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Current Affairs

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Centenary of the Vaikom Satyagraha

Syllabus :GS 1/History

In News

- The year 2024 marks the centenary of the Vaikom Satyagraha.

About Vaikom Satyagraha

- Background: Vaikom was a temple town in the princely state of Travancore. The low-caste Hindus were not allowed to enter into the temples.
- The issue of temple entry was first raised by Ezhava leader T K Madhavan in a 1917 editorial in his paper Deshabhimani.
- In the 1923 session of the INC in Kakinada, a resolution was passed by the Kerala Provincial Congress Committee to take up anti-untouchability as a key issue.
- Vaikom, with its revered Shiva temple, was chosen as the location for the very first satyagraha.
- Vaikom Satyagraha was the first among temple entry movements in India
- It lasted for 604 days (20 months) from March 30, 1924 to November 23, 1925
- Reasons: The princely state of Travancore had a “feudal, militaristic, and ruthless system of custom-ridden government.
- The idea of caste pollution worked not only on the basis of touch but also sight — lower castes were forbidden entry to any “pure” place, such as temples and the roads surrounding them.
- Prominent Leaders : The movement, led by TK Madhavan, EVR Periyar, MK Gandhi, and Narayana Guru.
- Temple Entry Proclamation : In November 1936, the Maharaja of Travancore signed the historic Temple Entry Proclamation which removed the age-old ban on the entry of marginalised castes into the temples of the state.

Impacts of the Vaikom Satyagraha

- Vaikom Satyagraha was a testing ground for the Gandhian Principles of Satyagraha.
- In 1925, Gandhiji wrote to W. H. Pitt, then Police Commissioner of Travancore to resolve the ongoing matter. Thus, Pitt intervened and a settlement was signed between the Government and Gandhiji.
- The Vaikom Satyagraha proclaimed its significance almost a decade later when in November 1936, the historic Temple Entry Proclamation was passed, which lifted the age-old orthodox ban on the entry of marginalized depressed castes into the temples of Travancore.
- It was also a great opportunity for the Indian National Congress Party to Grow in Kerala.
- It became the first struggle for human rights in India.
- The Vaikom Satyagraha had a significant impact on Indian society and politics. The Sree Narayana Dharma Paripalana Yogam (SNDP), a social reform organization that worked for the upliftment of the lower castes in Kerala began building temples that would allow entry to all people.

Conclusion

- The Vaikom Satyagraha was a pivotal moment in the Indian independence movement that brought attention to the injustices of the caste system and the need for social reform.
- The Kerala government, in July 2014, announced the establishment of Vaikom Satyagraha Memorial Museum and Mahatma Gandhi statue at Vaikom.

Bohag Bihu

Syllabus : GS 1/Art and Culture

In News

- Traditional Assamese Gamosa (rectangular piece of cloth) sees surge in demand ahead of 'Bohag Bihu'.

About the Bihu

- Bihu is the essence of Assam and is celebrated across the state with a tremendous zeal and enthusiasm.
- There are three Bihu festivals namely
- 'Bohag Bihu' is celebrated in the month of 'Bohag' (Baisakh, the middle of April): It is also called the Rongali Bihu and is a festival of merriment and heralds the Assamese New Year and the onset of spring.
- 'Magh Bihu' is celebrated in the month of 'Magh' (the middle of January): It is also called Bhogali Bihu, which is quintessentially the festival of food.
- It marks the end of the harvesting season. The eve of the Magh Bihu is called the Uruka.
- 'Kati Bihu' is celebrated in the month of 'Kati' (Kartik, the middle of October) :
- It is also called Kongali Bihu unlike the other Bihu's, is not a flamboyant festival and the festivities are graver in nature. An earthen lamp is lit near the Tulsi plant which is termed as the 'Tulsi Bheti'.

Significance

- Each Bihu coincides with an idiosyncratic phase in the farming calendar. The Bohag Bihu marks the New Year at the advent of seeding time, the Kati Bihu marks the completion of sowing and transplanting of paddies, and the Magh Bihu marks the end of the harvesting period.

Excavation Reveals Harappan Settlement in Kachchh

Syllabus: GS1/Ancient Indian History

Context

- A human skeleton, along with pottery artifacts and animal bones has been found on the slope of a hillock in a Gujarat village.

About

- Archaeologists excavated a site called Padta Bet, it was 1.5 km from the mass burial ground of Juna Khatiya, an Early Harappan necropolis.
- In 2018, archeologists had unearthed a mass burial site with 500 graves on the outskirts of Khatiya village in Gujarat's Kutch district which raised the questions of whose graves are these?
- The latest find bolsters the theory that the graveyard site may have served as a common facility for a cluster of several such smaller settlements.
- The Archaeologists also found semi precious stone beads made of carnelian and agate, terracotta spindle whorls, copper, lithic tools, cores and debitage, grinding stones and hammer stones.

Harappan Civilization

- The Harappan civilization is believed to be one of the oldest world civilizations together with Egypt and Mesopotamia.
- It was developed along the river Indus and for that reason it is also known as the Indus Valley Civilization.
- The Harappan civilization is identified as a Bronze-age civilization because many objects have been found that are made up of copper based alloys.

Major Features of Civilization

- Urban Planning: Their towns were well planned and they had brick houses which were situated along the roads.
- Every house was equipped with a staircase, a kitchen and several rooms.
- Their courtyards had wells, bathrooms and they had proper drainage systems.
- Ornaments: The Harappans wore ornaments made of gold, silver, ivory, shell, clay, semi-precious stones and others.

- Trade and Commerce: The civilization had extensive trade networks, reaching as far as Mesopotamia, Afghanistan, and the Arabian Peninsula.
- Religion and Iconography: Harappan artifacts depict various symbols and motifs believed to be related to religious beliefs.
- These include figures such as the “Priest King” and images of animals like bulls, suggesting possible reverence for certain animals.
- Craftsmanship and Artistry: The Harappans produced intricate pottery, including the famous red pottery with black painted motifs.
- They also created jewelry, sculptures, and seals made of steatite, terracotta, and other materials.
- Agriculture: They cultivated crops such as wheat, barley, peas, and cotton.
- Social Organization: The society was likely stratified, with evidence suggesting a hierarchical structure. This is indicated by variations in housing sizes and the presence of public buildings.
- Decline and Disappearance: The reasons for the decline of the Harappan Civilization are still debated among historians and archaeologists.
- Possible factors include ecological changes, such as shifts in river courses, as well as invasions and internal conflicts.

Major Harappan

Sites	Present Day
Harappa	Punjab, Pakistan
Mohenjo-Daro	Sindh, Pakistan
Dholavira	Kutch district of Gujarat,
Kalibangan	Rajasthan
Lothal	Gujarat
Rakhigarhi	Haryana
Chanhudaro	Sindh, Pakistan
Ganweriwala	Punjab, Pakistan
Sutkagendor	Baluchistan Province, Pakistan
Alamgirpur	Uttar Pradesh

Rakhigarhi Findings in NCERT Books Added

Syllabus: GS1/History and Culture

Context

- The National Council of Educational Research and Training (NCERT) has proposed to add findings from the archaeological site of Rakhigarhi in Haryana.

What are the DNA Findings?

- The study of ancient DNA from archaeological sources in Rakhigarhi, Haryana suggests that the genetic roots of the Harappans go back to 10,000 BCE.
- The DNA of the Harappans has continued till today and a majority of the south Asian population appears to be their descendants.
- The study indicates genetic continuity without large-scale immigration.
- People from bordering areas and distant regions were absorbed into Indian society.

Rakhigarhi

- Site location: The present-day Rakhigarhi is located 27 km from the Ghaggar river, in the Ghaggar-Hakra river plain.
- The archaeological site, dating back to 2600-1900 BCE.
- It is the largest Harappans site in the Indian Subcontinent.

Findings

- Granary: A granary belonging to the mature Harappan phase (2600 BCE to 2000 BCE) has been found here. It has 7 rectangular or square chambers.
- Culture, clothing and worship: Fire altars and apsidal structures were revealed in Rakhigarhi.
- Cemetery and burial sites: A cemetery of Mature Harappan period is discovered at Rakhigarhi, with eight graves found.

2550th Mahaveer Nirvan Mahotsav

Syllabus: GS1/History

Context

- Recently, the Prime Minister of India inaugurated the 2550th Bhagwan Mahaveer Nirvan Mahotsav on the auspicious occasion of Mahaveer Jayanti at Bharat Mandapam in New Delhi.

About Mahaveer Jayanti (aka Mahavir Janma Kalyanak)

- It celebrates the birth of Mahavira, the last Tirthankara and the founder of Jainism.
- Mahavira was born on the 13th day of the bright half of the Hindu month of Chaitra, which usually falls in March or April.

Mahavira Swami

Birth and Early Life:

- He was born to King Siddhartha and Queen Trishala of the Ikshvaku dynasty, in 540 BC at Kshatriyakund (part of the well known Vaishali republic) in Bihar.
- He was named Vardhaman, which means continuously increasing.
- He was a kshatriya prince of the Lichchhavis, a group that was part of the Vajji Sangha.
- Though he was born with worldly comforts and luxuries, they never attracted him and at the age of thirty, he left home and went to live in a forest. For twelve years he led a hard and lonely life.

Kevaljnan:

- At the age of forty-two he attained Kevaljnan (omniscience) through right knowledge, right faith and right conduct (Three Jewels of Jainism).
- He became a Jina (conqueror) and the twenty-fourth tirthankara.
- a. Rishabh Deva was the first tirthankara.

Teachings and Contributions:

- All living beings have a soul and all souls are equal.
- He questioned the authority of the Vedas and also emphasised individual agency and suggested the masses to attain liberation from the trials and tribulations of worldly existence.
- a. This was in marked contrast to the Brahmanical position, wherein, an individual's existence was thought to be determined by his or her birth in a specific caste or gender.
- He added one more vow to the four great vows from the time of Lord Parshvanath. The five great vows are:
 - a. Ahimsa (non-violence);
 - b. Satya (truth);
 - c. Asteya (non-stealing);
 - d. Aparigraha (non-possession);
 - e. Brahmacharya (chastity, added by Mahavira).

– There are two forms of these five vows:

- a. Mahavrata: The 5 great vows followed by Jain monks and nuns.
 - b. Anuvrata: The less strict version of great vows followed by Jain lay people.
- As the last Tirthankar, he revived the Tirth (religious order) and this order is known as the Jain Sangh (order).

Language:

- He used Prakrit language so that ordinary people could understand the teachings as Sanskrit was not understood by many.
- There were several forms of Prakrit, used in different parts of the country and named after the regions in which they were used.
- a. For example, the Prakrit spoken in Magadha was known as Magadhi Prakrit.

Death:

- He attained mahaparinirvana at the age of seventy-two at Pavapuri near Patna in 468 BC and became a Siddha (free from the cycle of birth and death).

Jainism

- The word Jain comes from the term Jina, meaning conqueror.
- The basic philosophy was already in existence in North India before the birth of Lord Mahavira.
- According to Jain tradition, Mahavira was preceded by 23 tirthankaras (teachers), literally, those who guide men and women across the river of existence.
- The most important idea in Jainism is that the entire world is animated and even stones, rocks and water have life.
- Non-injury to living beings, especially to humans, animals, plants and insects, is central to Jain philosophy.
- According to Jain teachings, the cycle of birth and rebirth is shaped through karma and asceticism and penance are required to free oneself from the cycle of karma. This can be achieved only by renouncing the world, therefore, monastic existence is a necessary condition of salvation. In order to do so, Jain monks and nuns had to take the five vows.

Seven Tattvas (elements) of Jain Philosophy:

- Jiva (living substance);
- Ajiva (matter or non-living substance);
- Asrava (influx of Karmic matter in the soul);
- Bandha (bondage of soul by Karmic matter);
- Samvara (stopping of Asrava);
- Nirjara (gradual removal of Karmic matter);
- Moksha (attainment of perfect freedom or salvation).

Karmas responsible for distortions of the soul:

- Ghati (Destructive) Karma: These obstruct the true nature of the soul.
- Jnanavarniya (Knowledge obscuring) Karma;
- Darshanavarniya (Perception obscuring) Karma;
- Antarāy (Obstructing) Karma;
- Mohniya (Deluding) Karma
- Aghati (Non-destructive) Karma: These affect only the body in which the soul resides. As long as Aghati karmas will be present, human souls will stay caged in some kind of a body and will have to experience pain and sufferings in many different forms.
- Vedniya (Feeling producing) Karma;
- Nam (Body determining) Karma;
- Gotra (Status determining) Karma;
- Ayushya (Age determining) Karma;
- Vedniya (Feeling producing) Karma

Spread of Jainism:

- Over hundreds of years, it spread to different parts of north India and to Gujarat, Tamil Nadu and Karnataka.

Literature:

- Jain scholars produced a wealth of literature in a variety of languages namely Prakrit, Sanskrit and Tamil.
- Jain literature is classified into two major categories
- Agam Literature: This consists of original scriptures compiled by Ganadhars and Srut-kevalis. They are written in the Prakrit language.
- Non-Agam Literature: This consists of commentary and explanation of Agam literature and independent works, compiled by elder monks, nuns, scholars, etc. and are written in many languages such as Prakrit, Sanskrit, Old Marathi, Gujarati, Hindi, Kannad, Tamil, German and English.

Jain Councils:

Jain Councils	Year	Place	Chairman	Development
1st	300 BC	Patilputra	Sthulabhadra	Compilation of Angas.
2nd	512 AD	Vallabhi	Devardhi Kshmasramna	Final compilation of 12 Angas and Upangas.

Sects of Jainism

- Famine in Magadha led to the division of Jainism into two sects namely Digambar (meaning sky clad) and Shwetambar (meaning white clad).

Digambar Sect:

- It was led by Bhadrabahu, leader of monks who moved to the south. It is more austere and is closer in its ways to the Jains at the time of Mahavira.
- In recent centuries, it has been further divided into various sub-sects.

Major sub-sects:	Minor sub-sects:
Bisapantha Terapantha Taranapantha or Samaiyapantha	Gumanapantha Totapantha

Shwetambar Sect:

- It was led by Sthulabhadra, the leader of Monks who stayed in the North.
- Like the Digambar Sect, it has also been divided into three main sub-sects:
- Murtipujaka
- Sthanakvasi (avoided Idol Worship/Murtipujak)
- Terapanthi (simpler worship pattern than Digambar TeraPanthi)

Differences Between Digambar and Shwetambar:

Dimensions	Digambar	Shwetambar
Clothes	They live completely naked.	They wear white clothes.
Women	Women cannot achieve liberation.	Women can achieve liberation.
Images	Digambara images of tirthankaras have downcast eyes, are plain and always carved as naked figures.	Svetambara images have prominent staring eyes and are richly decorated.

Difference Between Jainism and Buddhism

Dimension	Buddhism	Jainism
Soul	Does not believe in the soul. No soul theory is propounded (Nairatmyavada).	Believe in the soul, which is present in everything.
God	Generally silent on questions related to the existence of God.	Does believe in God, not as a creator, but as a perfect being.
Varna System	Condemn it.	Do not condemn it.
Incarnation	Do not believe in incarnations.	Believe in incarnations.

Indulekha Painting of Ravi Varma

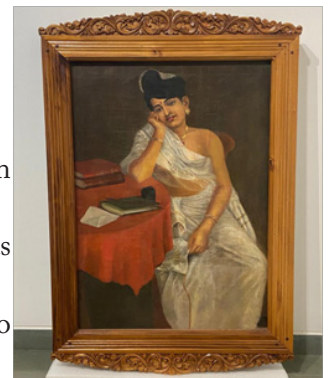
Syllabus: GS1/Art and Culture

Context

- Recently, the first true copy of the painting 'Indulekha' by the legendary artist Raja Ravi Varma was unveiled on the occasion of his 176th birth anniversary at the Kilimanoor Palace.

About the Painting and its History

- The painting 'Indulekha' is a masterpiece by Raja Ravi Varma.
- It portrays Indulekha, the protagonist of the first modern novel in Malayalam literature by O. Chandu Menon, published in 1889.
- It is believed that the famous painting 'Reclining Lady' by Ravi Varma was modelled on Indulekha.
- It depicts Indulekha holding a letter addressing her lover Madhavan (the hero of the novel).



Raja Ravi Varma (29 April 1848 – 2 October 1906)

- Born: Kilimanoor, Travancore (present-day Thiruvananthapuram, Kerala).
- Contributions
- His paintings are one of the best examples of the fusion of European academic art with a purely Indian sensibility and iconography.
- Varma's paintings depicted scenes from Hindu epics like the Ramayana and Mahabharata, as well as portraits of deities.
- He was notable for making affordable lithographs of his paintings available to the public, and increased the involvement of common people with fine arts and defined artistic tastes.

Chapter-
2**POLITY & GOVERNANCE****Association of Democratic Reforms Data on MPs****Syllabus: GS2/Governance****Context:**

- Recently, the Association of Democratic Reforms (ADR) scrutinised the affidavits of the sitting MPs, and revealed several sitting MPs with criminal charges.

Criminalisation of Politics in India

- It is a phenomenon, where individuals with criminal charges are elected to positions of power, posing a significant threat to the democratic fabric of the nation.
- It refers to the involvement of individuals with criminal charges or backgrounds in Indian politics. It means that persons with criminal backgrounds contest in the election and get selected as a member of parliament or state legislature.

Major Reasons

- Unholy Nexus between Bureaucracy and Politicians; Religion and Caste; Vote Bank Politics; Ineffective Legal Provisions; and Lack of Transparency and Accountability etc.

The Extent of the Problem: Key Findings of ADR

- Criminal Charges: Out of the 514 sitting Lok Sabha MPs analysed, 225 (44%) have declared criminal cases against themselves.
- ADR revealed that among the sitting MPs with criminal charges, 29% face serious criminal cases, including allegations of murder, attempt to murder, promoting communal disharmony, kidnapping, and crimes against women.
- Out of the sitting MPs with serious criminal cases against them, nine face murder cases.
- Educational Background, Age, and Gender: 73% of the MPs have graduate or higher educational qualifications, while only 15% of the sitting MPs are women.
- State-wise Distribution: More than 50% of the MPs from Uttar Pradesh, Maharashtra, Bihar, Andhra Pradesh, Telangana, and Himachal Pradesh face criminal charges.
- Party-wise Distribution: Among major parties, the BJP and the Congress have the highest number of billionaire MPs.
- Highest Declared Assets: 5% of the analysed MPs are billionaires, with assets exceeding 100 crore.

Other Key Reasons Highlighted By ADR Earlier:

- Electoral Bonds: The Supreme Court held that the Electoral Bonds Scheme was unconstitutional for violating the right to information of voters.
- Registered Unrecognised Political Parties: According to a report by ADR, the number of registered unrecognised political parties has increased two-fold from 2010 to 2019.
- Election Commissioners Appointment: ADR argues that the present practice of appointment of Election Commissioners by the Centre is violative of Articles 14 and Article 324 (2) and the basic features of the Constitution.

The Association for Democratic Reforms (ADR):

- It is an apolitical and non-partisan non-profit organisation in India that was established in 1999 by a group of professors from the Indian Institute of Management (IIM) Ahmedabad.
- It focuses on corruption and criminalization in the political process, empowerment of the electorate through greater dissemination of information relating to the candidates and the parties etc.

Objectives:

- To improve governance and strengthen democracy through continuous work in the area of Electoral and Political Reforms.

Significances:

- It has published numerous reports on the criminal backgrounds, financial details, and other relevant information of candidates contesting in various elections.

A. These reports have played a crucial role in promoting transparency and accountability in Indian politics.

Issues of Criminalization of Politics

- Question of safety & security: The main purpose of governance is to provide safety and security to citizens who elect their representatives for this role.
- But if the elected members themselves have criminal records, would they be interested in a criminal justice system that is prompt and efficient?
- Low conviction rate: As per the National Crime Records Bureau's 2021 report, only 10,416 cases of murder were disposed of during the year with just a 42.4% conviction rate.
- The Law minister has admitted to more than 4.7 crore cases pending in various courts.
- Situation in police stations: Politicians play a very powerful role at police stations, compromising both integrity and impartiality of field staff.
- In due course, ordinary criminals graduate to be dreaded ones and form gangs extorting money, grabbing land, threatening witnesses in criminal cases, etc.
- Impact on Democracy: The presence of criminals in politics undermines the very essence of democracy. It erodes public trust in the political system and compromises the integrity of our institutions.
- Moreover, it raises serious questions about the kind of representation citizens are receiving and the quality of governance being delivered.

Measures to Curb Criminalisation

- The Vohra Committee set up by the Centre in 1993 sounded a note of warning saying that "some political leaders become the leaders of these groups and, over the years, get themselves elected to local bodies, state assemblies, and the national Parliament.
- Law Commission's 179th report: It recommended an amendment to the Representation of People Act 1951, and suggested the people with criminal backgrounds should be disqualified for five years or until acquittal.
- It also recommended that the person who wants to contest the election must furnish details regarding any pending case, with the copy of the FIR/complaint, and also furnish details of all assets.

The Legal Framework:

- Representation of the People Act, 1951: It provides the basis for disqualifying a sitting legislator or a candidate on certain grounds.
- However, there is no provision regulating appointments to offices within political parties.
- Right to Information Act, 2005: Efforts have been made to bring political parties under the Right to Information regime to usher in transparency within political parties.

Related Supreme Court Judgement

- In 2002: Every candidate contesting election had to declare his criminal and financial records along with educational qualifications.
- In 2005: A sitting MP or MLA will be disqualified from contesting the election if convicted and sentenced to imprisonment for two years or more by a court of law.

- In 2014: The Supreme Court accepted the Law Commission recommendations and passed an order directing that trials against sitting MPs and MLAs should be concluded within a year of charges being framed and conducted on a day-to-day basis.
- As a follow-up to these directives, in 2017, the government started a scheme to establish 12 special courts for a year to fast-track the trial of criminal cases against MPs and MLAs.
- In 2021: The political parties need to upload on their websites and social media platforms the details of pending criminal cases against their candidates and the reasons for selecting them as also for not giving tickets to those without criminal antecedents.
- Recently, the Supreme Court published some necessary mandates to avert the criminalisation of politics as many lawsuits have been withdrawn against MPs and MLAs in the past.

Conclusion and Way Forward

- The criminalisation of politics in India is a grave issue that needs immediate attention. The involvement of criminals in politics not only undermines the democratic process but also hampers the development of the nation.
- There is a need to fix the role of Political Parties that should be more transparent and accountable in their candidate selection process.
- The Election Commission of India and other respective authorities need to take transparency measures about the Political Parties and their funding to the People of India so that they can make informed decisions while exercising their vote.
- It is high time that stringent measures are taken to curb this menace and restore faith in the democratic system.

