like in nano-dimensions, its properties are determined by its size.
- The more electrons are pressed together in a tiny particle, the more its properties are affected.
- This is because quantum physical forces begin to dominate at the nanometre scale.
- Gravity and classical physics rules, on the other hand, predominate at the macroscopic scale.
- Quantum dots are particles whose size dictates their behavior.

About

- Quantum dots are particles that are a few nanometres wide.
- They exhibit unique optical properties due to their small physical size.
- Their structure and atomic composition are the same as bulk materials, but the properties of the latter do not depend on their size.

Idea about the existence of such particle

- Scientists have known for a long time that such particles could exist in principle.
- By the 1970s, physicists recognized that adding a small amount of another element, such as gold, silver, cadmium, sulphur, or selenium, might affect the optical properties of glass.
- They also recognized how or why some of these changes may occur, but quantum dots had not yet been created.

The Nobel Prize-winning research**Dr. Ekimov**

- Dr. Ekimov achieved size-dependent quantum effects in colored glass in the early 1980s.
- He began researching the properties of glasses coloured with copper chloride, heated to high temperatures, and then cooled in 1979.
- He discovered that different methods of making this glass resulted in it absorbing light in varied ways.
- This occurred as a result of:
- The copper chloride crystallized, and Crystals of varying sizes interacted with light in varied ways, depending on the preparation method.

Dr. Brus

- In 1983, Dr. Brus and his colleagues went a step ahead and prepared similar crystals in a liquid solution, rather than in a glass.
- This allowed the researchers to better manipulate and study the crystals.
- These crystals also interacted with light differently depending on small variations in their size.

Dr. Bawendi

- Finally, in 1993, Dr. Bawendi devised a technology for producing these unusual crystals, known as quantum dots, with well-defined sizes and outstanding optical quality.
- This procedure began with the injection of a substance (from which the dot would be produced) into a heated solvent, followed by the heating of the solution.
- Nanocrystals developed naturally, and larger particles formed when the fluid was heated longer.
- The solvent also contributed to the crystals' flat outer surface.
- This procedure was simple, which meant that many scientists could use it to create and examine quantum dots.

Modern-day applications

- To light computer monitors and television screens
- Today, one of the simplest applications of quantum dots is to light computer monitors and television screens.
- Quantum dots are utilised in computer and television screens based on QLED technology, where the Q stands for quantum dot.

- Blue LEDs behind the screen excite these dots, causing them to emit light of different colours.
- Combining these colours gives rise to even more colours as well as brightness.
- Similarly, quantum dots are used in some LED lamps to adjust the cold light of the diodes.
- The light can then become as energising as daylight or as calming as the warm glow from a dimmed bulb.

Biochemistry and medicine

- Nanoscale-sized quantum dots are also used to map biological tissues by biochemists.
- Certain cancer treatments use quantum dots for targeted drug delivery and other therapeutic measures.
- Doctors have begun investigating the potential use of quantum dots to track tumour tissue in the body.
- This has wider applications in the field of nanomedicine too.

Additional applications

- Quantum dots are also employed in photovoltaic cells to increase absorption and efficiency in the conversion of solar light to energy.
- Quantum dots can be employed as anti-counterfeit security markers on banknotes and papers.
- They can be used as luminous markers to tag and track items in general.

PRELIM FACTS

1. Non-Alcoholic Fatty Liver Disease (NAFLD)

Context: According to new research, non-alcoholic fatty liver disease (NAFLD) is inextricably connected to personality disorders.

About:

- The term NAFLD refers to a group of disorders caused by an accumulation of fat in the liver.
- This fat accumulation is not caused by excessive alcohol consumption. Alcohol-associated liver disease occurs when excessive alcohol use causes fat to accumulate in the liver.
- Nonalcoholic fatty liver (NAFL) and nonalcoholic steatohepatitis (NASH) are the two kinds of NAFLD.
- Persons normally acquire one of two types of NAFLD, while persons with one form may later be diagnosed with the other.

NAFL:

- NAFL is a form of NAFLD in which you have fat in your liver but little or no inflammation or liver damage.
- NAFL typically does not progress to cause liver damage or complications.
- However, NAFL can cause pain from enlargement of the liver.

NASH:

- NASH is the form of NAFLD in which you have inflammation of the liver and liver damage, in addition to fat in your liver.
- The inflammation and liver damage of NASH can cause fibrosis, or scarring, of the liver.
- NASH may lead to cirrhosis, in which the liver is scarred and permanently damaged. Cirrhosis can lead to liver cancer.

Who is more likely to develop NAFLD?