Shukre Panel on Maratha Quota

Syllabus: GS2/Governance

Context

- The Panel under Justice Sunil B Shukre has found an “alarming” rise in the girl child marriage rate within the Marathas, in response to the petitions challenging the 10 per cent reservation granted to Marathas.

Background

- The Maharashtra Assembly unanimously passed a Bill granting 10% reservation in education and government jobs to the Maratha community.
- The law has been formulated based on a report of the Justice Sunil B Shukre-led Maharashtra State Backward Class Commission.
- It opined that “exceptional circumstances and extraordinary situations” justify granting reservation to the community beyond the Supreme Court-approved 50% limit.

Reservation in India

- As per existing instructions, reservation is provided to Scheduled Castes (SCs), Scheduled Tribes (STs) and Other Backward Classes (OBCs) at the rate of 15%, 7.5% and 27%, respectively, in case of direct recruitment on all India basis by open competition.
- In direct recruitment on an all India basis, other than by open competition, the percentage fixed is 16.66% for SCs, 7.5% for STs and 25.84% for OBCs.
- The Constitution (103rd Amendment) Act 2019 enables the State (i.e., both the Central and State Governments) to provide reservation to the Economically Weaker Sections (EWS) of the society.
- Whether or not to provide reservation to the EWS or appointment in States is to be decided by the State Government.
- Since the 1992 order, several states have passed laws breaching the 50% ceiling, including Haryana, Telangana, Tamil Nadu, Andhra Pradesh, Madhya Pradesh, Uttar Pradesh, Rajasthan, Chhattisgarh and Maharashtra.
- Laws made by many of these states have either stayed or are facing legal challenges.

Constitutional Provisions

- Article 16: It provides for equality of opportunity for all citizens but as an exception the State can provide for reservation of appointments or posts in favor of any backward class that is not adequately represented in the state services.
- Article 16 (4A): Provides that the State can make any provision for reservation in matters of promotion in favor of the Scheduled Castes and the Scheduled Tribes if they are not adequately represented in the services under the State.
- Article 335: It recognises that special measures need to be adopted for considering the claims of SCs and STs to services and posts, in order to bring them at par.
- 103 Amendment of the Constitution of India: Introduced 10% reservation for Economically Weaker Sections (EWS) of society by amending Article 15 and Article 16 of the Constitution.

Arguments in Favour

- Caste-based reservations address the roots of social injustice — and shouldn't be replaced by economic status-based reservations.
- The Constitution mandates realization of substantive equality in the engagement of the fundamental rights with the directive principles.
- It is a stereotypical assumption that the promotions drawn from the SCs and STs are not efficient or that efficiency is reduced by appointing them.
- The main reason for giving reservations and even promotions is that there are very few SC/ST candidates in the higher echelons of government.

Argument Against

- Reservations discourage merit and genuine talent by providing an unfair advantage to reserved candidates.
- Many deem poverty to be eligible for reservations in education and employment over caste-based marginalization.
- Reservations should only exist to level the playing field initially; they should be discontinued for higher positions/promotions.
- Economically well-off members of marginalized communities should not avail benefits of reservation.
- Low-cutoffs and eligibility criteria for reserved candidates brings down the overall caliber of an institution or organization.
- Continued reservation in education and public service were only a temporary measure.

Way ahead

- Allocating quotas often result in more cases of discrimination and hard feelings towards other communities. The purpose of reservation is not to isolate a particular section but to make them part of mainstream society.
- The policy makers while dealing with sensitive matters like Reservation policies must act wisely.

Indira Sawhney judgment

– The Indira Sawhney case is also known as the Mandal Commission case. In this case, the Supreme Court stated that:

a. Backward Classes of the Citizens of in Article 16(4) can be identified on the basis of caste and not only on the economic basis.

b. The Supreme Court upheld the Mandal Commission's 27 percent quota for backward classes, as well as the principle that the combined scheduled-caste, scheduled-tribe, and backward-class beneficiaries should not exceed 50 percent of India's population.

– The Reservation for backward classes should be confined to initial appointments only and not extend to promotions.

– State governments were called upon to identify creamy layer amongst the backward classes and exclude them from the purview of reservation.

SC Expanded Scope of Articles 14 and 21

Syllabus :GS 2/Governance

In News

- The Supreme Court has expanded the scope of Articles 14 and 21 to include the “right against the adverse effects of climate change”.

Key Highlights

- The Supreme Court was hearing a plea to protect the Great Indian Bustard (GIB) from losing its habitat due to power transmission lines.
- The court also highlighted the interconnection between climate change and various human rights, including the right to health, indigenous rights, gender equality, and the right to development.
- The SC has expanded the fundamental rights chapter from time to time to include various facets of a dignified existence.
- However, this is the first time that it has included the “right against the adverse effects of climate change”.
- The court highlighted that “States owe a duty of care to citizens to prevent harm and to ensure overall well-being”:
- “The right to a healthy and clean environment is undoubtedly a part of this duty of care.

Rationale

- Despite a plethora of decisions on the right to a clean environment, some decisions which recognise climate change as a serious threat, and national policies which seek to combat climate change, it is yet to be articulated that the people have a right against the adverse effects of climate change.
- As the havoc caused by climate change increases year by year, it becomes necessary to articulate this as a distinct right.
- It is recognised by Articles 14 and 21 which are important sources of the right to a clean environment and the right against the adverse effects of climate change.

About the Articles 14 and 21

- Article 14 of the Constitution of India reads as under: The State shall not deny to any person equality before the law or the equal protection of the laws within the territory of India.”
- Equality before law prohibits discrimination. It is a negative concept.
- The concept of ‘equal protection of the laws’ requires the State to give special treatment to persons in different situations in order to establish equality amongst all.
- It is positive in character.
- Therefore, the necessary corollary to this would be that equals would be treated equally, whilst un-equals would have to be treated unequally
- Article 21 recognises the right to life and personal liberty : It lays down that, no person shall be deprived of his life or personal liberty except according to procedure established by law.
- It guarantees that life or personal liberty shall not be taken away without the sanction of law. It ensures that no person can be punished or imprisoned merely at the whims of some authority. He/she may be punished only for the violation of the law.
- By the 86th Amendment Act of the Constitution a new article 21-A has been added after Article 21.
- By this Amendment Act, Right to Education has been made a Fundamental Right

Essence

- Fundamental Rights are enumerated in Part III from Article 14 to 32 in the Constitution of India.
- They provide standards of conduct, citizenship, justice and fair play. They serve as a check on the government.
- Various social, religious, economic and political problems in India make Fundamental Rights important.
- These rights are justiciable which means that if these rights are violated by the government or anyone else, the individual has the right to approach the Supreme Court or High Courts for the protection of his/her Fundamental Rights.

Do you know ?

- Article 48A of the Constitution provides that the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country.
- Clause (g) of Article 51A stipulates that it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures.
- a. These are not justiciable provisions of the Constitution but the importance of the environment, as indicated by these provisions, becomes a right in other parts of the Constitution.

Preventive Detention**Syllabus: GS2/Indian Polity****Context**

- The Jammu and Kashmir High Court ordered the release of Jaffar Ahmad Parray, who was detained under the state's Public Safety Act, 1978 (PSA).

What is Preventive Detention?

- Preventive detention means to detain a person so that to prevent that person from committing any possible crime.
- It is an action taken by the administration on the grounds of the suspicion that some wrong actions may be done by the person concerned which will be prejudicial to the state.
- The grounds for Preventive detention are:
 - Security of state, maintenance of public order,
 - Maintenance of supplies and essential services and defense,
 - Foreign affairs or security of India.

Punitive Detention

– It is to punish a person for an offence committed by him/her after trial and conviction in a court.

Safeguards Provided By The Constitution

- To prevent reckless use of Preventive Detention, certain safeguards are provided in the constitution under Article 22:
- A person can be taken to preventive custody only for 3 months at the first instance. If the period of detention is extended beyond 3 months, the case must be referred to an Advisory Board.
- The detainee is entitled to know the grounds of his detention. The state, however, may refuse to divulge the grounds of detention if it is in the public interest to do so.
- The detaining authorities must give the detainee earliest opportunities for making representation against the detention.

Arguments in Favour of Preventive Detention

- National Security: India faces various internal and external security threats, including terrorism, insurgency, and organized crime.
- Preventive detention is a necessary tool to address these threats by allowing law enforcement agencies to detain individuals suspected of involvement in activities that pose a risk to national security.
- Maintaining Public Order: In situations of civil unrest, communal tensions, or public disturbances, preventive detention is used to prevent further escalation of violence and maintain public order.
- Preserving Integrity and Sovereignty: Individuals involved in activities such as sedition, espionage, or conspiracy against the state are detained to prevent their actions from causing harm to the integrity and sovereignty of the nation.
- Deterrence: The existence of preventive detention laws and their occasional use serve as a deterrent to individuals or groups considering engaging in unlawful activities.
- The knowledge that authorities have the power to detain individuals suspected of posing a threat to public safety dissuade potential offenders from carrying out their plans.

Arguments Against Preventive Detention

- Colonial Law: Preventive detention was introduced to India during the colonial period and was largely used to target freedom fighters. It would therefore seem surprising that the Constitution allows both the union and state to enact preventive detention laws.
- Misuse of the Law: The state may refuse to divulge the grounds of detention if it is in the public interest to do so. This power conferred on the state leaves scope for arbitrary action on the part of the authorities.
- Against the Fundamental Rights: Part III of the Constitution, which deals with fundamental rights, also gives the the power to suspend these rights for preventive detention.
- Article 22 which provides Protection Against Arrest and Detention in Certain Cases expressly excludes preventive detention cases from direct judicial scrutiny and instead creates an administrative review framework.
- Detention on the Basis of Suspicion: The law authorizes the executive to arrest any person from whom reasonable suspicion arises that he can commit any cognizable offense and the police can arrest that person without warrant which is arbitrary in nature.
- Nature of Application of Law: In countries such as Britain, United States and Canada, preventive detention is a wartime measure. India is one of the few countries in the world whose Constitution allows for preventive detention during peacetime.

Way Ahead

- For preventive detention, there are very narrow grounds of judicial review because the Constitution emphasises the state's "subjective satisfaction" when ordering a detention.
- More safeguards can be provided to the detainee so that there is a narrow scope of misuse.
- Judges can ensure that the government has followed every procedure of law while using the preventive detention powers against individuals.

Demand to modify the 2G spectrum verdict

Syllabus :GS 2/Governance

In News

- The Centre moved the Supreme Court seeking modification of its verdict in the 2G spectrum case.

2G spectrum scam

- The alleged 2G spectrum allocation scam is said to have originated in 2008 when the then Congress-led United Progressive Alliance (UPA) government sold 122 2G licences on a first-come-first-serve (FCFS) basis to specific telecom operators.
- In its charge sheet filed in April 2011, the CBI alleged that there was a loss of 30,984 crore to the exchequer as a result of discrepancies in the allocation process.
- The Centre for Public Interest Litigation and Subramanian Swamy filed petitions in the top Court alleging a 70,000 crore scam in the grant of telecom licences in 2008.

Judgement

- The Supreme Court cancelled 122 telecom licences in the landmark 2G spectrum scam judgement while cautioning that an FCFS basis for the allocation of scarce natural resources can be prone to misuse.
- Advocating for competitive auctions instead, the Court said, "In our view, a duly publicised auction conducted fairly and impartially is perhaps the best method for discharging this burden
- Methods like first-come-first-served when used for alienation of natural resources/public property are likely to be misused by unscrupulous people who are only interested in garnering maximum financial benefit and have no respect for the constitutional ethos and values.
- It emphasised that the burden lies on the State to ensure that the "non-discriminatory method" of the auction is adopted "by giving wide publicity so that all eligible persons can participate in the process".

Centre's plea

- The Union government has moved an application to allocate spectrum administratively, bypassing auctions.
- An administrative allocation would give the government control over the selection of operators.

- The assignment of spectrum is required to discharge sovereign and public interest functions such as security, safety, and disaster preparedness.
- The Centre elaborated that administrative allocation is required when demand is lower than supply or for space communication.
- In such cases, it would be “more optimal and efficient for spectrum to be shared by multiple players, rather than being broken up into smaller blocks for the sole purpose of exclusive assignment”

GANHRI To Review India's Human Rights Accreditation Status

Syllabus: GS2/Polity

Context

- The Sub-Committee on Accreditation (SCA) of the UN-recognised Global Alliance of National Human Rights Institutions (GANHRI) is about to review India's human rights accreditation status.

About

- The National Human Rights Commission (NHRC) will defend the government's human rights processes at the meeting in Geneva.
- The NHRC's ratings were put on hold in 2023 over concerns on its composition procedure, the presence of police personnel in human rights investigations, and the lack of gender and minority representation.
- The decision over whether the NHRC is given an A rating or a B rating would affect its ability to vote at the UN Human Rights Council and some UNGA bodies.
- Since being accredited in 1999, India had retained its A ranking in 2006 and 2011, while its status was deferred in 2016 and restored after a year.

GANHRI and Accreditation

- GANHRI is one of the largest human rights networks worldwide.
- At an international workshop held in Tunis, Tunisia in 1993, a group of NHRIs set the foundation for the global network of national human rights institutions.
- It has its Head Office in Geneva and a governance structure representing NHRIs around the world.
- GANHRI is recognised, and is a trusted partner, of the United Nations.
- It has established strong relationships with the UN Human Rights Office, UNDP and other UN agencies.
- Members: It is a body of 120 members, of which 88 have “A” status accreditation, while 32 have “B” status”.
- GANHRI, through the Sub-Committee on Accreditation (SCA), is responsible for reviewing and accrediting NHRIs in compliance with the Paris Principles.
- Accreditation: To be effective in their work to promote and protect human rights, national human rights institutions must be credible and independent.
- The Paris Principles set out internationally agreed minimum standards that NHRIs must meet to be considered credible.
- The Paris Principles require NHRIs to be independent in law, membership, operations, policy and control of resources.
- They also require that NHRIs have a broad mandate; pluralism in membership; broad functions; adequate powers; adequate resources; cooperative methods; and engage with international bodies.
- It is a rigorous, peer-based process, undertaken by representatives of NHRIs from each of the four regions: Africa, Americas, Asia Pacific and Europe.
- A national human rights institution is reviewed by the SCA when:
 - it applies for initial accreditation;
 - it applies for re-accreditation every five years;
 - the circumstances of the NHRI change in any way that may affect its compliance with the Paris Principles.
- Significance: The Accreditation confers international recognition and protection of the NHRI.
- ‘A’ status accreditation also grants participation in the work and decision-making of the GANHRI, as well as the work of the Human Rights Council and other UN mechanisms.

Guidelines for the Elimination of Corporal Punishment in Schools (GECP)

Syllabus: GS2/Governance

Context

- The Tamil Nadu School Education Department has issued Guidelines for the Elimination of Corporal Punishment in Schools (GECP).

About

- The GECP includes safeguarding the mental well-being of students and conducting awareness camps to familiarise stakeholders with guidelines of the National Commission for Protection of Child Rights (NCPCR) for effective implementation.
- It also includes measures such as:
 - Promptly addressing any complaints related to corporal punishment,
 - extending the focus beyond eliminating corporal punishment to address any form of harassment or situations impacting students' mental health
 - and establish monitoring committees at each school comprising school heads, parents, teachers and senior students to oversee the implementation of guidelines and address any issues, were also part of the GECP.

Corporal Punishment

- Corporal punishment is the use of physical force against a child as a 'corrective' form of enforcing discipline.
- Usually, teachers who are unable to discipline their students take recourse to physical assault.
- Children are subject to corporal punishment in schools; institutions meant for care and protection of children such as hostels, orphanages, ashram shalas, and juvenile homes; and even in the family setting.
- Currently, there is no statutory definition of corporal punishment of children in Indian law.
- In keeping with the provisions of the RTE Act, 2009, corporal punishment could be classified as physical punishment, mental harassment and discrimination.

Perceptions on Corporal Punishment

- Punishing children is regarded as normal and acceptable in all settings – whether in the family or in institutions.
- It is often considered necessary in order that children grow up to be competent and responsible individuals.
- It is widely used by teachers and parents regardless of its evident lack of effectiveness, and potentially deleterious side-effects.
- This follows from the belief that those in whose care children are entrusted in school or other institutions are 'in loco parentis' and will therefore always act in the interests of the child.
- This notion needs to be reviewed in the light of the widespread violence that exists in all institutions occupied by children.

Consequences of Corporal Punishment

- Impact on Development of Child: It is now globally recognised that punishment in any form or kind in school comes in the way of the development of the full potential of children.
- When adults use corporal punishment it teaches their children that hitting is an acceptable means of dealing with conflict.
- Normalising Violence: Corporal punishment leads to adverse physical, psychological and educational outcomes – including increased aggressive and destructive behaviour.
- Children subjected to punishment prefer aggressive conflict resolution strategies with peers and siblings and they do not consider it a violation of their rights.
- Social Concerns: It can lead to poor school achievement, poor attention span, increased drop-out rate, school avoidance and school phobia, low self-esteem, anxiety, depression, suicide and retaliation against teachers – that emotionally scar the children for life.

Status of Corporal Punishment in India

- Section 17 (1) of the Right of Children to Free and Compulsory Education Act, 2009 expressly bans subjecting a child to mental harassment or physical punishment.

- Cruelty to children is also prohibited under the Juvenile Justice (Care and Protection of Children) Act, 2000.
- These laws hold teachers and adults liable for assault or Corporal punishment of children.
- Article 37 (a) of the United Nations Convention on the Rights of the Child, to which India is a signatory, says that no child should bear any torture, cruelty, or inhuman punishment.

Relevant Constitutional Provisions

- Violence against children is a violation of the right to live with dignity which is integral to the right to life under Article 21.
- Further, Corporal punishment serves as a deterrent to children from attending school and contributes to dropout rate.
- This goes against the Right to Education as a Fundamental Right guaranteed under Article 21-A of Constitution of India.
- Article 39 (e) of the Constitution directs the State to work progressively to ensure that the tender age of children are not abused.
- Article 39 (f) of the Constitution directs the State to work progressively to ensure that “children are given opportunities and facilities to develop in a healthy manner and in conditions of freedom and dignity and that childhood and youth are protected against exploitation and against moral and material abandonment.”

Government Initiatives

- The Juvenile Justice (Care and Protection of Children) Act, 2000 is an important statute that criminalises acts that may cause a child mental or physical suffering.
- Some provisions of the Scheduled Castes and Tribes (Prevention of Atrocities) Act, 1989 can be used to prosecute an adult in the general category who inflicts corporal punishment upon a scheduled caste or scheduled tribe child.
- Various provisions of the Protection of Civil Rights Act, 1955 can be used to prosecute a person/ manager/ trustee as well as warrant resumption or suspension of grants made by the Government to the educational institution or hostel on the ground of untouchability.
- The National Commission for Protection of Child Rights (NCPCR) and the State Commissions for Protection of Child Rights (SCPCRs) have been entrusted with the task of monitoring children’s right to education under Section 31 of the Right of Children to Free and Compulsory Education Act, 2009.

Suggestions

- The school should maintain the student-teacher ratio at the level as prescribed under the RTE Act, 2009, in order to avoid overcrowding and unmanageable class, leading to the practice of corporal punishment.
- All children should be informed through campaigns and publicity drives that they have a right to speak against physical punishments, mental harassment and discrimination.
- The teachers should be trained in the skills required to positively engage with children who are different in order to understand their predicaments.
- The conduct of the teacher and administration should be such that it fosters a spirit of inclusion, care and nurturing.
- A mechanism for children to express their grievances both in person and anonymously should be provided.

Supreme Court backs EVMs

Syllabus: GS2/Polity

Context

- The Supreme Court upheld the electronic voting machine (EVM) system of polling and refused a plea to revive paper ballots.

Supreme Court Judgement

- The court refused to hand over paper slips from Voter Verifiable Paper Audit Trail (VVPAT) units to electors to take a leisurely look before inserting them into the ballot boxes.
- It also declined to direct the cross-verification of 100% EVMs and VVPATs across the country.

- Currently, only five percent of EVM-VVPAT counts are randomly verified in any given Assembly constituency.
- It also directed the Election Commission of India (ECI) to “seal and secure” the Symbol Loading Unit (SLU) for 45 days after the declaration of election results.
- Currently, only the three components of the EVM — the ballot unit, control unit, and VVPAT — are stored for 45 days after the results.
- The court has allowed candidates to check the one-time programmable software in the BU (Ballot Unit), CU (Control Unit), and VVPAT for tampering, in case of any doubts regarding the result.
- This verification involves inspecting the burnt memory/ microcontrollers of these three components.

What are Electronic Voting Machines (EVMs)?

- It is a device used to electronically record and count votes cast in elections.
- EVMs were first used in 1982 in the Assembly constituency of Paravur in Kerala in 50 out of 123 booths.
- EVM has two parts, it consists of a ‘control unit’ and a ‘balloting unit’, connected by a 5-meter cable.
- The control unit is with the Election Commission-appointed polling officer and it is the brain of the EVM.
- The balloting unit is in the voting compartment into which the voter enters to cast the vote in secret by pressing the button against the name and symbol of the candidate of her choice.
- The balloting unit is turned on only after the polling officer presses the ‘Ballot’ button on it.

Voter Verified Paper Audit Trail (VVPAT)

- A VVPAT is intended as an independent verification system for voting machines designed to allow voters to verify that their vote was cast correctly.
- It contains the name of the candidate (for whom vote has been cast) and symbol of the party/individual candidate.
- When a vote is cast, the VVPAT machine, which is attached to the ballot unit (BU) of the EVM, prints out a slip of paper with the voter’s choice indicated on it.
- Though it remains behind glass, the printed slip is visible for seven seconds so the voter can see that the vote has been recorded correctly, before it falls into a box underneath.
- The idea of the VVPAT machine first emerged in 2010. However it was used for the first time in the Noksen Assembly constituency of Nagaland in 2013.
- The Conduct of Elections Rules, 1961 were amended in 2013 to allow for a printer with a drop box to be attached to the EVM.
- From 2017, 100% of VVPATs began to be used in polls, and the 2019 Lok Sabha elections became the first general election to have 100% of EVMs being attached to VVPATs.

What is a Symbol Loading Unit (SLU) ?

- The SLU is used to load the symbols of the candidates onto the VVPAT.
- Candidate-setting happens at any time from five to two days before voting at a seat. After loading the symbols onto the VVPAT, the SLU is of no relevance to the actual voting process.
- Once the symbol-loading is complete, the SLUs are handed over to the concerned district election officer for safekeeping. They remain in the officer’s custody until the day after voting.

Conclusion

- Overall, while the VVPAT system in India represents a significant step towards enhancing transparency and accountability in elections, it continues to face criticism and scrutiny regarding its effectiveness, cost, and implementation challenges.
- However “blind distrust” of an institution or a system breeds unwarranted skepticism and impedes progress.
- Addressing these concerns requires efforts to improve the reliability, accessibility, and public acceptance of the VVPAT system.

Reality of the Swachh Bharat Mission

Syllabus: GS2/Governance

Context

- India was ranked right at the bottom of 180 countries in the Environment Performance Index (EPI) in 2022.
- The ranking raises questions about the success of the Swachh Bharat Mission.

About

- The EPI ranks countries on climate change performance, environmental health, and ecosystem vitality.
- It measures 40 performance indicators across 11 issue categories, such as air quality, and drinking water and sanitation.
- The government responded to the rank saying the methodology is faulty and does not quantify the Indian scenario objectively.
- The Swachh Bharat Mission (SBM) aims to enable better living standards, so the poor ranking can be linked to the success of SBM.

What is the Swachh Bharat Mission?

- The Swachh Bharat (Clean India) Mission (SBM) was launched in 2014 with the goal of achieving universal sanitation coverage by 2019, as a tribute to the 150th Birth Anniversary of Mahatma Gandhi.
- It consisted of two sub-missions, urban, and rural or Gramin (G).
- The urban component of the mission is implemented by the Ministry of Urban Development, and the rural component by the Ministry of Drinking Water and Sanitation.
- SBM(G) sought to improve “the levels of cleanliness through Solid and Liquid Waste Management activities and making Gram Panchayats Open Defecation Free (ODF), clean and sanitized.
- SBM Phase II: The second phase, started in 2020-2021, expands efforts with a focus on safe management of solid and liquid waste and sustainability of ODF.
- An ODF Plus village is one which has sustained its Open Defecation Free (ODF) status along with implementing either solid or liquid waste management systems.
- It would transform villages from ODF to ODF Plus by 2024-25.

Achievements

- SBM Phase I: The programme led to the construction of over 10 crore individual household toilets, taking sanitation coverage from 39% in 2014 to 100% in 2019 when around 6 lakh villages declared themselves Open Defecation Free (ODF).
- While studies indicate that the SBM-G campaign led to significant economic, environmental and health impacts, contributing to the empowerment of women in particular, it also led to the achievement of SDG 6.2 (Sanitation and Hygiene), 11 years ahead of the stipulated timeline.
- SBM Phase II: 75% villages have achieved ODF Plus status under Phase II of the Mission.
- The top performing States/UTs which have achieved 100% ODF Plus villages are – Andaman & Nicobar Islands, D&N Haveli, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Ladakh, Puducherry, Sikkim, Tamil Nadu, Telangana, and Tripura.

Challenges in Implementing Swachh Bharat Mission

- Behavioral Change: One of the primary challenges has been changing deep-rooted cultural attitudes and behaviors towards cleanliness and sanitation.
- Encouraging people to adopt hygienic practices, such as proper waste disposal and toilet usage, requires sustained efforts in education and awareness campaigns.
- Infrastructure Development: Building adequate sanitation infrastructure, including toilets and waste management systems, especially in rural areas, has been a considerable challenge.
- Ensuring the availability of facilities in remote and economically disadvantaged regions requires significant investment and logistical planning.
- Maintenance of Infrastructure: Merely constructing toilets is not sufficient; ensuring their proper maintenance and usage over time is crucial.

- Many toilets constructed under SBM have faced issues of poor maintenance and non-functionality due to lack of ownership or awareness among users.
- Open Defecation: Despite efforts to eradicate open defecation, it remains prevalent in certain areas due to various factors such as lack of awareness, cultural practices, or inadequate toilet facilities.
- Changing these behaviors requires not only infrastructure development but also community engagement and behavior change communication.
- Waste Management: Proper solid and liquid waste management is essential for maintaining cleanliness and preventing environmental pollution.
- However, the infrastructure and systems for waste collection, segregation, and disposal are often inadequate, leading to issues such as littering and contamination of water sources.
- Funding and Resources: Adequate funding and resources are necessary for the successful implementation of SBM.
- While the government has allocated significant funds for the mission, ensuring effective utilization and allocation of resources at the grassroots level remains a challenge.

Way Ahead

- Addressing these challenges requires a multi-pronged approach involving not only government intervention but also active participation and cooperation from communities, civil society organizations, and other stakeholders.
- Sustainable solutions that address the root causes of sanitation and cleanliness issues, along with continuous monitoring and feedback mechanisms, are essential for the long-term success of the Swachh Bharat Mission.

Chapter- 3

GEOGRAPHY

Afar Depression

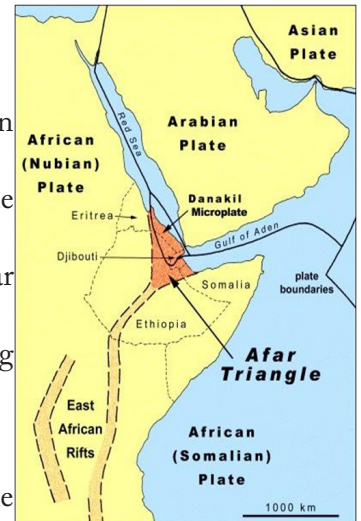
Syllabus: GS1/Geography

Context

- Geologists predict that the African continent's rift in the Afar Triangle could lead to the formation of a new ocean in 5 to 10 million years.

About

- The Afar Triangle is also known as the Afar Depression, located in the Horn of Africa.
- The Afar Triangle is a geological depression where three tectonic plates—the Nubian, Somali, and Arabian plates—converge.
- This area is part of the East African Rift system, which extends from the Afar region down through eastern Africa.
- The rifting process occurring here is a result of the tectonic plates slowly moving apart, a phenomenon that has been taking place for millions of years.



Formation of New Ocean

- In 2005, a 35-mile-long rift opened up in the Ethiopian desert, signaling the ongoing separation of the African continent.
- This rift is the surface expression of deep-seated tectonic forces at work, as the Somali plate moves away from the Nubian plate, stretching and thinning the Earth's crust.
- Geologists predict that in 5 to 10 million years, the tectonic movement will eventually split the African continent into two, creating a new ocean basin.
- This new body of water would be the result of the Red Sea and the Gulf of Aden flooding over the Afar region and into the East African Rift Valley.
- Consequently, this part of East Africa would evolve into its own distinct continent.

Impact of La Nina on Indian monsoon and Agriculture

Syllabus: GS1/Geography

Context

- The Asia-Pacific Economic Cooperation (APEC) Climate Center, has forecast the return of the La Nina phenomenon in India.

Monsoon forecast for India

- According to global weather agencies, India is likely to experience above-normal rains.
- It is predicted for the region spanning eastern Africa to the Arabian Sea, India, the Bay of Bengal, and Indonesia, the Caribbean Sea, the tropical North Atlantic, southern Australia, and the southern South Pacific.

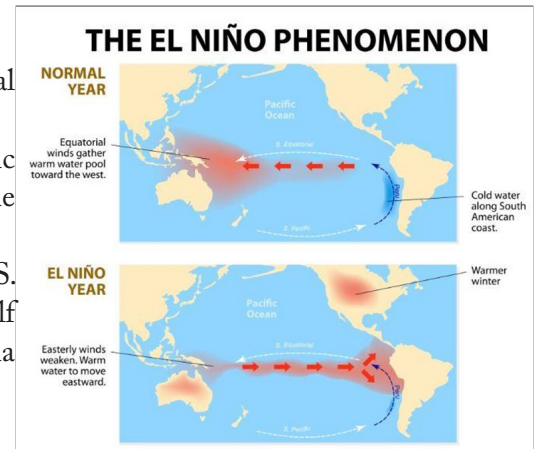
Ocean-Atmosphere system

- Normal Conditions:** During normal conditions in the Pacific ocean, trade winds blow west along the equator, taking warm water from South America towards Asia.
- To replace that warm water, cold water rises from the depths — a process called upwelling.
- The warmer surface waters near Indonesia create a region of low-pressure area, causing the air to rise upwards. This also results in formation of clouds and heavy rainfall.

- The air flow also helps in building up the monsoon system which brings rainfall over India.
- Abnormal Conditions: Both El Niño and La Niña usually begin to develop in the March to June season, reach their peak strength in the winters and then begin to dissipate in the post winter season.
- Both these phases typically last for a year, though La Niña, on an average, lasts longer than El Niño.
- While these phases alternate over a period of two to seven years, with the neutral phase thrown in between, it is possible for two consecutive episodes of El Niño or La Niña to occur.

What is El Niño?

- El Niño is the warming of seawater in the central-east Equatorial Pacific that occurs every few years.
- During El Niño, surface temperatures in the equatorial Pacific rise, and trade winds — east-west winds that blow near the Equator — weaken.
- Impact: El Niño causes dry, warm winters in the Northern U.S. and Canada and increases the risk of flooding in the U.S. gulf coast and southeastern U.S. It also brings drought to Indonesia and Australia.



What is La Niña?

- La Niña is the opposite of El Niño. La Niña witnesses cooler than average sea surface temperature (SST) in the equatorial Pacific region.
- Trade winds are stronger than usual, pushing warmer water towards Asia.
- Impact: This leads to drier conditions in the Southern U.S., and heavy rainfall in Canada. It has also been associated with heavy floods in Australia.

How does it affect the Indian Monsoon?

- In El Niño years, India faces warmer temperatures and less rainfall, causing droughts in some regions.
- This affects agriculture, water resources, and ecosystems.
- The El Niño phenomenon led to 1.4% decrease in food grain production for the 2023-24 (July-June) crop year.
- La Niña brings cooler sea surface temperatures, leading to increased rainfall in certain parts of India.

How is La Niña beneficial for India?

- Water resource management: Higher rainfall during La Niña events can improve water availability for irrigation.
- Increased agricultural productivity: La Niña tends to bring above-average rainfall during the monsoon season, which is crucial for agriculture in India.
- Lower food prices: Higher crop yields resulting from favorable weather conditions during La Niña events increases food supplies in the market.
- Power generation: In India, hydropower contributes significantly to the energy mix. Increased rainfall during La Niña events boost water levels in reservoirs, improving hydropower generation capacity.

Post Offices in Antarctica

Syllabus: GS1/Geography

Context

- Recently, the Chief Postmaster General Maharashtra Circle inaugurated the Bharati Branch Post Office at Bharati Station of Antarctica accompanied by the introduction of a new PIN code, MH-1718.

Brief History of Post Offices in Antarctica

- In 1984, shortly after the inaugural expedition to Antarctica, India established its first-ever post office at Dakshin Gangotri — the pioneering scientific base.
- The eventual submersion of Dakshin Gangotri under ice during the late 1980s, leading to its decommissioning.
- On January 26, 1990, a new post office branch emerged at India's Maitri research station in Antarctica.

Maitri and Bharati Post Offices

- These are research bases of India in Antarctica spanning a distance of 3,000 kms.
- They stand as a testament to the nation's enduring presence in the polar landscape, both falling under the purview of the Goa Postal Division.
- In practical terms, letters intended for Antarctica find their way to the National Centre for Polar and Ocean Research (NCPOR) in Goa, the pivotal hub for India's polar endeavours.

India and Antarctica

– India's engagement with Antarctica, the southernmost continent and site of the South Pole, traces back to 1981.
– It marked the initiation of the Indian Antarctic Programme, a multi-disciplinary, multi-institutional programme under the control of the NCPOR, Ministry of Earth Sciences.

- It gained global acceptance with India's signing of the Antarctic Treaty and subsequent construction of the Dakshin Gangotri (in 1983), Maitri (in 1989), Bharati (in 2012) were commissioned.
- Currently, India has two operational research stations in Antarctica: Maitri and Bharati.

–The Indian Antarctic Bill 2022

- It provides a regulatory framework and legal mechanisms for India's Antarctic activities.
- It aims at having India's own national measures for protecting the Antarctic environment as also the dependent and associated ecosystem.
- It proposes to set up the Indian Antarctic Authority (IAA) under the Ministry of Earth Sciences as the apex decision-making authority.

Catastrophic Soil Erosion

Syllabus: GS1/Geography; GS3/Conservation

Context:

- Recently, a study 'Geospatial modelling and mapping of soil erosion in India' classified soil erosion on a pan-India basis for the first time.

About Soil Erosion:

- The destruction of the soil cover is described as soil erosion.
- It involves the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity.
- Agents : Wind and water are powerful agents of soil erosion because of their ability to remove soil and transport it.
- Wind erosion is significant in arid and semi-arid regions.
- Erosion by running water is more significant in regions with heavy rainfall and steep slopes.
- Sheet erosion takes place on level lands after a heavy shower, and removes the finer and more fertile topsoil.
- Gully erosion is common on steep slopes.
- Gullies deepen with rainfall, cut the agricultural lands into small fragments and make them unfit for cultivation.
- According to Indian Council of Agricultural Research (ICAR), the extent of soil erosion, defined as soil loss more than 10 tonnes per hectare per year, in cultivable land of the country was 92.4 million hectares.

The Extent of the Problem:

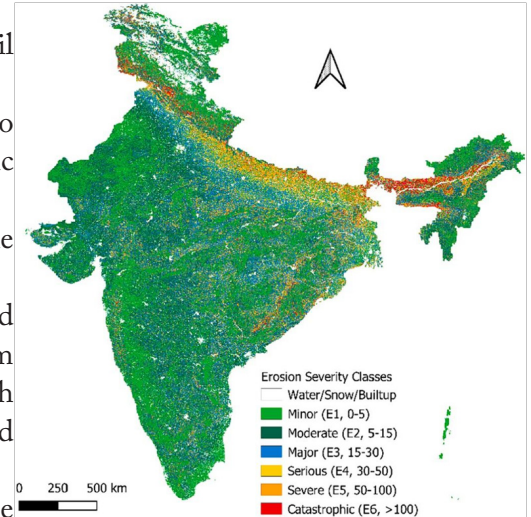
- The study came up with six classifications for soil erosion — ranging from 'minor' to 'catastrophic' — in terms of soil eroded in tonnes over a hectare over a year.
- It reveals that nearly 30% of India's landmass is experiencing minor soil erosion, while a critical 3% faces catastrophic topsoil loss.
- A region would be classified as 'catastrophic' if it reports over 100 tonnes of soil lost to erosion over a hectare during a year's time.

About Topsoil:

- It is the uppermost layer of soil, and is vital for agriculture as it holds nutrients and moisture essential for plant growth.
- The organic materials have got incorporated with the mineral matter, nutrients and water, which are necessary for the growth of plants.
- a. Erosion significantly reduces fertility and can lead to decreased crop yields.

The Worst-Affected Region:

- Brahmaputra Valley in Assam: It is the biggest hotspot for soil erosion in India.
- Data shows that the northeastern state of Assam lost close to 300 square kilometres or 31% of its surface soil to catastrophic erosion.
- It has severe implications for the state's agriculture and the livelihoods of its people.
- Lower reaches of the Himalayas: These regions are characterised by moraine or loose soil and highly unstable slopes. It spans from the Kashmir Valley to the southern regions of Himachal Pradesh and Uttarakhand and extends across the border into Nepal and parts of Odisha.
- Odisha, which differs markedly from the Himalayas and the Brahmaputra valley in terms of topography and biodiversity, is also another hotspot for 'catastrophic' erosion.
- This region stands as one of the most prominent erosion hotspots in the country, exacerbated by its susceptibility to seismic activity or earthquakes.



The Impact of Soil Erosion:

- Soil erosion of this magnitude has far-reaching consequences. According to the Food and Agriculture Organization (FAO) of the United Nations, it could take up to 1,000 years to produce 2 to 3 centimetres of topsoil.
- It means that the land lost to erosion will take centuries to regain its fertility.
- The loss of soil not only affects the fertility of the land but also leads to a decrease in the water-holding capacity of the soil, affecting the overall ecosystem.
- The increasing soil erosion is detrimental to the region's globally important biodiversity.

The Need for Action:

- The findings of this study underscore the urgent need for action. India needs a comprehensive strategy to combat soil erosion, which includes both preventive measures and efforts to restore eroded lands.
- Without such measures, the country's agricultural productivity could be severely impacted, threatening food security and rural livelihoods.

Conclusion:

- The study provides valuable insights into the extent and severity of soil erosion in India. It underscores the urgent need for strategies to prevent soil erosion and restore degraded lands.
- As the country strives to achieve its sustainable development goals, addressing soil erosion must be a top priority.

Mount Ruang

Syllabus: GS1/ Geography

In News

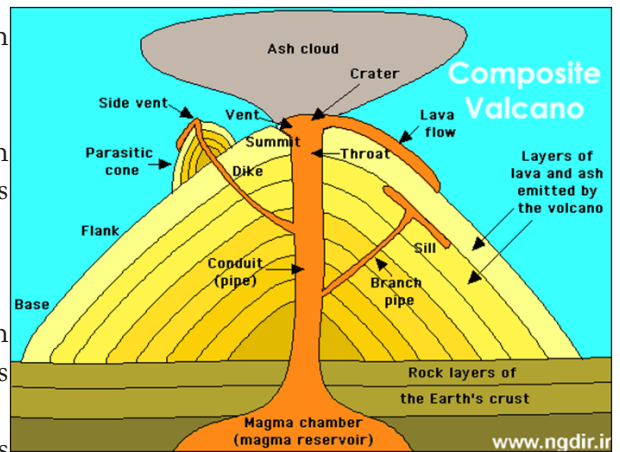
- A tsunami alert was issued in Indonesia after multiple eruptions of the Mount Ruang volcano.
- Indonesia, with 120 active volcanoes, faces frequent volcanic activity due to its location along the Ring of Fire.

What are Volcanic Eruptions?

- A volcano is a vent or fissure in Earth's crust through which lava, ash, rocks, and gases erupt.
- A volcano can be active, dormant or extinct.
- The magma is lighter than solid rock, it can rise through vents and fissures on the surface of the earth. After it has erupted, it is called lava.

Ring of Fire

- It is also called the Circum-Pacific Belt, which is a path along the Pacific Ocean characterized by active volcanoes and frequent earthquakes.
- It traces boundaries between several tectonic plates including the Pacific, Cocos, Indian–Australian, Nazca, North American, and Philippine Plates.
- It is home to about 75 per cent of the world's volcanoes and about 90 per cent of its earthquakes.
- Formation: The Ring of Fire is the result of the subduction of oceanic tectonic plates beneath lighter continental plates. The area where these tectonic plates meet is called a subduction zone.
- Here, the plate which is below at the convergent boundary is pushed down, or subducted, by the plate above. As the rock is subducted, it melts and becomes magma.



Seasonal Outlook for Hot Weather Season: IMD

Syllabus :GS 3/Environment

In News

- The India Meteorological Department (IMD) issued an updated Seasonal outlook for the hot weather season (April to June) 2024.

About

- Above-normal temperatures are likely to be recorded over most parts of the country
- During April May June hot weather season, above normal heatwave days are likely to occur over most parts of south peninsula, central India, east India and plains of northwest India.
- The El Niño however is likely to weaken during the upcoming season and eventually turn 'neutral'.
- Some models have even predicted the possibility of La Niña conditions developing during the monsoon, which can intensify rainfall across South Asia, particularly in India's northwest and Bangladesh.

Issues and Concerns

- Above-normal maximum and minimum temperatures can cause heat-related illnesses in people as well as affect agricultural output, cause water scarcity, increase the demand for energy, and affect ecosystems and air quality.
- The announcement comes even as India is already struggling to keep up with its power demand, which increases significantly during summer season.
- India's hydroelectricity output fell at the steepest pace in at least 38 years in the year ending March 31, 2024.
- Hydroelectric output will possibly remain low in the coming months as well, leading to a greater dependence on coal at a time when India has, in its Nationally Determined Contributions under the Paris Agreement, promised to reduce the emissions intensity of its GDP by 45% by 2030, compared to the 2005 level.

What is a heat wave?

- Qualitatively, a heat wave is a condition of air temperature which becomes fatal to the human body when exposed.
- Quantitatively, it is defined based on the temperature thresholds over a region in terms of actual temperature or its departure from normal.
- Heat waves in India are typically recorded between March and June, and tend to peak in May.

Criteria

- The IMD declares a heat wave if the maximum temperature of a weather station reaches at least 40 degrees C in the plains and at least 30 degrees C in hilly regions, with a departure of around 4.5-6.4 degrees C from the normal maximum temperature.
- The IMD can also declare a heat wave if the actual maximum temperature crosses 45 degrees C, and a 'severe heat wave' if it crosses 47 degrees C.

India Meteorological Department (IMD)

– It is an agency of the Ministry of Earth Sciences.

- It is the principal agency responsible for meteorological observations, weather forecasting and seismology.
- It is also one of the six Regional Specialised Meteorological Centres of the World Meteorological Organisation.
- IMD releases the long range forecast in two stages in April and June.

Viability of Green Hydrogen

Syllabus: GS3/Environment and Conservation

Context

- The Ministry of New and Renewable Energy (MNRE) has announced to support efforts to test the viability of green hydrogen as a fuel for cars and heavy vehicles.

Scheme Guidelines for Pilot Project





- The scheme will support development of technologies for use of Green Hydrogen as a fuel in Buses, Trucks and 4-wheelers, based on fuel cell/internal combustion engine-based propulsion technology.
- The other thrust area for the scheme is to support development of infrastructure such as hydrogen refueling stations.
- The scheme will also seek to support any other innovative use of hydrogen for reducing carbon emissions in the transport sector, such as blending of methanol/ethanol, based on green hydrogen and other synthetic fuels derived from green hydrogen in automobile fuels.

What is hydrogen

- Hydrogen is the chemical element with the symbol H and atomic number 1.
- Hydrogen is the lightest element and the most abundant chemical substance in the universe, constituting roughly 75% of all normal matter.
- It is colorless, odorless, tasteless, non-toxic, and highly combustible gas.