- NAFLD is more common in people who have certain diseases and conditions, including obesity, and conditions that may be related to obesity, such as type 2 diabetes.
- NAFLD can affect people of any age, including children.

Treatment:

- There's currently no specific medication for NAFLD.
- Doctors recommend weight loss to treat NAFLD.
- Weight loss can reduce fat, inflammation, and fibrosis in the liver.
- Treatment may also be recommended for associated conditions (high blood pressure, diabetes, and cholesterol) or complications.

2. Very Short-Range Air Defence (VSHORAD) missile system

Context: The Indian defense establishment recently launched a tender to purchase 30 units of the indigenous Very Short-Range Air Defence (VSHORAD) missile system.

About

- It is a MANPAD (Man Portable Air Defence System) intended specifically to counter low-altitude aircraft threats at short distances.
- Individuals or small groups can fire these short-range, lightweight, portable surface-to-air missiles.
- It was designed and built entirely in India by the DRDO's Research Centre Imarat (RCI) in collaboration with other DRDO laboratories and Indian business partners.

- The Indian Army is the primary user of VSHORAD missiles in India.

Features

- It is intended to provide short-range air defense capabilities in order to protect ground forces and vital assets from aerial threats such as helicopters and low-flying aircraft.
- Many unique technologies are used in the missile, including as a dual-band IIR Seeker, a miniaturized Reaction Control System, and integrated avionics.
- A dual-thrust solid motor propels it.
- The DRDO built the missile and launcher to be portable, allowing for speedy deployment over rough terrain.

3. National Investment and Infrastructure Fund (NIIF)

Context: The National Investment and Infrastructure Fund recently announced a \$600 million India-Japan Fund in partnership with the Japan Bank for International Cooperation (JBIC).

About

- It is an investor-owned fund manager that is supported by the Government of India (GoI) and significant global and domestic institutional investors.
- It is India's first sovereign wealth fund (SWF), which was established in 2015.
- It is a finance institution that invests in greenfield (new), brownfield (existing), and stalled projects to improve infrastructure financing.
- The major purpose of establishing NIIF was to maximize economic effect primarily through investments in infrastructure-related projects.

Types of NIIF Funds

- **Master Fund:** This fund primarily invests in infra-related projects such as roads, ports, airports, and power. Also, the master fund invests in well-established enterprises that are into a long-term agreement and are operating in a regulated environment with a good history.
- **Fund of Funds:** It looks to invest in funds managed by the renowned fund managers having an excellent track record. The fund of funds invests as anchor investors, and this enables the fund managers to accumulate more funds from the institutional investors
- **Strategic Fund:** This fund is registered as an Alternative Fund II under the Securities and Exchange Board of India (SEBI) in India. Strategic funds invest primarily in equity and equity-linked instruments.
- The funds are registered as Alternative Investment Fund (AIF) with the Securities and Exchange Board of India (SEBI).

4. Bojjannakonda

Context: The Central Government recently approved 7.30 crore rupees for landscaping and development of tourism amenities at the Bojjannakonda location.

About

- It is in the Indian state of Andhra Pradesh.
- In 1906, the site was excavated under the supervision of Alexander Rim.
- It was originally called as 'Buddhuni konda' (Buddha's hill), but it was shortened to 'Bojjannakonda' over time.
- Around 2,000 years ago, Buddhist monks practiced atop the hill.
- At the site, a gold coin from the Samudra Gupta dynasty, copper coins from the Chalukya ruler Kubja Vishnu Vardhan, coins from the Andhra Satavahanas, and pottery were discovered.

Features

- This site has an intriguing characteristic in that it presents features from all three periods of Buddhism: Hinayana, Mahayana, and Vajrayana.
- A 'Kalabhairava' statue with Lord Ganesha's head wearing conch shells and a 'Harati' statue of a Buddhist monk were also discovered at the site.
- On the hill, there is a massive double-story cave.
- The rectangular cave has a doorway and is flanked on either side by 'dwarapalakas'.
- In the cave's center, there is a rock-cut stupa standing on a square platform.
- On the northern side of the hill, there are a number of rock-cut caves and monolithic constructions standing on granite platforms.
- The imposing figures of the Buddha, seated in meditation posture, and the stupa are the main attraction for tourists at Bojjannakonda.
- On the top of the hill, there is a group of structural buildings and a vihara (monastery), which has been reduced to ruins.

- To the west of Bojjannakonda, another hillock, Lingalakonda or Lingalametta, is present.
- A number of monolithic and structural stupas can be seen on the top of this hillock.
- The Buddhist temple at Barabodur in Java has been constructed on the lines of the structures on Lingalametta”.
- The caves at Bojjannakonda and those in Takshasila are similar.
- The word ‘Sangrama’ was in use at Takshasila but was never used in Andhra Pradesh. These two features suggest that Buddhist practices influenced Bojjannakonda in northern India.”