Extraction of Hydrogen

- Hydrogen exists in combination with other elements.
- Hence, for using it as a source of energy, it has to be extracted from naturally occurring compounds like water (which is a combination of two hydrogen atoms and one oxygen atom).
- Green hydrogen refers to hydrogen that is produced using renewable energy sources, such as wind, solar, or hydropower, through a process called electrolysis.
- Electrolysis involves splitting water (H₂O) into hydrogen (H₂) and oxygen (O₂) using an electric current.
- When this electricity comes from renewable sources, the hydrogen produced is considered “green” because the overall process has a minimal environmental impact.
- Grey Hydrogen: It involves extracting hydrogen from natural gas through a process called steam methane reforming (SMR).
- This process releases carbon dioxide (CO₂) as a byproduct, contributing to greenhouse gas emissions.
- Blue Hydrogen: It involves capturing and storing the CO₂ emissions generated during the production of hydrogen from natural gas.

Color	GREY HYDROGEN	BLUE HYDROGEN	TURQUOISE HYDROGEN*	GREEN HYDROGEN
Process	SMR or gasification	SMR or gasification with carbon capture (85-95%)	Pyrolysis	Electrolysis
Source	Methane or coal 	Methane or coal 	Methane 	Renewable electricity 

Note: SMR = steam methane reforming.
* Turquoise hydrogen is an emerging decarbonisation option.

Significance of Green Hydrogen

- **Zero Emissions:** Unlike conventional hydrogen production methods that rely on fossil fuels, green hydrogen production emits no greenhouse gases or pollutants, making it a zero-emission energy carrier.
- **Energy Storage:** Green hydrogen can serve as a means of storing excess renewable energy generated during periods of low demand for later use, helping to balance the grid and enhance energy security.
- **Versatile Applications:** Hydrogen can be used as a fuel in various sectors including transportation, industry, and heating.
- **Economic Opportunities:** The transition to green hydrogen presents significant economic opportunities, including job creation, investment in new infrastructure, and the growth of related industries such as electrolyzer manufacturing and hydrogen fuel cell technology.
- **Climate Mitigation:** By replacing fossil fuels with green hydrogen, countries can reduce their carbon emissions and contribute to global efforts to mitigate climate change.

Challenges

- **Risks associated with the transportation:** Hydrogen in gaseous form is highly inflammable and difficult to transport, thereby making safety a primary concern.
- **Higher Cost:** Green hydrogen production is currently more expensive than conventional methods, primarily due to the high cost of renewable energy sources and electrolysis technology.
- **Lack of fuel station infrastructure:** India will need to compete with around 500 operational hydrogen stations in the world today which are mostly in Europe, followed by Japan and South Korea.

Way Ahead

- Increasing renewable energy use across all economic spheres is central to India's Energy Transition.
- Hydrogen offers the possibility to decarbonize applications, end uses, and sectors that have been traditionally difficult to tackle with other clean energy solutions.
- Hydrogen is expected to be used widely in the transportation sector in the coming years, and as a large and growing market for both vehicles and energy.
- India stands to gain significantly from the large-scale adoption of green hydrogen as vehicular fuel.

Evolution and Essentials of India's Climate Policy

Syllabus: GS3/Environment and Climate Change

Context:

- India's climate policy has evolved significantly over the years, reflecting the country's commitment to addressing the challenges posed by climate change.

The Evolution of India's Climate Policy:

- India's climate change policies have primarily focused on supporting synergies between development and climate outcomes, and it has always been clear, consistent, and coordinated.
- After the Rio Summit of 1992, the Divisions of Climate Change and Biodiversity in India's then Ministry of Environment and Forests came to life slowly and steadily.
- The Rio Summit of 1992 saw the emergence of the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) and Forest Principles.

Do You Know?

- India has been a consistently strong voice of the Global South: the CBDR-RC (Common But Differentiated Responsibilities and Respective Capabilities) principle was developed largely through Indian interventions at the Rio Summit, 1992.
- India has been clear that the problem of climate change is the result of overexploitation of natural resources by developed countries.

Consumption by Developed Countries:

- The US accounts for 27% of the world's excess material use, followed by the EU (25%). Other rich countries such as Australia, Canada, Japan, and Saudi Arabia were collectively responsible for 22%.
- a. High-income countries with only 16% of the world's population are responsible for 74% of excess resource use over their fair share.
- China has also overshoot its sustainability limit by 15% of resource overuse.
- Over the same period, 58 countries representing 3.6 billion people — including India, Indonesia, Pakistan, Nigeria, and Bangladesh — stayed within their sustainability limits.
- While India is within the limits of its sustainability, the high-income countries must reduce resource use by ~70% from existing levels to reach the sustainability range.

Major Determinants of India's Climate Policy:

- Geography: The Indian landmass has an area of 3.28 million sq km, accounting for 2.4% of the world's geographical land surface area and 4% of the world's freshwater resources.
- India is the seventh largest country in the world.
- It is one of the 17 mega-biodiverse countries, having four biodiversity hotspots, 10 biogeographic zones, and 22 agro-biodiversity hotspots.
- Population: India's 1.4 billion people account for almost one-sixth of humanity.
- It is home to 7-8% of the world's recorded species, with more than 45,500 species of plants and 91,000 species of animals documented so far.
- The human to land ratio is very low in India at 0.0021 sq km, and is continuing to recede.
- Impacts: The Global Climate Risk Index (2020) prepared by Germanwatch puts India as the fifth most affected country in terms of experiencing extreme weather events, a sharp rise from its 14th position in 2017.
- The World Bank report on the Impact of Climate Change on South Asia predicts that rising temperatures and changing monsoon rainfall patterns could cost India 2.8% of its GDP and depress the living standards of nearly half the country's population by 2050.
- Worldview: Our worldview is shaped by our ancestors — of living in harmony and consonance with nature.
- The 'Prithvi Sukta' says that the Earth is our Mother, and sacred groves tell us that the idea of protection of nature and natural resources is seeped in our way of life.
- Gandhi's ideals of standing up for the last man, trusteeship, and the ability of the Earth to provide enough for everyone's need and not anyone's greed represents a continuous strain of thought since time immemorial.
- Actions: The logo of the Ministry of Environment, Forest and Climate Change (MoEFCC) — 'Nature Protects if She is Protected' — shows our reverence, respect for nature, and our focus towards conserving it.
- Despite having historical cumulative emissions of less than 4% (1850-2019) and 1.9 tonnes CO₂ per capita emissions, India has not dissuaded itself from taking resolute domestic and international actions that benefit the planet.

Role of Supreme Court in Climate Policy:

- The Supreme Court of India has recognized the links between ecology, human dignity, and climate change and made important connections between human rights and global warming mitigation.
- It stated, 'Without a clean environment which is unimpacted by the vagaries of climate change, the right to life is not fully realised'.
- It noted that the right to a healthy environment, safe from the ill-effects of climate change, was a 'fundamental human right'.
- The court linked the right against climate change to Articles 21 (right to life) and 14 (right to equality), stating that the rights to life and equality could not be fully realised without a clean, stable environment.

- It highlighted the interconnection between climate change and various human rights, including the right to health, indigenous rights, gender equality, and the right to development.

Conclusion:

- India's climate policy is informed by its vision of inclusive growth for all-round economic and social development, the eradication of poverty, declining carbon budget, firm adherence to the foundational principles of the UNFCCC, and climate-friendly lifestyles.
- It has created international institutions like the International Solar Alliance (ISA) to focus on the transition to renewable energy, separated carbon emissions from economic growth, Coalition for Disaster Resilient Infrastructure (CDRI) and the Global Biofuels Alliance (GBA).
- As the world grapples with the effects of climate change, India's climate policy will continue to evolve, reflecting the country's commitment to sustainable development and environmental protection.

Science Based Targets initiative (SBTi)

Syllabus: GS3/Environment

Context

- The SBTi recent declaration of allowing companies to utilize carbon offsets to fulfill their climate commitments has gathered widespread criticism

About

- The Science Based Targets initiative (SBTi) is a corporate climate action organization that enables companies and financial institutions worldwide to play their part in combating the climate crisis.
- SBTi perform various function such as;
- Defines and promotes best practice in emissions reductions and net-zero targets in line with climate science.
- Develops standards, tools and guidance to enable companies and financial institutions to set science-based targets in line with the latest climate science.
- Through its validation services arm, it assesses and validates companies and financial institutions targets.

What is a carbon offset?

- A carbon offset refers to a way by which organizations or individuals can cut down on their carbon dioxide emissions from the atmosphere.
- These reductions are achieved through projects that either capture and store carbon or prevent emissions from occurring in the first place, such as through renewable energy projects, reforestation initiatives, and methane capture from landfills.
- Companies or individuals purchase carbon offsets to compensate for their own carbon emissions, thereby "offsetting" their environmental impact and contributing to climate change mitigation efforts.

Hydrocarbons Extraction

Syllabus: GS 1/Natural Resources /GS 3/Environment

In News

- Recently, the geological processes, extraction methods, and environmental impact of hydrocarbon extraction seen in the news .

About 'hydrocarbon'

- The term 'hydrocarbon' is self-explanatory which means compounds of carbon and hydrogen only.
- Over millennia, mighty geological processes in the earth's crust heated and compressed together pieces of life-forms that had been dead for a while. Eventually, this mulch of organic matter accumulated as hydrocarbons inside rock formations.
- Categories: Depending upon the types of carbon-carbon bonds present, they can be classified into three main categories –
- Saturated Hydrocarbons are the important sources of energy and they contain carbon-carbon and carbon-hydrogen single bonds.

- Unsaturated : They contain carbon-carbon multiple bonds – double bonds, triple bonds or both
- Aromatic hydrocarbons: They are a special type of cyclic compounds
- Occurrence: The most common forms in which these hydrocarbons exist in subterranean rock formations are natural gas, coal, crude oil, and petroleum.
- They are usually found in underground reservoirs created when a more resistant rock type overlays a less resistant one, in effect creating a lid that causes hydrocarbons to accumulate below it.
- Such formations are important because otherwise, the hydrocarbons would float to the surface and dissipate.
- Experts use the tools, methods, and techniques of the field of petroleum geology to assess these rocks, including to check for their porosity and permeability.
- If a rock formation is highly porous, it could hold a larger quantity of hydrocarbons.
- The primary source of hydrocarbons in this rocky underground is called kerogen: lumps of organic matter.
- Kerogen can be deposited from three possible sources: as the remains of a lake (lacustrine), of a larger marine ecosystem, or of a terrestrial ecosystem.
- Lacustrine kerogen yields waxy oils; marine kerogen, oil and gas; and terrestrial kerogen, light oils, gas, and coal.
- Applications : Hydrocarbons are sources of energy and are also used for the manufacture of polymers like polythene, polypropene, polystyrene etc.
- Higher hydrocarbons are used as solvents for paints. They are also used as the starting materials for manufacture of many dyes and drugs

Extraction

- Drilling and reservoir engineers are responsible for extracting as much of the hydrocarbons .
- The first task is to create a production well, the principal hole through which the reservoir will be drained to the surface; its location is chosen to maximise the amount of drainage.
- The production profile of a well can be split into three phases:
- Primary : It banks on natural processes, like pressure differences between the reservoir and the well and less dense compounds floating to the top
- Secondary : are concerned with inducing artificial pressure in the rock to maintain the differential (e.g. by injecting water into it or diluting the hydrocarbon mix to help it flow better).
- Tertiary : focused on forcing the remainder into the well. Steam injection is a common example of such an enhanced recovery method.
- The process of recording the rock cuttings by depth and studying their properties is called mud-logging.
- Once the production well has been drilled, it has to be prepared to drain the hydrocarbons – a step called completing.

Handling of depleted well

- A well abandoned needs to be plugged so that its contents – both the hydrocarbons and the gases accumulating in the borehole – don't escape into their surroundings.
- The most exhaustive way to conclude operations at a well, whether on land or offshore, is to decommission it, but this process is expensive and often commercially infeasible for the proponent.
- Improperly abandoned wells are a major source of methane emissions – to go with the emissions released during the production and use of various components required to extract hydrocarbons.

Sovereign Green Bonds

Syllabus: GS3/Mobilisation of Resources; Conservation

Context

- Recently, the Reserve Bank of India (RBI) allowed investments in the country's Sovereign Green Bonds (SGB) by Foreign Institutional Investors (FIIs).

Sovereign Green Bonds (SGB)

- These are a kind of government debt that specifically funds projects attempting to accelerate India's transition to a low carbon economy.

- These bonds are specifically earmarked for funding green projects, assets, and expenditures that contribute to environmental sustainability and climate objectives.

Why has RBI allowed FIIs to invest in its Green Bonds?

- **Attracting Foreign Investments:** By allowing FIIs to invest in green bonds, India attracts foreign capital into its green projects.
- FIIs are investors such as insurance companies, pension funds and nation-states' sovereign wealth funds.
- **Widening the Pool of Capital:** Allowing FIIs to invest in India's green projects expands the sources of funding available for the country's ambitious climate goals, including achieving net zero emissions by 2070 and increasing the share of non-fossil fuel-based energy sources to 50%.
- **Meeting Climate Commitments:** India pledged at COP26 to reduce India's carbon emission by 45% and increase the share of renewable energy in the country's energy mix.
- **Diversification of Investments:** FIIs are looking to diversify their portfolios and seek opportunities in green investments due to regulatory support, particularly in developed countries.
- India's Sovereign Green Bonds Framework (2022), addresses concerns about greenwashing by providing a credible framework for green investments.

Fourth Global Mass Coral Bleaching

Syllabus: GS3/ Environment

In News

- The National Oceanic and Atmospheric Administration (NOAA) revealed the fourth global mass coral bleaching event has started due to ocean temperatures.

About

- The first mass bleaching took place in 1998 in which 20% of the world's reef areas suffered bleaching-level heat stress.
- The next two global bleaching events occurred in 2010 (35% of reefs affected) and between 2014 and 2017 (56% of reefs affected).
- The fourth global bleaching event is currently underway. Nearly 54 countries, territories and local economies — from Florida, the US, Saudi Arabia to Fiji — have confirmed bleaching.

Reason for Rising Temperature & Bleaching

- The primary reason behind the soaring temperatures is the rising emissions of heat-trapping greenhouse gases (GHGs) such as carbon dioxide and methane in the atmosphere. Nearly 90% of the extra heat trapped by GHGs has been absorbed by the oceans.
- The rise in temperature has been exacerbated by El Niño, a weather pattern which is associated with warmer oceans.
- Coral Bleaching could have serious consequences for ocean life and millions of people who rely on reefs for food, jobs, and coastal defence.

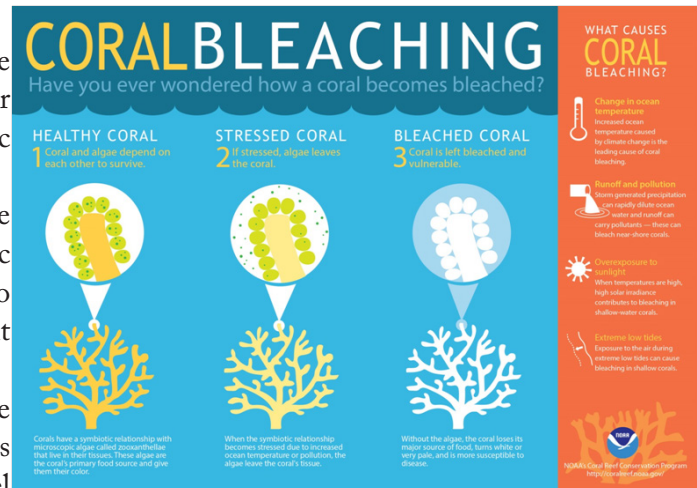
What are Coral & Coral Reefs?

- Corals are essentially animals, which are sessile, meaning they permanently attach themselves to the ocean floor.
- Each individual coral animal is known as a polyp and it lives in groups of hundreds to thousands of genetically identical polyps that form a 'colony'.
- Corals are largely classified as either hard coral or soft coral. It is the hard corals that are the architects of coral reefs.
- Unlike soft corals, hard corals have stony skeletons made out of limestone that are produced by coral polyps. When polyps die, their skeletons are left behind and used as foundations for new polyps.
- **Geographical Conditions:** Temperature: 20°C- 35°C; Salinity: Between 27% to 40%. Coral reefs grow better in shallow water; less than 50 m.
- Australia's Great Barrier Reef (World Heritage Site) is the largest in the world, stretching across 2,028 kilometers.

- Coral reefs in India: Gulf of Kutch, Gulf of Mannar, Andaman & Nicobar, Lakshadweep Island and Malvan.

Coral Bleaching

- Most corals contain algae called zooxanthellae — they are plant-like organisms — in their tissues. Corals and zooxanthellae have a symbiotic relationship.
- While corals provide zooxanthellae a safe place to live, zooxanthellae provide oxygen and organic products of photosynthesis that help corals to grow and thrive. Zooxanthellae also give bright and unique colours to corals.
- Corals are very sensitive to light and temperature and even a small change in their living conditions can stress them. When stressed, they expel zooxanthellae and turn entirely white. This is called coral bleaching.
- Coral bleaching doesn't immediately lead to the death of corals. Coral bleaching reduces the reproductivity of corals and makes them more vulnerable to fatal diseases.
- Global mass bleaching of coral reefs is when significant coral bleaching is confirmed in the Atlantic, Indian and Pacific oceans.



Importance of Corals

- Coral reefs, also referred to as “rainforests of the sea”, have existed on the Earth for nearly 450 million years.
- Thousands of marine species can be found living on one reef.
- These massive structures also provide economic goods and services worth about \$375 billion each year. More than 500 million people across the world depend on coral reefs for food, income and coastal protection from storms and floods.
- Coral reefs can absorb up to 97% of the energy from waves, storms, and floods, which prevents loss of life, property damage, and soil erosion.

Way Ahead

- To curb global warming to no more than 1.5 degree Celsius, countries need to bring GHG emissions to a net zero by 2050, according to the Paris Agreement.
- Steps needed in direction of Climate resiliency (Paris agreement, SDG 8 & 12)
- R & D for heat resistant corals.

Europe is the World's Fastest-Warming Continent

Syllabus: GS3/Environment

Context

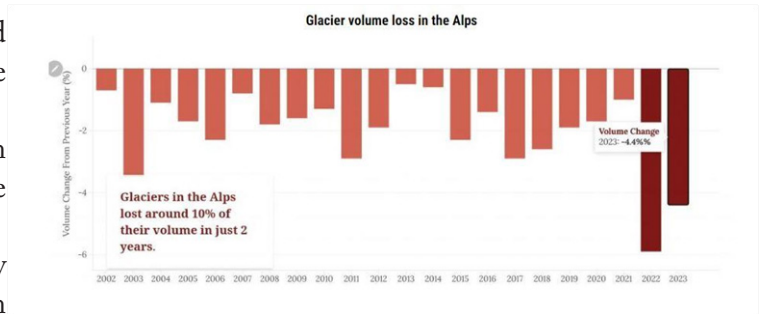
- Europe is the world's fastest-warming continent as per the U.N.'s World Meteorological Organisation and the European Union's climate agency.

Major Findings

- Europe is the fastest-warming continent and its temperatures are rising at roughly twice the global average.
- The latest five-year averages show temperatures in Europe are now running 2.3 degrees C above pre-industrial levels, compared to 1.3 degrees C higher globally.
- Extreme Heat Stress: The continent experienced the most number of days with ‘extreme heat stress’ and a decrease in the number of days with ‘cold stress’.
- The global meteorological agency defines ‘extreme heat stress’ as the condition when the ‘feel like’ temperature is higher than 46°C.
- Loss of Glacier Volume: Because of the consistent and rapid heating, the Alps mountain range, which

consists of Europe's highest peak Mont Blanc, lost 10 percent of its glacier volume in the last two years, 2022 and 2023.

- In 2023, the glacier's on the range reduced in volume by 4.4 percent compared to the previous year.
- More energy in Europe was generated from renewables than from fossil fuels for the second year running.
- The continent generated 43% of its electricity from renewable resources last year, up from 36% the year before.
- The report focuses this year on the impact of high temperatures on human health, noting that deaths related to heat have risen across the continent.
- More than 150 lives were lost directly last year in connection with storms, floods and wildfires.
- The cost of weather- and climate-related economic losses in 2023 were estimated at more than 13.4 billion euros.



Climate Change

- Climate change refers to long-term shifts in global or regional climate patterns.
- It's primarily driven by human activities, such as burning fossil fuels, deforestation, and industrial processes, which release greenhouse gases like carbon dioxide (CO₂) and methane into the atmosphere.
- These gases trap heat, causing the Earth's temperature to rise—a phenomenon known as global warming.
- Impact: It threatens the essential ingredients of good health – clean air, safe drinking water, nutritious food supply and safe shelter – and has the potential to undermine decades of progress in global health.

Greenhouse Gases

- Gases that trap heat in the atmosphere are called greenhouse gases. The gases act like the glass walls of a greenhouse – hence the name, greenhouse gases.
- Without this greenhouse effect, temperatures would drop to as low as -18°C (-0.4°F); too cold to sustain life on earth.
- CO₂ accounts for 64 percent of the global warming effect, while methane accounts for 16 percent and nitrous oxide accounts for 7 percent.
- Three industrial fluorinated gases – hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF₆) – are solely man-made during industrial processes and do not occur in nature.
 - a. Though they are present in very small concentrations in the atmosphere, they trap heat very effectively, meaning they are extremely potent.

UN Framework Convention on Climate Change (UNFCCC)

- It is an international treaty established to address the global challenge that came into force in 1994.
- Aim: To stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system.

Key features of the UNFCCC:

- Parties and Membership: The Convention has 198 members.
- Conference of the Parties (COP): It is the supreme decision-making body of the UNFCCC and COP meetings are held annually.
- Funds to Developing Countries: Industrialized nations agree under the Convention to support climate change activities in developing countries by providing financial support for action on climate change—above and beyond any financial assistance they already provide to these countries.
- Kyoto Protocol: It was adopted in 1997 and establishes legally binding emission reduction targets for developed countries.
- It operates under the framework of the UNFCCC and has its own decision-making body, the Meeting of the Parties to the Kyoto Protocol (CMP).

- Paris Agreement: Adopted in 2015 at COP21 in Paris, it is an international treaty that builds upon the UNFCCC.
- It aims to limit global warming to below 2 degrees Celsius above pre-industrial levels, with efforts to limit the increase to 1.5 degrees Celsius.
- The Paris Agreement emphasizes nationally determined contributions (NDCs) and encourages all countries to take climate action.

India's Efforts to Combat Climate Change

- Renewable Energy Expansion: India has set ambitious targets for renewable energy generation, aiming to increase its capacity significantly.
- The country has invested heavily in solar and wind energy projects, with the goal of reducing reliance on fossil fuels and lowering greenhouse gas emissions.
- International Commitments: India is a signatory to the Paris Agreement, committing to reduce its carbon intensity and increase the share of non-fossil fuel energy sources in its total energy mix.
- India has announced its aim to meet 50% of its electricity demands from renewable energy sources by 2030.
- Afforestation and Forest Conservation: Recognizing the role of forests in carbon sequestration and climate regulation, India has initiated programs to increase forest cover, restore degraded lands, and promote sustainable forest management practices.
- Clean Transportation: India is promoting the adoption of electric vehicles (EVs) and has set a target of 30% EV market share by 2030.
- The government has introduced incentives and subsidies to support the production and adoption of EVs.
- Climate Resilience: India is investing in measures to enhance climate resilience and adaptation, particularly in vulnerable sectors such as agriculture, water resources, and coastal areas.
- This includes the development of climate-resilient crop varieties, water conservation techniques, and disaster preparedness measures.
- International Cooperation: India actively participates in international forums and collaborations on climate change, engaging in initiatives such as the International Solar Alliance and the Coalition for Disaster Resilient Infrastructure.

Need of Global Plastics Treaty

Syllabus: GS3/Environment, Conservation, Environment Pollution & Degradation

Context

- Negotiators and observers from 175 countries arrived in Ottawa, Canada, to begin talks regarding the very first global treaty to curb plastics pollution.

Background

- Under the UN Environment Assembly Resolution 5/14, the Intergovernmental Negotiating Committee (INC) is responsible for delivering a global plastics treaty by the end of 2024.
- The INC began its work during the second half of 2022. It is the fourth round of negotiations and the final round will take place in South Korea.

What is Plastic?

– Plastic refers to a wide range of synthetic or semi-synthetic materials that use polymers as a main ingredient with their defining quality being their plasticity – the ability of a solid material to undergo permanent deformation in response to applied forces.

– Most modern plastics are derived from fossil fuel-based chemicals like natural gas or petroleum.

Polymers used in Plastics

– The polymers used in plastic production are: Polyethylene terephthalate or PET, High-density polyethylene or HDPE, Polyvinyl chloride or PVC, Low-density polyethylene or LDPE, Polypropylene or PP, and Polystyrene or PS.

– Each of these have different properties and can be identified by their resin identification code (RIC) denoted by symbols found on plastic products.

Concerns of Plastic Pollution

- Plastics are hard to eradicate due to their slow decomposition rate in natural ecosystems.
- Plastics break down into their smaller units called microplastics, which find their way across the planet, from the depths of the Pacific Ocean to the heights of the Himalayas.

- BPA or Bisphenol A, the chemical which is used to harden the plastic contaminates food and drinks, causing alterations in liver function, fetal development in pregnant women, the reproductive system and brain function.
- Plastic, which is a petroleum product, also contributes to global warming. If plastic waste is incinerated, it releases toxic fumes and carbon dioxide into the atmosphere.
- Plastic waste damages the aesthetic value of tourist destinations, leading to decreased tourism-related incomes and major economic costs related to the cleaning and maintenance of the sites.

Why is a global plastics treaty needed?

- Plastic production increased from just 2 million tonnes in 1950 to more than 450 million tonnes in 2019. If left unchecked, the production is slated to double by 2050, and triple by 2060.
- As plastic takes anywhere from 20 to 500 years to decompose, and less than 10% has been recycled till now. According to a 2023 study published by The Lancet nearly 6 billion tonnes now pollute the planet
- About 400 million tonnes of plastic waste is generated annually, a figure expected to jump by 62% between 2024 and 2050.
- According to a report by the Organisation for Economic Co-operation and Development (OECD), in 2019, plastics generated 1.8 billion tonnes of GHG emissions — 3.4% of global emissions.
- Roughly 90% of these emissions come from plastic production.

Global Efforts In Tackling Plastic Waste

- London Convention: The 1972 Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter.
- Clean Seas Campaign: The United Nations Environment Programme launched the Campaign in 2017. It became the largest global campaign to raise awareness on plastic pollution and marine litter.
- Basel Convention: In 2019, the Basel Convention was amended to include plastic waste as a regulated material.
- The Convention contains three main entries on plastic wastes in Annex II, VIII and IX of the Convention. The Plastic Waste Amendments of the convention are now binding on 186 States.

India's Efforts In Tackling Plastic Waste

- Extended Producer Responsibility (EPR): The Indian government has implemented EPR, making plastic manufacturers responsible for managing and disposing of the waste generated by their products.
- Plastic Waste Management (Amendment) Rules, 2022: It prohibits manufacture, import, stocking, distribution, sale and use of plastic carry bags having thickness less than 120 microns.
- Swachh Bharat Abhiyan: It is a national cleanliness campaign, which includes the collection and disposal of plastic waste.
- Plastic Parks: India has set up Plastic Parks, which are specialized industrial zones for recycling and processing plastic waste.
- Beach clean-up drives: The Indian government and various non-governmental organizations have organized beach clean-up drives to collect and dispose of plastic waste from beaches.

Challenges to the treaty

- Some of the biggest oil and gas-producing countries, as well as fossil fuel and chemical industry groups are trying to narrow the scope of the treaty to focus just on plastic waste and recycling.
- Countries like Saudi Arabia, Russia, and Iran have opposed plastic production caps, and are using myriad delay tactics (like arguing over procedural matters) to derail constructive dialogues.
- Countries are yet to decide if the plastics treaty would be agreed upon by consensus or through a majority vote
- There is a coalition of around 65 nations, known as the “High-Ambition Coalition” which seeks to tackle plastic production.
- The US has not joined the HAC as it is a fossil gas country.

Way Ahead

- The proposed treaty will be the most important environmental accord since the 2015 Paris Agreement on climate change, in which nations agreed to cut greenhouse gas (GHG) emissions.

- The treaty can theoretically lay out guidelines on how rich nations should help poorer ones meet their plastic reduction target.
- It may also ban “particular types of plastic, plastic products, and chemical additives used in plastics, and set legally binding targets for recycling and recycled content used in consumer goods.

Heatwaves

Syllabus :GS 3/Environment

In News

- Recently, large geographical areas in India experienced heatwave conditions.

Heat wave

- Qualitatively, a heat wave is a condition of air temperature which becomes fatal to the human body when exposed.
- Quantitatively, it is defined based on the temperature thresholds over a region in terms of actual temperature or its departure from normal.

Criterion

- Heat wave is considered if the maximum temperature of a station reaches at least 40°C or more for Plains and at least 30°C or more for Hilly regions.

a) Based on Departure from Normal

Heat Wave: Departure from normal is 4.5°C to 6.4°C

Severe Heat Wave: Departure from normal is >6.4°C

b) Based on Actual Maximum Temperature

Heat Wave: When actual maximum temperature $\geq 45^{\circ}\text{C}$

Severe Heat Wave: When actual maximum temperature $\geq 47^{\circ}\text{C}$

- For coastal stations in India : When maximum temperature departure is 4.50°C or more from normal, Heat Wave may be described provided the actual maximum temperature is 37°C or more.

Favourable conditions

- Transportation / Prevalence of hot dry air over a region (There should be a region of warm dry air and appropriate flow pattern for transporting hot air over the region).
- Absence of moisture in the upper atmosphere (As the presence of moisture restricts the temperature rise).
- The sky should be practically cloudless (To allow maximum insulation over the region).
- Large amplitude anticyclonic flow over the area.
- El Niño leads to extreme heat in many parts of the world and the ocean.

Areas in India are prone to heatwaves

- The Core Heatwave Zone (CHZ) spanning central, north, and peninsular India between Gujarat and West Bengal is prone to heatwave conditions every year, during the summer season March to June and occasionally in July.
- Rajasthan, Punjab, Haryana, Chandigarh, Delhi, West Madhya Pradesh, Uttar Pradesh, Chhattisgarh, Odisha, Vidarbha in Maharashtra, parts of Gangetic West Bengal, coastal Andhra Pradesh, and Telangana are the most heat-wave-prone states or regions.

Impacts

- Population exposure to heat is increasing due to climate change
- The health impacts of Heat Waves typically involve dehydration, heat cramps, heat exhaustion and/or heat stroke
- Heatwaves can burden health and emergency services and also increase strain on water, energy and transportation resulting in power shortages or even blackouts.

- Food and livelihood security may also be strained if people lose their crops or livestock due to extreme heat.
- Affect agricultural output, cause water scarcity, increase the demand for energy, and affect ecosystems and air quality.

Initiatives

- Governments at various levels — State, district, and city — have prepared heat action plans (HAPs).
- HAPs aim to increase preparedness and lower the adverse impacts of extreme heat by outlining strategies and measures to prepare for, address, and recover from heat waves.
- The National Disaster Management Authority and IMD are reported to be working with 23 States to develop HAPs.
- The Election Commission of India has issued an advisory to manage the impact of heat waves during voting, including carrying a water bottle and protecting oneself from direct sunlight.

Suggestions

- The focus should be given to passive cooling inside buildings through better ventilation, window shading, reflective paints, suitable building materials, and traditional methods.
- Understanding heat hotspots, increase in green-blue structures, access to cool spaces, support for suitable adaptation measures, and multisectoral health-centric heat action plans are relevant.
- Assessing patterns of socio-economic, demographic, and environmental factors, access to basic services, disease distribution, existing institutional mechanisms, and preparedness helps to take stock of the situation and to prioritise resource allocation for vulnerable populations, and strengthen institutional responses.

Warming of Indian Ocean

Syllabus: GS3/ Environment

Context

- According to the Indian Institute of Tropical Meteorology (IITM), From 1950-2020, the Indian Ocean had become warmer by 1.2°C and climate models expect it to heat up a further 1.7°C–3.8°C from 2020–2100.

Key Highlights

- Marine heatwaves: Marine heatwaves are expected to increase tenfold from the current average of 20 days per year to 220–250 days per year. The tropical Indian Ocean will likely be in a “near-permanent heatwave state.
- It causes habitat destruction through coral bleaching, seagrass loss and the degradation of kelp forests, adversely affecting the fisheries sector.
- The heat content of the Indian Ocean, when measured from surface to a depth of 2,000 meters, is currently increasing at the rate of 4.5 zetta-joules per decade, and is predicted to increase at a rate of 16–22 zetta-joules per decade in the future.
- Joule is a unit of energy and one zetta-joule is equal to one billion-trillion joules (10^{21}).
- Thermal expansion: Rising heat content causes the volume of water to increase, called the thermal expansion of water.
- It is responsible for more than half of the sea-level rise in the Indian Ocean -larger than the changes arising from glacier and sea-ice melting.
- The frequency of extreme dipole events is predicted to increase by 66% whereas the frequency of moderate events is to decrease by 52% by the end of the 21st century.

What are marine heat waves?

– A marine heat wave is an extreme weather event. It occurs when the surface temperature of a particular region of the sea rises to 3 or 4 degree Celsius above the average temperature for at least five days. MHWs can last for weeks, months or even years.

– Marine heatwaves can occur in summer or winter – they are defined based on differences with expected temperatures for the location and time of year.

Consequences of extreme heating

- It has significant repercussions for the southwest monsoon season, which provides about 70 per cent of India’s annual rainfall.

- The warming could also lead to more frequent and intense extreme weather events, such as tropical cyclones and floods, as well as a rise in sea levels due to thermal expansion.
- The Indian Ocean Dipole (IOD), is also expected to change due to the warming of the Indian Ocean.
- In the positive phase of the IOD, when the western parts of the Indian Ocean are warmer than the eastern parts, monsoon rainfall generally increases across many regions in India and the rest of South Asia.
- In the negative phase, when the western parts of the ocean are cooler than the eastern parts, less than normal rainfall is observed during the post-monsoon period in northwestern India.
- The pH levels of the ocean's waters are projected to decrease from about 8.1 currently to 7.7 by the end of the century.
- Changes in pH may be detrimental since many marine organisms are sensitive to the change in ocean acidity.

Way Ahead

- Addressing the impending challenges in the Indian Ocean demands a multifaceted approach. Reducing GHG emissions and building climate-resilient infrastructure are the most effective strategies to mitigate the current and future impacts of warming.
- Conserving marine ecosystems through sustainable practices and improving forecasting capabilities can strengthen the region's resilience to extreme weather events.

G7 countries agree to end use of coal power by 2035

Syllabus: GS3/Environment

Context

- Energy and climate ministers from the G7 group of industrialized nations have agreed to phase out by 2035 the use of coal power where the emissions have not been captured.

About

- The non-governmental organization had called for the G7 to set an earlier 2030 phaseout date for power generation by coal, and a 2035 deadline for gas-fired supplies.
- Together the G7 makes up around 38 percent of the global economy and was responsible for 21 percent of total greenhouse gas emissions in 2021.

Coal Sector in India

- Coal Reserves: India has significant coal reserves, and it is one of the world's largest coal producers.
- The major coal fields in India are located in the eastern states of Jharkhand, Odisha, and West Bengal, as well as in central states like Chhattisgarh and Madhya Pradesh.
- Coal Production: India is among the top 3 leading coal producers globally. The Coal India Limited (CIL) is the state-owned coal mining company and the largest government-owned-coal-producer in the world.
- Coal Consumption: The power demand in India is surging. In 2022, the requirement grew about 8 – 9%.
- Industrial and commercial activity are among the biggest consumers of energy in the country.
- Import and Export: Despite being a significant coal producer, India has also been importing coal to meet the growing demand.
- This is due to issues such as transportation challenges and the need for specific types of coal for certain industries.

Concerns in phasing Out of Coal Power Plants

- Currently, out of the total energy produced in the country, only 22% is from renewable sources. Fossil fuels, mainly coal, still provide 75% of India's power supply.
- Dependency on Natural Factors: Energy sources like solar and wind are variable as they rely on natural factors like sunlight, wind and water availability.
- To ensure a steady supply, India has to heavily invest in battery storage.
- Concerns in Hydropower Projects: Numerous hydropower projects are under construction or in the planning stages in the Himalayan region.
- But they have come under fire as the projects have caused ecological damage and raised concerns about the potential conflicts over water resources in the area.

- Nuclear Energy: The country's plans to generate energy with the help of nuclear power plants have not really taken off.
- During 2021-22, the plants produced about 3.15% of the total electricity generated in India.
- Infrastructure Development: The transition to renewable energy requires significant infrastructure development.
- The speed and scale of this infrastructure development can be a challenge for a country as large and diverse as India.
- Grid Integration: Integrating renewable energy into the existing power grid is a complex task.
- The grid must be flexible and capable of handling fluctuations in supply.

Steps Taken by Government for Transition to Renewable Energy Sources

- India aims to reach 500 GW of renewable energy capacity by 2030, about three times the current capacity of about 180 GW.
- National Solar Mission (NSM): It was launched in 2010, it has set ambitious targets for solar capacity installation, including grid-connected and off-grid solar power projects.
- Green Energy Corridors: The Green Energy Corridor project focuses on enhancing the transmission infrastructure to facilitate the integration of renewable energy into the national grid.
- Renewable Purchase Obligation (RPO): This requires power distribution companies and large electricity consumers to procure a certain percentage of their power from renewable sources, encouraging the demand for renewable energy.
- Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM): It includes the installation of solar pumps, solarization of existing grid-connected agricultural pumps, and the establishment of solar power plants on barren or fallow land.
- International Solar Alliance (ISA): India played a key role in establishing the International Solar Alliance, a coalition of solar-resource-rich countries to address their energy needs through the promotion of solar energy.

Concluding Remark

- The agreement marks a significant step in the direction indicated last year by the COP28 United Nations climate summit for a transition away from fossil fuels, of which coal is the most polluting.
- It helps accelerate the shift of investments from coal to clean technology in particular in Japan and more broadly in the whole Asian coal economy, including China and India.

Group of Seven (G7)

– It is an intergovernmental organization of seven countries that are the world's most industrialized and developed economies.

– Member: France, Germany, United Kingdom, Italy, United States of America, Canada and Japan.

– History: It traces its origin to an informal meeting of the Finance Ministers of France, West Germany, the US, Great Britain and Japan (Group of Five) in the wake of the 1973 oil crisis.

A. Canada joined the group in 1976 and the European Union (EU) began attending the meetings from 1977.

B. It was called the G8 after the original seven were joined by Russia in 1997 and it returned to being called G7 when Russia was expelled as a member in 2014 following the latter's annexation of the Crimea region of Ukraine.

Trend in Solar Power Generation Potential in India

Syllabus: GS3/Environment

Context

- A study by the India Meteorological Department (IMD) has revealed a significantly decreasing trend in solar power generation potential in the country.

Major Highlights of the Study

- The study titled "Understanding the climatology and long-term trends in solar radiation using ground based in-situ observations in India," is authored jointly by six scientists, and has been published by IMD.

- Investigation by Authors: They investigated the climatology and trends of global radiation (GR), diffuse radiation (DR), bright sunshine hours (BHS) and technical potential of solar photovoltaic power (SPV) using data procured from IMD for the period 1985–2019.
- Decrease in SPV Potential: There is an alarming decreasing trend in the solar photovoltaic potential in all the selected stations which is likely to continue in the near future as well. It would negatively impact energy production from solar resources.
- Reduction in GR: The study points towards a significant reduction in GR in all parts of the country except the extreme northwest.
- Reduction in GR is attributed to the increased atmospheric turbidity and cloudiness.
- Increase in DR: A significant increase in DR has been observed in more than 50 percent of the stations, especially in the northwest and some parts of peninsular India.
- Decrease in BHS: Pointing out that BHS has significantly decreased in 75 percent of the selected stations, the study brings out that the annual BHS is high in northwest India but low in north, north-east and southern peninsular India.
- Causative Factors: Increased aerosol load — fine particles from carbon emissions, fossil fuel burning and dust — and clouding are said to be causative factors.
- Aerosols absorb the sunlight and deflect it away from the ground and they can also precipitate the formation of dense clouds that again block sunlight.
- The efficiency of solar panels are significantly influenced by the amount of sunlight incident on them.
- Global Trends on Solar Radiation: The role of aerosols in blocking sunlight available on earth has been apparent since the 1980s, several studies have shown that there are variations both over time as well as location.
- Global solar radiation showed a generally decreasing trend from 1981-2006. 1971-2000 showed greater dimming compared to 1981-2006.
- However, on the whole, there was a reversal in trends after 2001 with the exact causes unclear.

Significance of Solar Energy

- Impact on Climate of Earth: Solar radiation has an important role in governing the earth's surface-atmosphere energy exchange and climate of the Earth.
- It modulates global energy balance and changes the climate and hydrological cycle.
- Reliance of Various Sectors: Various sectors such as agriculture, energy, industry, etc. directly or indirectly depend on the incoming solar radiation.
- Source of Clean Energy: Solar energy has been recognized as an alternative to conventional energy resources.
- Amongst all the clean technologies, solar energy serves as an effective renewable energy resource to mitigate greenhouse gas emissions and reduce global warming.
- Crucial for Self Dependency: Solar energy is one of the resources capable of self-reliant energy generation, reducing foreign energy dependence.

India's Solar Energy

– Capacity: As of today, India's installed solar power capacity is about 81 GW (1 GW is 1,000 megawatt), or roughly 17% of the total installed electricity.

a. India's largest solar parks are located in the north-west, particularly Gujarat and Rajasthan.

– India's Goals: India has ambitious plans of sourcing about 500 GW, nearly half its requirement of electricity, from non-fossil fuel sources by 2030.

a. This would mean at least 280 GW from solar power by that year or at least 40 GW of solar capacity being annually added until 2030.

Way Ahead

- The technical potential of solar power has a significant decreasing trend in most of the selected stations which is alarming.
- It necessitates the wide use of solar panels with better efficiency to meet the energy requirements from solar resources.

Vietnamese Methods to Reduce Methane

Syllabus: GS3/Environmental Pollution/Agriculture

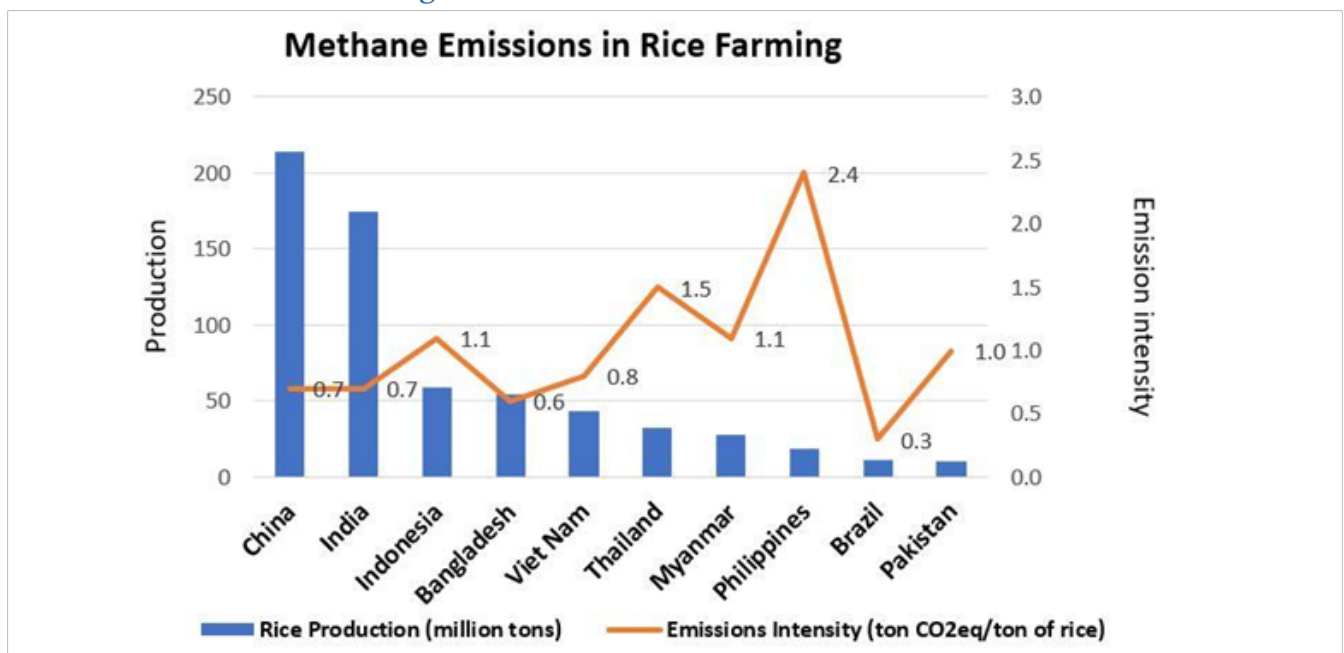
Context

- Vietnamese rice farmers are pioneering new methods to cut down on methane emissions.