5. Uterus transplant

Context: Recently, doctors in the U.K., conducted the country’s first uterus transplant.

About

What is a uterine transplant?

- Uterus transplants, unlike heart or liver transplants, are not life-saving transplants.
- They are more analogous to limb or skin transplants, which increase the quality of people's lives.
- Uterus transplants can assist women who do not have a uterus in meeting their reproductive needs.
- India is one of the rare places where a uterine transplant has been successful.

Surgeons determine the transplant’s success in three stages:

- In the first step of pregnancy, doctors transfer embryos prepared by in vitro fertilisation and cryopreserved to the recipient’s uterus.
- Just as with pregnancies after the transplants of other organs among women, there is a higher risk that the body will reject the uterus, or of spontaneous abortion, intrauterine death, low birthweight, or premature birth.
- The final stage of success is of course successful childbirth.

Challenges:

Side effects from drugs:

- To prevent the recipient’s body from rejecting the transplanted uterus, the recipient needs to take drugs that suppress the immune system.
- These drugs are selected such that they won’t harm foetal development at any stage.
- These immunosuppressants have side-effects, including toxicity of the kidneys and bone-marrow.
- They also carry a higher risk of developing diabetes and cancer.
- For these reasons, the uterus must be removed later.

High cost involved:

- The recipient is recommended regular follow-ups with doctors for at least a decade after the uterus’s removal to lookout for potential long-term side effects of immunosuppressants.

6. New Study Challenges Existence of Lightning on Venus

Context: A recent study, utilizing data from the National Aeronautics and Space Administration (NASA)’s Parker Solar Probe, has raised doubts about the presence of lightning on Venus, a topic debated among scientists for decades.

About

- The study published in Geophysical Review Letters, suggests that the observed "lightning" near Venus may not be actual lightning but rather disturbances in the planet's weak magnetic fields.
- Previous scientific belief suggested constant lightning on Venus, but signals collected by various instruments over time challenge this notion.
- Another study suggests that previous observations of lightning may have been misinterpreted meteor burn-ups in the atmosphere.
- Venus is known for its inhospitable conditions, including extreme temperatures that makes it the hottest planet in the solar system and atmospheric pressure.

7. National Turmeric Board

Context: Recently, the Government of India has established the National Turmeric Board. As India is the world's largest producer (75% of global turmeric production), consumer, and exporter of turmeric, this move aims to enhance the development and expansion of the turmeric industry within the country.

About

- The Board will consist of a Chairperson appointed by the Central Government, members from key government departments including the Ministry of AYUSH, Departments of Pharmaceuticals, Agriculture & Farmers Welfare, Commerce & Industry of the Union Government, along with rotating senior State Government representatives from three states.
- The Board is expected to help develop and grow the spice market in India, which controls over 62% share of the turmeric world trade.

- The largest producing states of Turmeric are Maharashtra, Telangana, Karnataka and Tamil Nadu.
- With its strategic approach, it aspires to propel turmeric exports to a staggering USD 1 Billion by 2030, ultimately benefiting both growers and consumers.

8. Nagorno-Karabakh Conflict

Context: Azerbaijan recently conducted a military operation in the disputed Nagorno-Karabakh territory, which resulted in deaths. The operation is part of Azerbaijan and Armenia's long-running dispute over the region.

Facts about Nagorno-Karabakh Conflict

- Armenians refer to Nagorno-Karabakh as Artsakh, a landlocked mountainous region in the Caucasus region (the transcontinental region between the Black Sea and the Caspian Sea).
- It is internationally recognized as part of Azerbaijan, however the majority of its residents are ethnic Armenians.
- They have their own government, which has close ties to Armenia's, but it is not recognized by Armenia or any other country.
- The conflict dates back to the late 1980s when the region declared its independence from Azerbaijan as the Soviet Union collapsed.
- The first war erupted between Armenia and Azerbaijan over the territory, which ended with a ceasefire in 1994, leaving Nagorno-Karabakh and some surrounding areas under Armenian control.
- The ceasefire was frequently violated by both sides, and several attempts to negotiate a peaceful settlement failed.
- Azerbaijan initiated the Second Karabakh War in 2020, retaking seven surrounding districts and roughly one-third of Nagorno-Karabakh.
- Following the Second Karabakh War in 2020, Russia secured a peace settlement that included up to 1,960 Russian forces stationed in the region.