Vietnamese Model of Rice Cultivation

- Irrigation Methods: Vietnamese Rice farmers are adopting a water-saving irrigation technique called alternate wetting and drying (AWD). AWD reduces methane emissions because it keeps paddies moist but not constantly flooded, unlike traditional methods.
- Using Drones: To save the labour costs they are opting drone technology.
- Stubble Disposal: Once crops are harvested, he no longer burns the rice stubble — a major cause of air pollution in Vietnam. Instead, it's collected by the Loc Troi Group for sale to other companies that use it as livestock feed and for growing straw mushrooms, a popular addition to stir-fries.

Rice Cultivation & Climate Change



- Rice is a semi-aquatic plant cultivated in flooded fields, where it thrives under a layer of stagnant water.
- This creates the ideal anaerobic conditions for bacteria to thrive on decomposing organic matter (mainly rice straw residue) and release methane.
- Poor absorption by the rice plant of nitrogen-based fertilizers, often overused by farmers, leads to nitrous oxide emissions.
- This phenomenon contributes significantly to global methane emissions, with rice production alone accounting for approximately 10% of these emissions worldwide.

India's Methane Emissions through Agriculture

- India's methane emissions in 2016 were 409 million tone CO₂e of which, 73.96% was from Agriculture sector, 14.46% from Waste sector, 10.62% from Energy sector and 0.96% was from Industrial Processes and Product Use sector.
- The two predominant sources of methane emissions in India are enteric fermentation and paddy cultivation.

Measures to Reduce Methane Emissions

- National Mission on Sustainable Agriculture (NMSA): This mission by the Ministry of Agriculture & Farmers Welfare promotes climate-resilient practices, including techniques that reduce methane emissions during rice cultivation.
- Livestock Management: The National Livestock Mission promotes practices that can reduce methane emissions from livestock. These practices include:

- Green fodder production
- Silage making
- Chaff cutting
- Total mixed ration feeding
- Biogas Programs: The New National Biogas and Organic Manure Programme (NNBOMP) and the Gobar-Dhan scheme encourage the use of biogas produced from cattle dung and organic waste.
- Though India has opted various measures, however, India is not currently part of the Global Methane Pledge, an international agreement to reduce methane emissions by 30% by 2030.

Status of National Clean Air Programme (NCAP)

Syllabus :GS 3/Environment

In News

- The National Clean Air Programme missed the 2024 target to push back pollution.

What is the NCAP?

- It was launched by the Ministry of Environment, Forest and Climate Change in January 2019 as a comprehensive initiative in partnership with various Ministries and States to improve air quality at city, regional and national level.
- It aims to improve air quality in 131 cities (non-attainment cities and Million Plus Cities) in 24 States by engaging all stakeholders.
- Features : Under NCAP, cities continuously violating annual PM levels in India need to prepare and implement annual Clean Air Action Plans (CAAPs).
- To facilitate this, the Ministry of Environment, Forest, and Climate Change has allocated 10,422.73 crore.
- NCAP envisages reduction by 20-30% in PM 10 concentration over baseline in 2017 by 2024.
- Target has been revised to achieve reduction in PM10 level up to 40% or achievement of national standards (60 µg/m³) by 2025-26.

Issues and Concerns

- Most cities proactively submitted their Clean Air Action Plans(CAAPs) yet their implementation has been inconsistent.
- On average, only 60% of the allocated funds have been used thus far, according to the Ministry, with 27% of cities spending less than 30% of their designated budgets.
- Implementation delays hinder NCAP's success, particularly delays in approvals from the competent authorities (for example, the technical specification of tendering processes or for procuring products such as mechanical sweepers and electric buses).
- There is also a lack of standard operating procedures for the implementation process.
- Time-consuming tasks required to implement control measures and the absence of well-defined timelines create further delays.
- Yet other reasons include bureaucratic red-tape and lingering doubts regarding the effectiveness of proposed mitigation measures.
- Pollution from high-emitting industries and other sources outside city limits, carried into urban areas by winds complicates urban air-quality management.
- According to the Portal for Regulation of Air-pollution in Non-Attainment cities, only 37% of cities have completed EI and SA studies, meaning the remaining 63% don't have a clear idea about what is polluting their air.

Role of scientific tools

- Emissions Inventory (EI) and Source Apportionment (SA) studies are critical to identify and understand the origins of pollution.
- EIs provide insights into local pollution sources and their contributions, allowing experts to forecast future emissions based on demographic shifts and technological advancements across sectors, among other factors.
- EIs also help shape targeted pollution control strategies.

- They have their limitations, too, particularly in assessing the impact of transboundary pollution sources — such as when determining the effect of stubble-burning outside Delhi on the city’s air quality.
- SA studies offer a detailed analysis of contributions from various pollution sources, including those located afar.
- However, they aren’t suited for predictive analysis and require substantial resources, including specialised personnel and equipment for chemical analysis.
- SA studies also can’t distinguish between the origins of pollution, like, say, emissions from diesel trucks 200 m away and 20 km away, because diesel emissions have similar chemical signatures.
- These gaps can be bridged through AQ modelling, which informs our understanding of pollution dispersion, including from distant sources.

Conclusion and Way Forward

- The cities should look into EI and SA data to pinpoint air pollutants and prepare mitigation measures targeting each polluting activity.
- Based on the potential and infrastructure requirements, cities need to set proper yearly targets and fund them.
- Many existing control measures focus only on primary PM emissions, neglecting their secondary precursors.
- A shift towards comprehensive strategies addressing both primary and secondary pollutants is thus important.
- Beyond the need for data and models, swift implementation on the ground is essential.
- For this, implementation agencies should seek to reduce bureaucratic red tape by utilising shared, standardised technical evaluations.
- As NCAP funding is linked with the performance of cities (based on the annual average PM concentration reduction), prior budgeting and time management play crucial roles.
- Technical feasibility, budgeting, and time estimates need to be part of the initial plans.
- The journey towards cleaner air in India, as charted by NCAP, will be difficult but is necessary.
- NCAP’s success hinges on a multifaceted approach that combines rigorous scientific studies, strategic funds, and swift and effective implementation of mitigation measures.

Chapter-
5**SCIENCE & TECHNOLOGY****Genetic Profiling****Syllabus: GS 3/S&T****In News**

- The Wildlife Institute of India (WII) is carrying out the genetic profiling to add the details of the elephants to a national database.
- WII is an autonomous institution under the Ministry of Environment, Forest and Climate Change with the objective of advancing wildlife research, education, and conservation in the country.

What is Genetic profiling?

- It is an Information about changes in specific genes, gene expression, or chromosomes in cells or tissue of a person.
- They may also be a sign that a person has an increased risk of developing a specific disease or condition or of having a child or other family member with the disease or condition.
- A genetic profile may be used to help diagnose disease, plan treatment, or find out how well treatment is working.
- In forensic science, genetic profiling is used for identifying individuals based on DNA evidence, such as in criminal investigations or paternity testing.

Fukushima Water Issue**Syllabus: GS3/Science and Technology, Disaster Management****Context**

- Japanese and Chinese Experts held talks to assuage concerns over the discharge of treated radioactive wastewater from the Fukushima Daiichi nuclear power plant into the sea.

About

- The discharges have been opposed by fishing groups and neighboring countries, especially China, which banned all imports of Japanese seafood.
- China's move has largely affected Japanese scallop growers and exporters to China.

What is the Fukushima Water Issue?

- In 2021, Japan's government announced plans to release over one million tonnes of contaminated water from the Fukushima nuclear plant into the sea over the next 30 years.
- The wastewater is a byproduct of the catastrophic 2011 earthquake and tsunami, which disabled the Fukushima Daiichi nuclear power plant, leading to the release of radioactive materials.
- After more than a decade of storing this wastewater, Japan says they are running out of storage space, and allege that the now treated water is safe for release.

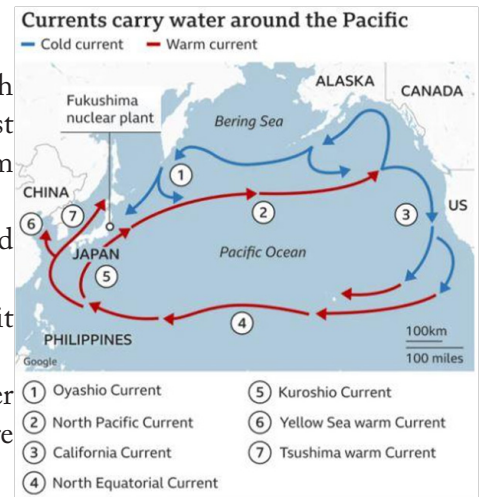
Nuclear Disasters

- A nuclear and radiation accident is an event that has led to significant consequences to people, the environment or the facility.
- Examples include lethal effects to individuals, large radioactivity release to the environment, or reactor core melt.
- Worldwide there have been 99 accidents at nuclear power plants.
- Fifty-seven accidents have occurred since the Chernobyl disaster, and 57% of all nuclear-related accidents have occurred in the USA.

- Serious nuclear power plant accidents include the Fukushima Daiichi nuclear disaster (2011), Chernobyl disaster (1986), Three Mile Island accident (1979), and the SL-1 accident (1961).

Concerns Over the Fukushima Water Release

- Tritium and Carbon-14: Fukushima water is filtered through Advanced Liquid Processing System (ALPS), which reduces most radioactive substances to acceptable safety standards, apart from tritium and carbon-14.
- Both emit very low levels of radiation, but can pose a risk if consumed in large quantities.
- Lack of Study: The scientists say it requires more studies on how it would affect the ocean bed and marine life.
- The Pacific Islands Forum regional group has called the plan “another major nuclear contamination disaster”, as several of its members are still dealing with the consequences of US nuclear testing.



Nuclear Energy Summit 2024

- First ever Nuclear Energy Summit was recently held in Brussels.
- It highlighted the role of nuclear energy in addressing the global challenges to reduce the use of fossil fuels, enhance energy security and boost economic development.
- The Summit comes in the wake of the historic inclusion of nuclear energy in the Global Stocktake agreed at the UN Climate Change Conference (COP28) in Dubai in 2023.

Artificial Sun Produced Heat of 100 Million Celsius for a Record Period

Syllabus: GS3/Science and Technology

Context

- South Korean scientists have been able to produce heat of 100 million Celsius for a record period of 48 seconds through Artificial Sun.

About

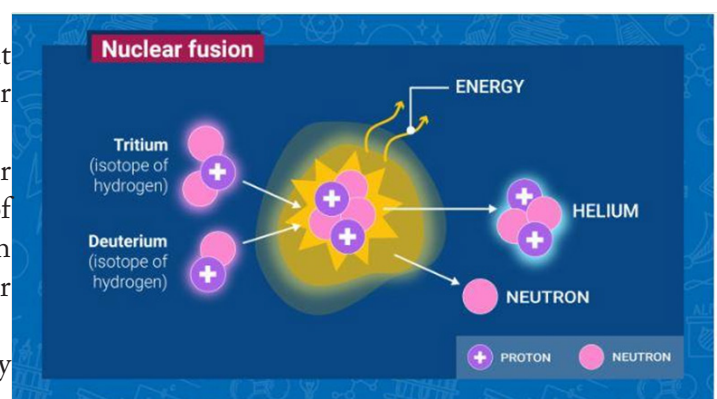
- The Korea Institute of Fusion Energy’s (KFE) Korea Superconducting Tokamak Advanced Research (KSTAR) fusion reactor reached temperatures seven times that of the Sun’s core.
- The temperature of the core of the Sun is 15 million degrees Celsius.

Artificial Sun

- It is a nuclear fusion reactor facility, and it is called an “artificial sun” because it mimics the nuclear fusion reaction that powers the real sun – which uses hydrogen and deuterium gases as fuel.
- Scientists generally use a donut-shaped reactor called a tokamak in which hydrogen variants are heated to extraordinarily high temperatures to create a plasma.

What is Nuclear Fusion?

- Nuclear fusion is the process by which two light atomic nuclei combine to form a single heavier one while releasing massive amounts of energy.
- Fusion reactions take place in a state of matter called plasma — a hot, charged gas made of positive ions and free-moving electrons with unique properties distinct from solids, liquids or gases.
- The sun, along with all other stars, is powered by this reaction.
- Process: The Deuterium (H-2) and Tritium (H-3) atoms are combined to form Helium (He-4). A free and fast neutron is also released as a result.



- The neutron is powered by the kinetic energy converted from the 'extra' mass left over after the combination of lighter nuclei of deuterium and tritium occurs.

Significance of Fusion energy?

- **Clean Energy:** Nuclear fusion — just like fission — does not emit carbon dioxide or other greenhouse gases into the atmosphere, so it could be a long-term source of low-carbon electricity from the second half of this century onwards.
- **More Efficient:** Fusion could generate four times more energy per kilogram of fuel than fission (used in nuclear power plants) and nearly four million times more energy than burning oil or coal.
- **Fusion fuel is plentiful and easily accessible:** Deuterium can be extracted inexpensively from seawater, and tritium can potentially be produced from the reaction of fusion-generated neutrons with naturally abundant lithium.
- **These fuel supplies would last for millions of years.**
- **Safer to Use:** Future fusion reactors are also intrinsically safe and are not expected to produce high activity or long-lived nuclear waste.
- Furthermore, as the fusion process is difficult to start and maintain, there is no risk of a runaway reaction and meltdown.

Carbon Fibre

Syllabus: GS 3/S&T

In News

- India is planning to manufacture carbon fibre for use in aerospace, civil engineering and defence as an alternative to metal

About Carbon Fibre

- Carbon fiber is made by heating a carbon-containing material, such as polyacrylonitrile (PAN), rayon, or pitch, to a very high temperature in an inert atmosphere.
- The main features include the high modulus and specific tensile strength calculated by the excellence of the graphite crystallites.
- **Applications:** Carbon fiber composites are very strong and lightweight, and they are also corrosion-resistant and have a good electrical conductivity. This makes them ideal for use in a variety of applications, including:
 - Aircraft manufacturing
 - Automotive manufacturing
 - Sports equipment
 - Medical devices
- **Status in India:** Currently, India does not produce any carbon fibre, relying entirely on imports from countries such as the US, France, Japan and Germany.

Atomic Clock

Syllabus: GS3/Science and Technology

Context:

- Recently, India is willing to join an exclusive group of four other countries — the US, the UK, Japan, and South Korea — to have their own atomic clocks.

About the Atomic Clock

- It is a type of clock that uses the vibrations of atoms to measure time with extraordinary precision.
- They are the most accurate timekeeping devices in the world, with the ability to measure billionths of a second.

Working:

- Most modern clocks keep time using a quartz crystal oscillator.
- These devices take advantage of the fact that quartz crystals vibrate at a precise frequency when voltage is applied to them.

- However, by space navigation standards, quartz crystal clocks aren't very stable.
- After only an hour, even the best-performing quartz oscillators can be off by a nanosecond (one billionth of a second), and after six weeks, they may be off by a full millisecond.
- Atomic clocks combine a quartz crystal oscillator with an ensemble of atoms to achieve greater stability.
- NASA's Deep Space Atomic Clock will be off by less than a nanosecond after four days and less than a microsecond (one millionth of a second) after 10 years.

Atomic Clocks in Space Navigation

- To determine a spacecraft's distance from Earth, navigators send a signal to the spacecraft, which then returns it to Earth.
- The time the signal requires to make that two-way journey reveals the spacecraft's distance from Earth, because the signal travels at a known speed (the speed of light).

Atomic Clocks in India:

- India's NAVIC satellite navigation system works on Indian atomic clocks.
- ISRO and the National Physical Laboratory (NPL) have signed an MoU under which the latter will help authenticate precise timings for the space agency, and also end its dependence on the US-built GPS.

NICES Programme

Syllabus: GS3/Science and Technology; Environment

Context:

- Recently, the National Information System for Climate and Environment Studies (NICES) programme invited Indian researchers to join in combating climate change.

About the NICES Programme:

- It is a programme operated by the Indian Space Research Organisation (ISRO) and the Department of Space, along with other ministries and institutions under the framework of the National Action Plan on Climate Change (NAPCC).
- It was conceptualised in 2012 to meet the ongoing challenge of monitoring climate variability and climate change from space.
- It functions under the guidance of the NICES – Programme Management Council (PMC).

Objectives:

- To generate and disseminate long-term Essential Climate Variables (ECVs), derived from Indian and other Earth Observation (EO) satellites, which are crucial for characterising Earth's climate.
- NICES has developed and made accessible over 70 geophysical variables related to Terrestrial, Ocean, and Atmospheric conditions.
- Key focus areas are Space-based ECVs and Climate Indicators, Climate Change Challenges, Weather Extremes, Climate Services, etc

Shallow Fakes

Syllabus:GS 3/IT & Computers

In News

- The influx of shallow fakes on social media is increasing every day.

About Shallow fakes

- Shallow fakes or cheap fakes are pictures, videos and voice clips created without the help of AI technology but by either editing or by using other simple software tools.
- Shallow fake videos are manually altered or selectively edited.
- They can be created easily, in some cases it can be just a clipped video being shared without any context.

The difference between deepfakes and shallow fakes

Deep Fakes	Shallow fakes
Deep Fakes describe photorealistic and audio-realistic images, video and audio created or manipulated with artificial intelligence to deceive.	Shallow fakes or cheap fakes are made with existing technologies—for example a conventional edit on a photo, or slowing-down a video to change the speech patterns of an individual, or more often rely on mis-captioning or mis-contextualising an existing image or video, claiming it is from a time or place which it is not from.

Technology Behind Manufacturing a Semiconductor Chip

Syllabus: GS3/Science and Technology

Context

- With supply chain disruptions during the pandemic and recent geopolitical tensions, many countries, including India, have realised the importance of investing in chip manufacturing infrastructure.

About the Semiconductor Chip

- A semiconductor has properties between a conductor, which conducts electricity, and an insulator, which does not.
- In its purest form, a semiconductor is a very weak conductor of electricity.
- However, its electrical properties can be changed by adding small amounts of certain substances called ‘dopants’.
- By taking a pure semiconductor and carefully injecting certain parts with specific dopants, complex circuits can be ‘printed’ on the semiconductor.

The Role of Transistors:

- The transistor, one of the earliest electronic components to be built using a semiconductor, is an extremely versatile device.
- In its most popular form, it can function as an electronic switch.
- A typical semiconductor chip can have millions/billions of these interconnected switches that work together to perform various logical and computational operations.
- A transistor can also function as an amplifier (to amplify the weak signal received by your cell phone) and is an integral part of circuits that generate and process high-frequency signals (such as those required in wireless communication technologies).

The Manufacturing Process:

- It involves several critical steps like deposition, photoresist, lithography, etch, ionisation, and packaging.
- Deposition: It begins with a silicon wafer. Wafers are sliced from a salami-shaped bar of 99.99% pure silicon (known as an ‘ingot’) and polished to extreme smoothness.
- Thin films of conducting, isolating, or semiconducting materials are deposited on the wafer to enable the first layer to be printed on it.
- Photoresist Coating: The wafer is then covered with a light-sensitive coating called ‘photoresist’, or ‘resist’ for short.
- Positive Resist: The areas exposed to ultraviolet light change their structure and are made more soluble – ready for etching and deposition.
- Lithography: It is a crucial step in the chipmaking process, because it determines just how small the transistors on a chip can be.
- During this stage, the chip wafer is inserted into a lithography machine where it’s exposed to deep ultraviolet (DUV) or extreme ultraviolet (EUV) light.
- Etching: It refers to any technology that will selectively remove material from a thin film on a substrate (with or without prior structures on its surface) and by this removal create a pattern of that material on the substrate.

Global Semiconductor Consumption

- China is the largest downstream user of semiconductors, as Chinese manufacturers incorporate semiconductors into a range of electronic products that are consumed domestically or exported globally.
- The United States and China were the top final consumers of semiconductors contained in electronic goods, with a share of 25% and 24%, respectively, followed by the European Union (EU) at 20%.
- Global semiconductor sales reached an all-time high at \$574 billion in 2022.
 - a. It is projected to surpass \$1 trillion by 2030, driven by demands from computing and data storage, wireless communication, and automotive electronics.

India and Semiconductor

- India has established the India Semiconductor Mission (ISM) to address the global semiconductor shortage and encourage manufacturers to set up their semiconductor facility.
- India has realised the importance of investing in chip manufacturing infrastructure.
 1. The TATA group has partnered with Taiwan's Powerchip Semiconductor Manufacturing Corporation (PSMC) to set up a 300mm wafer fabrication plant in Gujarat.
 - a. It will roll out its first 28nm chip in 2026.
 2. Two assembly and test plants in Gujarat and Assam have also been recently approved by the Government of India.

Government Initiatives

- In a bid to make India's \$10 billion chip-making initiative more attractive to investors, the Centre approved changes to the scheme for the development of a semiconductor and display manufacturing ecosystem in the country.
 - It aims to provide up to 50% of Project cost for two semiconductor and two display fabs in the country.

Piezoelectricity

Syllabus:GS3/Science and Technology

Context

- The Command Hospital Pune performed two successful piezoelectric bone conduction hearing implants, making it the first government hospital in the country to do the medical operations.

What is Piezoelectricity?

- Piezoelectric Effect is the ability of certain materials to generate an electric charge in response to applied mechanical stress.
- History: Piezoelectricity was discovered in 1880 by Pierre and Paul-Jacques Curie, who found that when they compressed certain types of crystals including quartz, tourmaline, and Rochelle salt, along certain axes, a voltage was produced on the surface of the crystal.

Piezoelectric Principle

- Principle: This property is the result of their unusual crystal structures. Usually, the charges on atoms in the molecules that make them up are symmetric on two sides of an axis.
- When some stress is applied, the molecule becomes distorted and the asymmetry of charges gives rise to a small electric current.
- Some materials also display an inverse piezoelectric effect, where the application of an electric current induces a mechanical deformation.

Applications

- Both direct and inverse piezoelectric materials are used in pressure sensors, accelerometers, and acoustic devices – where their ability to convert mechanical signals into electrical signals is crucial.
- The material is also used in devices such as microphones, phonograph pickups, and wave filters in telephone-communications systems.

Sweden Joins Artemis Accords

Syllabus: GS3/ Science and Technology

Context

- Sweden and Slovenia became the 38th and 39th country respectively to sign the Artemis Accords.