Azerbaijan

Azerbaijan is a country in Asia that is bordered by Russia, Georgia, Armenia, and Iran.

The east of the country is **bordered by the Caspian Sea**.

Much of the north and west is **covered by the Caucasus Mountains**.

Capital city: **Baku**.

Azerbaijan is abundant in oil and natural gas.

Yanar Dag, a famous site in Azerbaijan, has a natural eternal fire fueled by seeping natural gases, burning for over 65 years along the Caspian Sea. This unique phenomenon aligns with Azerbaijan's nickname, "The Land of Fire."

Armenia

A landlocked country in the Caucasus with **Turkey to the west, Georgia to the north, and Azerbaijan to the east**.

Capital: **Yerevan**.
Armenia is a mountainous country.
Highest Peak: Mount Ararat.

ANSWER WRITING

Q. “constitutionally guaranteed judicial independence is a prerequisite of democracy.” Comment.

Introduction

Judicial independence is the notion that the judiciary should be free of outside influence or interference in its operations. It is necessary in a democratic government to ensure the rule of law, preserve fundamental rights, and maintain checks and balances.

Judicial independence is not just an ideal, but a fundamental necessity for the functioning of a democratic society for the following reasons:

Checks and Balances: The Independent Judiciary plays a vital role in ensuring that the executive and legislative branches of the government do not violate the Constitution or encroach upon the rights of the people. For instance, in the case of *Kesavananda Bharati vs State of Kerala*, the Supreme Court held that the Parliament cannot amend the basic structure of the Constitution.

Protection of Rights: The Independent Judiciary has been a staunch defender of the fundamental rights and freedoms guaranteed by the Constitution to all citizens. The Court has expanded the scope of these rights through various landmark judgements, such as *Indira Sawhney vs Union of India*, which upheld the reservation policy for backward classes and *Navtej Singh Johar vs Union of India*, which decriminalized homosexuality and recognized the right to sexual orientation as a part of the right to privacy.

Fair and Impartial Justice: The Independent Judiciary strives to deliver justice without fear or favor, regardless of the status or identity of the parties involved. The Court has demonstrated its commitment to fair and impartial justice by taking up cases suo motu, entertaining public interest litigation (*Hussainara Khatoon vs. State of Bihar*), and appointing amicus curiae (friends of the court) to assist it in complex matters.

Conflict Resolution: In a democratic society, disputes and conflicts are inevitable. An independent judiciary provides a peaceful and lawful means to resolve conflicts, reducing the likelihood of social unrest and chaos.

The Court has also exercised its extraordinary powers provided by the Constitution under Article 142 to pass any order necessary for doing complete justice in any case or matter pending before it.

Some examples of conflict resolution by the Supreme Court are *S.R. Bommai vs Union of India*, which laid down guidelines for imposition of President's rule in states; and *Ayodhya Judgement*, which settled a long-standing dispute over a religious site.

Protection of Minority Rights: Democracy is not just about majority rule; it also entails protecting the rights of minorities. An independent judiciary can safeguard minority rights by preventing the majority from oppressing or discriminating against minority groups.

The Court has also intervened to protect minorities from discrimination, violence, or persecution, such as in *Mohd. Ahmed Khan vs Shah Bano Begum*, which granted maintenance to a Muslim woman divorced by her husband; and *John Vallamattom vs Union of India*, which struck down a discriminatory provision in the Indian Succession Act applicable to Christians.

Upholding the Constitution: Constitutions are the bedrock of democratic societies. An independent judiciary ensures that the Constitution remains the supreme law of the land, guarding against unconstitutional actions by the government or any attempts to amend the Constitution in a manner that undermines its democratic principles.

The Court has evolved various doctrines and principles to safeguard the constitutional values, such as basic structure doctrine, doctrine of harmonious construction, doctrine of pith and substance, doctrine of eclipse, etc. to uphold the spirit of the Constitution.

Conclusion

Constitutionally guaranteed judicial independence is indeed a prerequisite for democracy. Without it, the principles of democracy, such as the rule of law, protection of individual rights, accountability, and checks and balances, cannot be effectively upheld. An independent judiciary is a cornerstone of democratic governance, providing the necessary legal framework and oversight to ensure that the democratic system functions as intended, protecting the rights and freedoms of all citizens.

MCQs

1. Consider the following statements on the SPRINT Initiative, which were just made public:
 1. Its goal is to encourage domestic enterprises to develop defense technologies.
 2. The Defence Research and Development Organisation (DRDO) is the one who launched it.
 Which of the above statements is/are correct?
 - a) 1 only
 - b) 2 only
 - c) Both 1 and 2
 - d) Neither 1 nor 2