About

- The Artemis Accords are a set of principles and guidelines for international cooperation in space exploration.
- They are not a legally binding instrument.
- They were announced by NASA in 2020 and named after NASA's Artemis program which is aimed at returning humans to the Moon by the mid-2020s.
- The Accords mirror principles set out in 1967, as part of the Outer Space Treaty to help govern international cooperation space.
- Members: Artemis Accords has 39 members including Australia, France, Germany, India, Japan, United Kingdom, United States of America etc.
- India joined the Artemis Accords in 2023.
- Russia and China are not part of the Artemis Accords.

Key Principles of the Artemis Accords

- Peaceful Exploration of space: All activities conducted under the Artemis program must be carried out for peaceful purposes in accordance with international law.
- Transparency: Signatory nations should conduct their activities in a transparent way. The accords state: "Artemis Accords signatories commit to the public release of scientific information, allowing the whole world to join us on the Artemis journey."
- Interoperability: Nations participating in the Artemis program should aim to develop and provide support for systems that can work in conjunction with existing infrastructure.
- Emergency Assistance: Nations signing the Artemis Accords are committed to assisting astronauts and personnel in outer space who are in distress.
- Registration of Space Objects: Nations participating in Artemis should determine which of them should register any relevant space object.
- Preserving Heritage: Artemis Accords signatories have committed to preserving humanity's outer space heritage such as human or robotic landing sites, artifacts, spacecraft, and other evidence of activity on other celestial bodies.
- Space Resources: The accord signatories affirm that extracting and utilizing space resources from the celestial bodies listed, is vital to supporting safe and sustainable space exploration.
- Deconfliction of Activities: Nations are committed to preventing harmful interference and exercising the principle of due regard. This also covers the establishment of "safety zones" with areas that can be established between countries and which can be ended when relevant operations cease.
- Orbital Debris: Countries are committed to planning for the safe, timely and efficient disposal of debris as part of the mission planning process.

Activities under Artemis programme

- The initial three missions of the programme are Artemis-I, II and III.
- Under Artemis-I, NASA launched its spacecraft 'Orion' on its indigenously built super heavy-lift launch vehicle (SLS) directly to the moon on a single mission.
 - In 2022, the SLS carrying Orion commenced its first uncrewed integrated flight test.
- Artemis-2 programme will commence, with a crew of four astronauts onboard the SLS performing multiple manoeuvres on an expanding orbit around the Earth.
- Artemis-III, mission will witness the four-member crew land on the moon, conduct a week-long lunar exploration, perform a lunar flyby, and return to earth.

Significance of Artemis Accords for India

- Collaboration between ISRO and NASA: NASA will provide advanced training to Indian Space Research Organization (ISRO) astronauts with the goal of launching a joint effort to the International Space Station.

- Vision of Global Space Power: This agreement holds significant importance for India to establish itself as a global space power.
- It will benefit space exploration ambitions under the new space policy mainly through international collaboration as all signatories to the accords commit to the open sharing of scientific data and assist each other in the efforts.
- Technology Transfer: Artemis Accords could possibly liberalize some of those technology transfer hurdles that are there between the US and India.
- India's being the part of Artemis Accords highlights its dedication to global space cooperation and a keen interest in participating in lunar exploration missions.
- This collaboration enables the sharing of knowledge and expertise, contributing to the advancement of scientific research, technological development, and the expansion of humanity's presence in space.
- International Cooperation: Now India is much more open to international collaborations and open to exploring uncharted territories.
- It also opens up markets for Indian companies with all the other signatories of the Artemis Accord.

Aditya Mission

Syllabus: GS3/Science and Technology

Context

- Aditya L1 solar mission of the ISRO is continuously sending data about the Sun.

What is the Aditya-L1 mission?

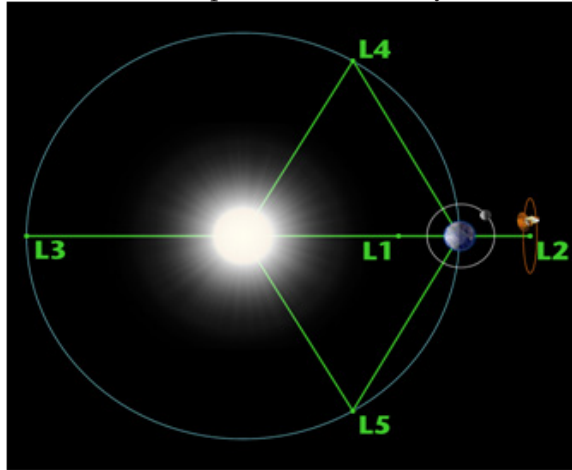
- Aditya-L1 is the first space-based Indian observatory to study the Sun. It was launched on September 2, 2023 by the PSLV-C57.
- Solar observatory is placed at Lagrangian point L1 for "Observing and understanding the chromospheric and coronal dynamics of the Sun" in a continuous manner.
- Placing the Aditya-L1 in a halo orbit around L1 point has advantages as compared to placing in a Low Earth Orbit (LEO):
- It provides a smooth Sun-spacecraft velocity change throughout the orbit, appropriate for helioseismology.
- It is outside of the magnetosphere of Earth, thus suitable for the "in situ" sampling of the solar wind and particles.
- It allows unobstructed, continuous observation of the Sun, and view of earth for enabling continuous communication to ground stations.
- It is equipped with seven payloads (instruments) on board with four of them carrying out remote sensing of the Sun and three of them carrying in-situ observation.

What are the seven payloads?

- The Visible Emission Line Coronagraph (VELC) will study the Corona, imaging and spectroscopy, and Coronal mass ejections.
- The Solar Ultraviolet Imaging Telescope (SUIT) will focus upon the Photosphere and Chromosphere imaging- narrow and broadband. It will also measure the solar irradiance variations.
- The Solar Low Energy X-ray Spectrometer (SoLEXS) and High Energy L1 Orbiting X-ray Spectrometer (HEL1OS) will study the soft and hard X-ray flares from the Sun over a wide X-ray energy range.
- The Aditya Solar wind Particle Experiment (ASPEX) and Plasma Analyser Package For Aditya (PAPA) will analyze the electrons and protons in the Solar wind or particles. It will also study the energetic ions.
- The Advanced Tri-axial High Resolution Digital Magnetometers will study the interplanetary magnetic field at L1 point.

What is a Lagrange Point?

- Lagrange points are positions in space where objects sent there tend to stay put. At Lagrange points, the gravitational pull of two large masses precisely equals the centripetal force required for a small object to move with them.
- There are five Lagrange points, three are unstable and two are stable. The unstable Lagrange points are labeled L1, L2 and L3. The stable Lagrange points are labeled L4 and L5.
- The L1 point of the Earth-Sun system affords an uninterrupted view of the sun and is currently home to the Solar and Heliospheric Observatory Satellite SOHO.



Oldest Remnants of Earth's Early Magnetic Field

Syllabus: GS3/Science and Technology

Context

- Geologists at MIT and Oxford University have found ancient rocks in Greenland that bear the oldest remnants of Earth's early magnetic field.

About

- The rocks are about 3.7 billion years old and retain signatures of a magnetic field with a strength of at least 15 microtesla.
- Today, Earth's magnetic field measures around 30 microtesla.
- The iron particles in these rocks effectively act as "tiny magnets" that can detect and record the Earth's magnetic field.
- The rocks were uncovered from the Isua Supracrustal Belt in Greenland.
- Scientists suspect that, early in its evolution, the Earth was able to foster life, in part due to an early magnetic field that was strong enough to retain a life-sustaining atmosphere and simultaneously shield the planet from damaging solar radiation.
- Significance: This discovery can help scientists understand Earth's early history and the factors that contributed to the emergence of life.
- The detailed analysis could help measure early traces of Earth's magnetic field in other places around the world, helping recreate its global shape and evolution through the planet's 4.5 billion-year lifespan.

Supracrustal Belt

- The Supracrustal Belt has a special geology: It sits upon a thick layer of Earth's crust that has protected it from tectonic activity and deformation for billions of years.
- The Isua Supracrustal Belt is one of the oldest known rock formations on Earth, with some of its rocks dating back to around 3.7 to 3.8 billion years ago.
- This makes it a crucial site for studying the early Earth's geological and environmental conditions.
- The Isua Supracrustal Belt is located in southwestern Greenland, in a remote and inaccessible region.

Earth's Magnetic Field

- Earth's magnetic field — also known as the geomagnetic field — is generated in planet's interior and extends out into space, creating a region known as the magnetosphere.

- It is a protective shield generated by the movement of molten iron and nickel in its outer core.
- This movement, called convection, creates electric currents, which in turn produce magnetic fields.
- These magnetic fields combine to form the Earth's overall magnetic field.
- Significance: It extends from the planet's interior out into space and helps protect the Earth from the harmful effects of solar wind and cosmic radiation.
- The magnetic field also plays a crucial role in navigation, as it influences compass needles, allowing travelers to find their way based on magnetic north.
- Without the magnetic field, life on Earth would not be possible as it shields us from the constant bombardment by charged particles emitted from the sun.

Phi-3-mini

Syllabus: GS 3/S&T

In News

- Microsoft unveiled the latest version of its 'lightweight' AI model – the Phi-3-Mini.

About Phi-3-mini

- It is the smallest AI model developed by Microsoft. It is believed to be the first in a series of three smaller models planned by Microsoft.
- It reportedly outperformed models of the same size and the next size up across a variety of benchmarks, in areas like language, reasoning, coding, and maths.
- Essentially, language models are the backbone of AI applications like ChatGPT, Claude, Gemini, etc.
- These models are trained on existing data to solve common language problems such as text classification, answering questions, text generation, document summarisation, etc.

Comparison with LLMs

- Phi-3-mini is an SLM. Simply, SLMs are more streamlined versions of large language models.
- When compared to LLMs, smaller AI models are also cost-effective to develop and operate, and they perform better on smaller devices like laptops and smartphones.
- SLMs are great for "resource-constrained environments including on-device and offline inference scenarios."

Do you know ?

- Phi-2 was introduced in December 2023 and reportedly equaled models like Meta's Llama 2.
- Phi-3 models significantly outperformed several models of the same size or even larger ones, including Gemma 7B and Mistral 7B, in key areas.

Infrastructure and Connectivity along LAC in Arunachal Pradesh

Syllabus: GS3/Infrastructure; Security Challenges and management in Border Areas

Context

- Recently, India has accelerated the efforts to improve infrastructure and connectivity along the Line of Actual Control with China.



Arunachal Pradesh

- It is the 24th state of the Indian Union, and is located in the northeastern part of the country.
- It is bordered by Bhutan to the west, Myanmar to the east, China to the north and north-east, and the plains of Assam to the south.
- Flora and Fauna: The state bird is the Hornbill, the state animal is the Mithun (*Bos Frontalis*), and the state flower is the Foxtail Orchid (*Rhynchostylis Retusa*).
- Highest Peak: The highest peak in the state is Kangto, which stands at 7,090 metres.

Enhanced Connectivity and Development

- The Line of Actual Control (LAC) in Arunachal Pradesh, a contested border area between India and China, has seen significant developments in infrastructure and connectivity in recent years.

Boosting Connectivity:

- The Indian Army has been instrumental in connecting remote areas of the state, speeding up efforts to improve infrastructure along the LAC.
- It has both military and civilian advantages, boosting tourism and quickening the Army's movements.
- The work on the 2,400-km-long Trans Arunachal Highway is nearing completion, and the focus of infrastructure development has shifted to the trans-frontier highway, which will connect all the valleys in the state.
- It aims to significantly reduce time and effort for both military and general movement, especially in eastern Arunachal Pradesh.
- Nechiphu Tunnel: It is the 500-metre long Nechiphu Tunnel on Balipara-Chariduar-Tawang Road in Arunachal Pradesh. This tunnel, along with the under construction Sela Tunnel, will provide all-weather connectivity to the strategic Tawang Region.

Border Roads Organisation (BRO)

- It was formed in 1960 for coordinating the speedy development of an adequate road communication network of roads in the North and the North-Eastern border regions of the country.
- It works under the administrative control of the Ministry of Defence.

Major Functions:

- Support the armed forces meet their strategic needs by committed, dedicated and cost-effective development and sustenance of the infrastructure.
- Achieve international levels of quality excellence and time consciousness in a diversified sphere of construction activity in a cost-effective manner.
- Optimise potential and expertise through increased involvement in agency, transnational and national development projects.

Enhancing Surveillance:

- In the last few years, the Army has significantly upgraded firepower and infrastructure along the LAC in the Tawang sector of Arunachal Pradesh.
- The pace of capability and infrastructure development in the rest of the state has gained significant pace in the last few years.
- This includes road infrastructure, bridges, tunnels, habitat and other storage facilities, aviation facilities, and upgradation of communications and surveillance.

Associated Challenges

- **Geographical Challenges:** The areas along the LAC in Arunachal Pradesh are characterised by high-altitude terrain and sparse population.
- It makes infrastructure development and connectivity a challenging task.
- **Educational Limitations:** The remote areas along the LAC have limited access to quality education.
- It is a significant challenge as it affects the quality of life for the residents of these areas.
- **Financial Constraints:** The cost of infrastructure development in these remote and difficult terrains is high.
- It poses a significant challenge in terms of resource allocation and management.
- **Security Concerns:** The proximity to the contested border with China adds a layer of complexity to the infrastructure development process.
- Ensuring the security of the infrastructure projects and the workers involved is a major challenge.
- **Lack of Last-Mile Connectivity:** While major highways and other connectivity improvements are being constructed, providing last-mile connectivity to the most forward posts is a significant challenge.

Related Government Initiatives

- **Inter-state Border Areas Development Programme (ISBADP):** It aims to provide facilities for the socio-economic development of the people living along the Inter-State boundary with Assam.
- Projects taken up under this program are to ensure sustainability and provide value addition to any given product.
- **Border Areas Development Department (BADP):** It is to meet the special developmental needs and well-being of the people living in remote and inaccessible areas situated near the International Boundary (IB).
- The provision of essential infrastructure facilities and opportunities for sustainable living would help integrate these areas with the hinterland, create a positive perception of care by the country and encourage people to stay on in the border areas, leading to safe and secure borders.
- **Infrastructure Development by Ministry of Home Affairs:** It includes the construction of fences, floodlighting, roads, Border Out Posts (BOPs), Company Operating Bases (COBs), and deployment of technological solutions along the India-Pakistan, India-Bangladesh, India-China, India-Nepal, India-Bhutan, and India-Myanmar borders.
- **Vibrant Villages Programme:** It has been instrumental in developing remote villages in Arunachal Pradesh.
- Under this programme, primary health centres and residences of school teachers are being upgraded, and concrete tracks are being laid.
- It has brought about a significant improvement in the quality of life for the residents of these villages.

Conclusion

- The development of infrastructure and connectivity along the LAC in Arunachal Pradesh is a testament to India's commitment to securing its borders and improving the lives of its citizens in border areas. While challenges remain, the progress made so far is promising and sets the stage for a more connected and secure future.

Parivartan Chintan

Syllabus: GS3/Defence

Context

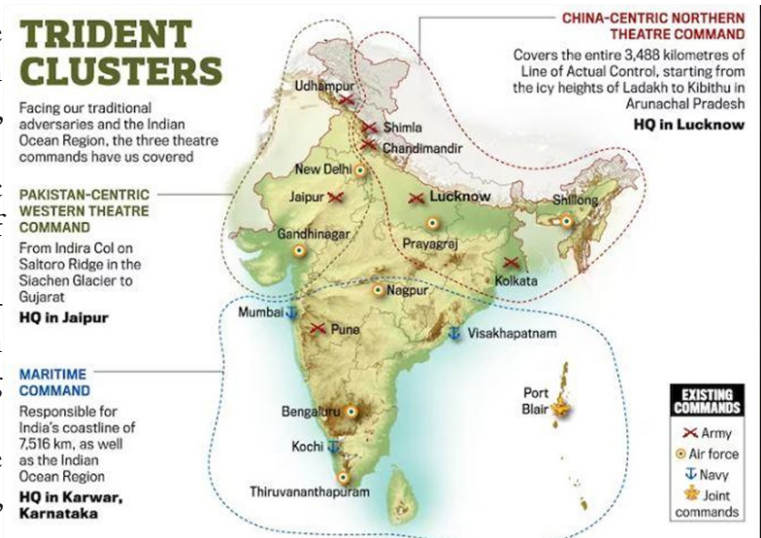
- The Tri-service Conference, 'Parivartan Chintan', was held in New Delhi.

About

- The 'Chintan' was curated as a brainstorming and idea incubation discussion to generate new and fresh ideas, initiatives and reforms to further propel Jointness and Integration in the Armed Forces.
- Jointness and Integration are the cornerstones of the transformation to Joint Structures which the Indian Armed forces are progressing towards with the intention of being "Future Ready".

Theatre Command

- A theatre command deploys elements of the three services i.e. the Indian Army, Indian Navy, and Indian Air Force under a single, unified command structure.
- Each command is assigned a specific geographical region, combining resources of the three services for operational roles.
- There will be two land-based commands—one focused on Pakistan and the other on China—and a third maritime one, overseeing the Indian Ocean Region.
- The three theatre commands that will be set up first are likely to be located in Jaipur, Lucknow and Karwar.
- Creation of theatre commands and their structure has been under discussion for three years now.



Need for the Theatre Command

- **Hostile Neighborhood:** The main threat is from China, which works in collaboration with Pakistan. A two-front war is, therefore, a distinct possibility for India.
- The prospect of high technology, multi-domain warfare where adversaries are nuclear-armed requires a swift and dynamic response.
- **Optimal use of Resources:** The forces will be able to pool their resources efficiently, resulting in the optimum utilisation of platforms, weapon systems, and assets.
- This will also prevent resources from being allocated for duplicate purchases for the three services.
- **Help in Logistics:** Theatre commands, in the long run, could also improve logistics management in the forces.
- **Better Coordination:** Currently, India's multiple military commands are all located in different geographical areas. This, at times, causes communication hindrances during joint operations and exercises.
- With a unified command structure, these communication processes could be simpler and more efficient.
- **In Practice in other Nations:** Armed forces of major military powers, including the United States, the United Kingdom, Russia, China and France all operate under theatre commands.
- **Efficient Planning:** Further, in the realm of policy, having a unified command structure with representatives from all three services will also lead to more efficient planning for both peacetime and wartime strategies.

Challenges in Implementation

- Difference of opinion among three forces: There are differences among the three forces on scope, structure, and control of the commands.
- Transfer of Resources: There is a contention on the kind of war-fighting equipment that will be deployed under a single command and ambiguity surrounding the transfer of weapons, platforms, and resources from one theatre command to another.
- Curriculum Framework: In terms of preparing the educational bedrock for military personnel to serve in theatre commands, the country seems to be behind the curve.
- Lack of NSS: Many retired military professionals have criticised implementing theatre commands without having a coherent National Security Strategy (NSS).
- Theatre commands will not have a clear blueprint and policy objective to work towards without an NSS.

Conclusion

- India is moving towards implementing its biggest military overhaul, which could be a force multiplier, a few institutional and ideational changes will have to be incorporated to find the correct balance in such a transformation.
- Given the threat India faces on its northern and western borders, integrated theatre commands and the roles assigned will be key in dealing with any future conflict.

Naxalism in India

Syllabus: GS3/Internal Security

Context

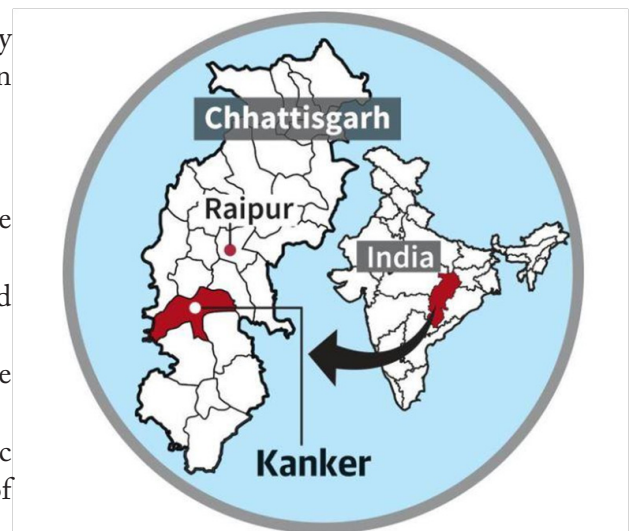
- At least 29 Maoists were killed in an operation by security forces along the Kanker-Narayanpur border in Chhattisgarh's Bastar.

Naxalism Problem

- Naxalism or Left Wing Extremism (LWE) is one of the major challenges to India's internal security.
- Naxal affected areas in India are known as the 'Red Corridor'.
- Reason for Naxalism: Naxalites seek to overthrow the State through violent means.
- They openly proclaim lack of faith in the democratic means of ballot and adhere to the violence as a means of achieving their ends.
- Initial Stage: The Naxal movement started with the tribal-peasant uprising against landlords in Naxalbari village of Darjiling district, West Bengal in 1967.
- The uprising was led by leaders such as Charu Majumdar, Kanu Sanyal and Jangal Santhal.
- Communist Party of India (Maoist): In 2004, two main naxal groups, namely the Maoist Communist Centre of India (MCCI) and People's War merged to form the CPI (Maoist) party.
- Eventually, by 2008 most of the other Naxal groups were merged into CPI (Maoist) which emerged as the umbrella of Naxalite outfits.
- The CPI (Maoist) and all its front organization formations have been included in the list of banned terrorist organizations under the Unlawful Activities (Prevention) Act, 1967.

Presence of Maoists in India

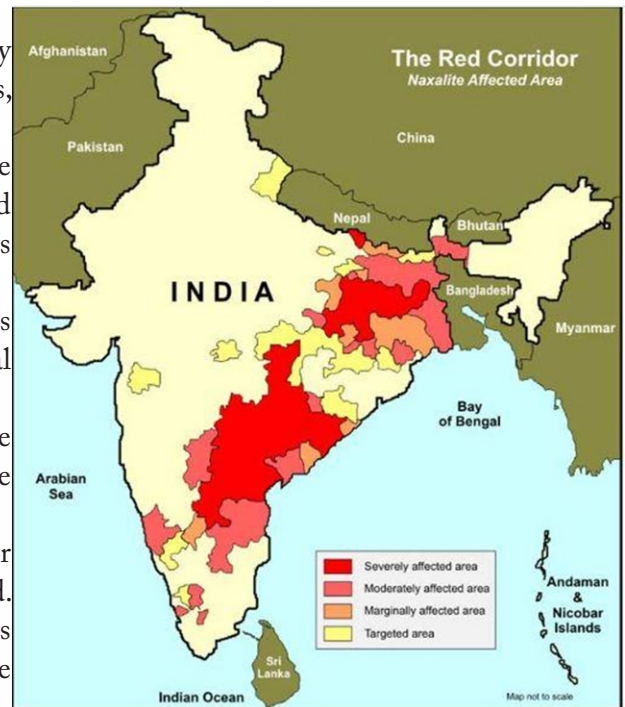
- The States of Chhattisgarh, Jharkhand, Orissa and Bihar are considered severely affected.
- The States of West Bengal, Maharashtra and Andhra Pradesh are considered partially affected. The States of UP and MP are considered slightly affected.
- The CPI(Maoist) are making forays into Southern States of Kerala, Karnataka and Tamil Nadu and planning to link up the Western Ghats to the Eastern Ghats through these states.



- They are attempting incursions into Assam and Arunachal Pradesh, which has serious long-term strategic implications.

Causes of Naxalism

- Marginalisation: Naxalites do not belong to any particular religion, or community, but largely are Dalits, Adivasis and other marginalised sections of society.
- They are led by people totally indoctrinated by the teachings of Mao. The basic issues are land reforms and economic development. The ideological dimension is provided by Maoism.
- Support Base of Naxalites: Naxalite movement has its support among the landless, share-croppers, agricultural labour, Harijans and tribals.
- As long as these people are exploited and social justice continues to be thwarted, this support base of the Naxalites will continue.
- Forest Management and Livelihood of Tribals: For tribals, forest, land, and water mean their livelihood. They have been deprived of these under various acts and orders which increased the resentment against the authorities.
- Lack of Development: Absence of developmental activities and virtual absence of health care, drinking water, roads, electricity and educational facilities in areas where Naxalism has taken roots.



How Naxalites Possess a Challenge for Country?

- Vulnerability to External Threats: The Maoist movement highlights India's interior weaknesses, which makes India also vulnerable to external threats.
- The CPI (Maoist) have close fraternal ties with many North-East insurgent groups.
- Most of these outfits have linkages with external forces hostile to India.
- The CPI (Maoist) have also frequently expressed their solidarity with the J&K terrorist groups.
- Impediments to Economic Development: The Maoists concentrate on the poor and marginalized regions of India, the more economic development (which is imperative to improving those regions, conditions) will be hampered. Internal order and stability are necessary for a nation's economic development.
- Additional Expenses on Internal Security: The Naxalite activities are using up scarce resources on defence and internal security when it should be spent on areas such as social development.
- Adverse Impact on Governance: In the areas under Maoist domination, the absence of governance, which is created by their violent methods in the first place.
- The service delivery systems are extinguished through killing, kidnap, intimidation and extortion.

Government of India's Approach

- Deployment of the Central Armed Police Forces (CAPFs): Battalions of the CAPFs/Naga Battalions (BNs) are deployed for assisting the State Police in the LWE affected States.
- Security Related Expenditure (SRE) Scheme: Funds are provided for meeting the recurring expenditure relating to insurance, training and operational needs of the security forces, rehabilitation of Left Wing Extremist cadres who surrender, and publicity material to create awareness against violence.
- Review and Monitoring Mechanisms: A number of review and monitoring mechanisms have been put in place by the Government and the Ministry of Home Affairs monitors the situation on a regular basis at various levels.
- Strengthening the Intelligence Gathering Mechanism: Several steps have been taken to strengthen and upgrade the capabilities of intelligence agencies at the Central and State levels.
- These include intelligence sharing through Multi-Agency Centre (MAC) at the Central and State levels, and Multi Agency Centre (SMAC) at the subsidiary level on a 24x7 basis.

- Better Inter-state Coordination: The area of operation of the Maoist cadres is not confined to one single State. It is often spread over two or more States.
- To improve inter-state coordination the government conducts frequent meetings and interactions between the official machinery of the bordering districts of Left Wing Extremism affected States across the country.
- Tackling the challenge of Improvised Explosive Devices (IEDs): IED is the most potent weapon in the hands of Maoists.
- The Union Home Ministry has formulated a Standard Operating Procedure (SOP) on 'Issues related to Explosives/IEDs/Landmines in naxal affected areas' and the same has been circulated to the stakeholders for compliance.
- Strengthening of air support: State Governments and the CAPFs have been provided with enhanced air support in terms of UAVs and helicopters for anti-naxal operations, including evacuation of casualties/injured persons.

Way Ahead

- There is a widely accepted view that the Naxal problem can be tackled successfully through a combination of development and security related interventions.
- The problem is not to be viewed entirely as a law and order issue. Often, innocent tribals who live in the interior forest regions fall prey to Naxal intimidation.
- Re-establishing control over Naxalite affected areas, their development, and enabling the marginalized people living there to lead a secure, dignified and better quality of life is vital.
- It is note-worthy that due to the measures initiated by the Government, LWE violence has significantly declined in the last few years.

SCO Defence Ministers' Meeting

Syllabus: GS 2/IR

In News

- Recently, India participated in the Shanghai Cooperation Organisation (SCO) Defence Ministers' meeting which was held in Astana, Kazakhstan,

Key Outcomes of Meeting

- The SCO Defence Ministers agreed to develop the idea of 'One Earth, One Family, One Future', rooted in the ancient Indian philosophy of 'Vasudhaiva Kutumbakam'.
- India reiterated its steadfast commitment toward maintaining peace, stability, and security in the SCO region.
- India emphasised the need to adopt a zero-tolerance approach toward terrorism in all its forms for the prosperity and development of the SCO Member States.
- India highlighted its long-standing proposal for a Comprehensive Convention on International Terrorism at the United Nations.
- India also underscored the concept of 'Security and Growth for All in the Region (SAGAR)', proposed by India for the Indo-Pacific.

About Shanghai Cooperation Organization(SCO)

- It is a permanent intergovernmental international organization established on June 15, 2001 in Shanghai (PRC) by the Republic of Kazakhstan, the People's Republic of China, the Kyrgyz Republic, the Russian Federation, the Republic of Tajikistan and the Republic of Uzbekistan.
- Its predecessor was the mechanism of the Shanghai Five.
- Composition : Currently, the SCO countries includes: 9 Member States — the Republic of India, the Islamic Republic of Iran, the Republic of Kazakhstan, the People's Republic of China, the Kyrgyz Republic, the Islamic Republic of Pakistan, the Russian Federation, the Republic of Tajikistan, the Republic of Uzbekistan.
- The official languages of the SCO are Russian and Chinese.
- The Organization has 2 standing bodies — the Secretariat in Beijing and the Executive Committee of the Regional Anti-Terrorist Structure (RATS) in Tashkent.

The goals of the SCO are:

- To strengthen mutual trust, friendship and good-neighbourliness between the Member States;
- To encourage the effective cooperation between the Member States in such spheres as politics, trade, economy, science and technology, culture, education, energy, transport, tourism, environmental protection, etc;
- To jointly ensure and maintain peace, security and stability in the region; and
- To promote a new democratic, fair and rational international political and economic international order.
- International Collaborations : The SCO has established partnerships with the Commonwealth of Independent States (CIS), the Association of Southeast Asian Nations (ASEAN), the Collective Security Treaty Organization (CSTO), the Economic Cooperation Organization (ECO), the UN Economic and Social Commission for Asia and the Pacific (ESCAP), the UN Office on Drugs and Crime (UNODC), UNESCO, the Food and Agriculture Organization, the World Tourism Organization (WTO),

India and SCO

- India has been actively participating in SCO and providing substantial support to various mechanisms in the forum.
- Since its accession as a full – fledged Member State in 2017, India has maintained an active engagement with the organisation.
- India is focusing on initiating proposals for mutual benefit of SCO Member States, Observers and Dialogue Partners.
- The SCO offers India the chance to safeguard, advance, and showcase its geostrategic and geoeconomic pursuits in the Central Asian and South Asian regions.
- India used the SCO as a platform to secure its northern border from Pakistan's state-sponsored terrorism.
- During the 2023 presidency, India took a strong stance to promote new areas of development, including startups and innovation, traditional medicine, digital inclusion, youth empowerment, and the shared Buddhist heritage among most of the SCO member states.
- India established two new mechanisms—the Special Working Group on Startups and Innovation and the Expert Working Group on Traditional Medicine—significantly demonstrating New Delhi's dedication to contributing to regional economic and social transformations.
- The Summit adopted the 'SECURE' SCO theme, where S stands for security of citizens; E for economic development for all; C for connecting the region; U for uniting the people; R for respect for sovereignty and integrity; and E for environmental protection.
- India's demand for "an Afghan-led, Afghan-owned and Afghan-controlled" peace process received support from all SCO Central Asian members and Russia.
- The agreements on counterterrorism, security cooperation, and defence between India and the Central Asian Republics further demonstrated the significant progress made by New Delhi through the SCO.
- The Chinese BRI projects have created a debt crisis and violated the sovereignty and integrity of SCO countries.
- To overcome the China-Pakistan axis, New Delhi invested in Chabahar Port and the 7,200-km long International North-South Transport Corridor (INSTC).
- These connectivity initiatives led by New Delhi are consultive, transparent, economical, and reliable.

Nuclear, Chemical and Biological Disarmament

Syllabus: GS3/Internal Security, Defence

Context

- India and South Korea discussed developments in the areas of disarmament and non-proliferation relating to nuclear, chemical and biological domains.

What is Disarmament ?

- Disarmament refers to the act of eliminating or abolishing weapons (particularly offensive arms) either unilaterally or reciprocally.
- It may refer either to reducing the number of arms, or to eliminating entire categories of weapons.

Nuclear Powers in the World

- There are nine countries recognized as possessing nuclear weapons.
- These countries are often referred to as “nuclear-armed states” or “nuclear powers.”
- United States, Russia, China, United Kingdom, France, India, Pakistan, North Korea and Israel.

Treaties Related to Nuclear Disarmament

- Treaty on the Non-Proliferation of Nuclear Weapons (NPT): Signed in 1968 and entered into force in 1970, the NPT aims to prevent the spread of nuclear weapons and promote disarmament.
- It divides the world into nuclear-weapon states (NWS), recognized as possessing nuclear weapons at the time of the treaty’s signing, and non-nuclear-weapon states (NNWS), which agree not to develop or acquire nuclear weapons.
- The treaty also requires NWS to pursue disarmament negotiations in good faith.
- Treaty on the Prohibition of Nuclear Weapons (TPNW): Adopted by the United Nations in 2017 and opened for signature in 2018, the TPNW aims to prohibit the development, testing, production, stockpiling, stationing, transfer, use, and threat of use of nuclear weapons.
- It represents a significant step towards nuclear disarmament, although it has not been signed by nuclear-armed states.
- Comprehensive Nuclear-Test-Ban Treaty (CTBT): Opened for signature in 1996, the CTBT aims to ban all nuclear explosions for both civilian and military purposes.
- While the treaty has been signed by 185 countries and ratified by 170, it has not entered into force as nuclear-armed states must ratify it to become operational.
- Outer Space Treaty: This multilateral agreement entered into force in 1967 and bans the siting of weapons of mass destruction in space.
- All nine states believed to have nuclear weapons are parties to this treaty.

Treaties Related to Chemical Disarmament

- Chemical Weapons Convention (CWC): It is a multilateral treaty that bans chemical weapons and requires their destruction within a specified period of time.
- CWC is implemented by the Organization for the Prohibition of Chemical Weapons (OPCW).
- CWC currently has 193 states-parties. Israel has signed but has yet to ratify the convention. Three states have neither signed nor ratified the convention (Egypt, North Korea and South Sudan).

Treaties Related to Biological Disarmament

- Biological Weapons Convention, 1972: The Biological Weapons Convention (BWC) effectively prohibits the development, production, acquisition, transfer, stockpiling and use of biological and toxin weapons.
- It was the first multilateral disarmament treaty banning an entire category of weapons of mass destruction (WMD).

Arguments in Favour of Disarmament

- Humanitarian Concerns: The weapons possess unparalleled destructive power, capable of causing immense loss of life, widespread devastation, and long-term environmental damage.
- Global Security: The proliferation of these weapons increases the likelihood of their use, whether intentionally or accidentally, leading to catastrophic consequences for humanity.
- Economic Benefits: Funds can be redirected from weapons towards more constructive purposes to improve overall well-being.
- Ethical and Moral Imperatives: Eliminating nuclear weapons is viewed as a moral imperative and a step towards building a more peaceful and just world.
- Environment Pollution: The weapon testing and potential use can have devastating environmental consequences.

Arguments Against Disarmament

- Deterrence: Possessing these weapons serves as a powerful deterrent against potential adversaries, preventing conflicts and maintaining strategic stability.
- National Security: It provides a form of insurance against potential threats and enhances the ability to protect the interests and sovereignty of a country in an uncertain international environment.

- **Verification and Compliance:** Critics argue that without robust verification mechanisms and effective enforcement measures, countries may exploit disarmament agreements for strategic advantage.
- **Geopolitical Realities:** Deep-rooted mistrust, unresolved conflicts, and strategic competition among states make it difficult to envision a scenario in which all countries would willingly and simultaneously relinquish their weapons.

Way Ahead

- Disarmament is seen as a crucial step towards reducing the risks and promoting international peace and stability.
- While achieving complete Disarmament may be a long-term objective, incremental progress can still be made through concerted international efforts and cooperation.
- It requires sustained commitment from all nations to work towards a world free of nuclear weapons, ensuring the security and well-being of future generations.

India's Nuclear Weapon Program

- **Smiling Buddha:** In 1974, India conducted its first nuclear test code-named “Smiling Buddha, and since then, it has developed a nuclear triad consisting of land-based, sea-based, and air based delivery systems.
- **Operation Shakti:** In 1998, India conducted a series of nuclear tests at Pokhran, codenamed “Operation Shakti.”
 - a. These tests included both fission and fusion devices and marked India’s formal entry into the nuclear weapons club.
- **International Criticism:** The international community has criticized India’s nuclear weapons programme, particularly the United States and its allies.
- **No First Use:** India has a “no first use” policy, meaning it pledges not to use nuclear weapons first in a conflict but reserves the right to retaliate if attacked with nuclear weapons.

India's stance on nuclear disarmament?

- India has argued that any country’s possession of nuclear weapons poses a threat to global security, and that the only way to ensure peace and stability is for all nuclear weapons to be destroyed.
- India is not a signatory to the Non-Proliferation Treaty (NPT), and stated that the NPT is discriminatory and perpetuates a two-tiered system of nuclear haves and have-nots by unfairly restricting access to peaceful nuclear technology for non-nuclear weapon states.
- **National Security:** India’s nuclear weapons programme is a legitimate expression of its national sovereignty, and that India has the right to defend itself against potential threats.
 - a. India’s nuclear disarmament and nonproliferation policy is complex and nuanced, reflecting the country’s desire for security and recognition, as well as its commitment to global disarmament and non-proliferation.

Chapter- 7

INTERNATIONAL RELATION

BIMSTEC Charter

Syllabus: GS2/International Relations

Context

- Recently, a majority in the Lower House of Nepal supported the proposal seeking endorsement of the BIMSTEC Charter.

BIMSTEC

The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is a regional organisation comprising seven Member States (five from South Asia, including Bangladesh, Bhutan, India, Nepal, and Sri Lanka, and two from Southeast Asia, including Myanmar and Thailand) lying in the littoral and adjacent areas of the Bay of Bengal.

a. The region hosts 22% of the world population (more than 1.68 billion people); and the member states have a combined GDP of more than US\$3.697 trillion/per year.

– It was initially founded as BIST-EC in 1997, with the adoption of the Bangkok Declaration, with Bangladesh, India, Sri Lanka, and Thailand as members.

a. It became BIMST-EC with the entry of Myanmar in late 1997, and eventually, it was named in its current form when Nepal and Bhutan became members in 2004.

– Unlike many other regional groupings, BIMSTEC is a sector-driven cooperative organisation. Six areas of focus under BIMSTEC are — trade, technology, energy, transport, climate change (added in 2008), tourism and fisheries.



About the BIMSTEC Charter

- It was signed and adopted during the Fifth BIMSTEC Summit held in Colombo, Sri Lanka in 2022.
- It provides a legal and institutional framework for BIMSTEC, aiming to create an enabling environment for rapid economic development through the identification and implementation of specific cooperation projects in the agreed areas of cooperation and other areas that may be agreed upon by the Member States.
- It reaffirms the commitment to the principles and purposes of BIMSTEC as enshrined in the Bangkok Declaration of 1997.

Significance of the BIMSTEC Charter

- The adoption of the BIMSTEC Charter formalises the grouping into an organisation made up of member states that are littoral to, and dependent upon, the Bay of Bengal.
- The Charter allows BIMSTEC to engage in external relations with non-member States, developmental partners, and regional as well as the UN and International Organisations.
- It stresses the need for a fair, just, equitable, and transparent international order and reaffirms faith in multilateralism with the United Nations at the centre and the rule-based international trading system.

BIMSTEC and India

- Alignment with Foreign Policy: BIMSTEC aligns with India's 'Neighbourhood First' and 'Act East' policies.
- It provides a natural platform for India to foster greater regional cooperation in South and Southeast Asia.
- Economic Integration: BIMSTEC is an important element in India's strategy for economic cooperation with South East Asian countries.

- The BIMSTEC Free Trade Area Framework Agreement, signed in 2004, aims to increase trade and economic integration among member countries.
- Security Cooperation: India plays a significant role in BIMSTEC's security cooperation. Under the new changes adopted in the summit, India has become the 'security pillar' of BIMSTEC.
- It includes cooperation in areas such as counter-terrorism and transnational crime.
- Connectivity and Infrastructure Development: The BIMSTEC Master Plan for Transport Connectivity seeks to connect several major transport projects in India, Bangladesh, Myanmar, and Thailand and establish a shipping network across the Bay of Bengal.
- It aims to benefit the littoral states as well as the Bay of Bengal dependent states like Nepal and Bhutan.

Challenges Associated with BIMSTEC for India

- Uneven Progress: Despite being in existence for over 25 years, the pace of cooperation within BIMSTEC has been somewhat uneven.
- The progress across different sectors has been inconsistent, which has affected the overall effectiveness of the organisation.
- Regional Conflicts among member states: It can hamper the smooth functioning of BIMSTEC.
- For instance, the Rohingya refugee crisis created tensions between Myanmar and Bangladesh, which affected the working of BIMSTEC.
- Legal and Institutional Challenges: Finalising legal instruments for various initiatives, such as coastal shipping and road transport, can be time-consuming and complex.
- These can slow down the progress towards stronger trade relations among the member countries.
- Security Concerns: Terrorism remains a significant threat to peace and stability in the region.
- While BIMSTEC has been working towards strengthening cooperation against terrorism, it continues to be a major challenge.

Conclusion

- The BIMSTEC Charter represents a significant step forward in regional cooperation. It provides a robust framework for the organisation to work towards a peaceful, prosperous, and sustainable Bay of Bengal Region.
- As BIMSTEC enters a new era with the adoption of its Charter, it is poised to play a crucial role in fostering regional cooperation and integration.

Eurasian Economic Union

Syllabus: GS2/International Institutions

Context:

- Recently, India, Eurasian Economic Union (EAEU) bloc officials held talks to formally start negotiation for the Free Trade Agreement (FTA).

About (EAEU):

- It is an Economic Union, established in 2015, that integrates several post-Soviet states.
- It includes Armenia, Belarus, Kazakhstan, Kyrgyzstan, and the Russian Federation (Russia).

Objectives:

- It aims to ease cross-border trade and labour migration, and eliminate non-tariff trade barriers among member states.
- It has a Common External Tariff (CET) and a common customs code.
- It boasts a combined GDP of more than \$1.5 trillion and represents a market of 180 million consumers.

Financing for Sustainable Development Report 2024: United Nations

Syllabus: GS2/International Institutions; GS3/Inclusive Growth;

Context:

- Recently, the United Nations (UN) has recently released the 'Financing for Sustainable Development Report 2024' highlighting the urgent need for increased investment in sustainable development to achieve the SDGs.

About Sustainable Development Goals (SDGs):

- These are a set of 17 goals established by the UN as a shared blueprint for peace and prosperity for people and the planet.
- These goals, adopted by all UN Member States in 2015, are an urgent call for action by all countries – developed and developing – in a global partnership.

The Journey of SDGs:

- More than 178 countries adopted Agenda 21, a comprehensive plan of action to build a global partnership for sustainable development at the Earth Summit in Rio de Janeiro, Brazil in 1992.
- It continued through the Millennium Summit in 2000, the World Summit on Sustainable Development in South Africa in 2002, and the United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro, Brazil, in June 2012.

The 17 Goals:

- These SDGs recognise that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.



Key Issues Highlighted in Report:

- Sustainable Development Crisis: The report identified that the world is facing a sustainable development crisis. It identified financing challenges as the heart of this crisis, which threatens the achievement of the SDGs and climate action.
- Rising geopolitical tensions, climate disasters, and a global cost-of-living crisis have hit billions of people, battering progress on healthcare, education, and other development targets.
- If current trends continue, the UN estimates that almost 600 million people will continue to live in extreme poverty in 2030 and beyond, more than half of them women.
- The Finance Divide: Developing countries are paying around twice as much on average in interest on their total sovereign debt stock as developed countries.
- Staggering debt burdens and sky-high borrowing costs are preventing developing countries from responding to the confluence of crises they face.
- Many of these countries lack access to affordable finance or are in debt distress.
- The Financing Gap: The report estimated that the development financing gap has grown to USD 4.2 trillion annually, up from USD 2.5 trillion before the COVID-19 pandemic.
- It represents a more than 50% increase over the pre-pandemic estimates.
- Weak Enabling Environments: Average global growth has declined, while policy and regulatory frameworks still do not set appropriate incentives.
- Public budgets and spending are not fully aligned with SDGs. Private investors are not incentivised to invest enough in SDGs and climate action.
- Closing Window: The window to rescue the SDGs and prevent a climate catastrophe is still open but closing rapidly.

Suggestions Made in Report:

- Urgent Actions Needed: This is the last chance to correct course if we want to achieve the SDGs by the 2030 deadline.
- Only an urgent, large-scale and sustainable investment push can help us achieve our global goals.

Four Actions:

- Close financing gaps for SDG/climate investments (both public and private) at scale and with urgency;
- Close policy and architecture gaps, and reform international institutions;
- Close credibility gaps and trust deficits both international and domestically; and
- Formulate and finance new development pathways.

- Reforms in existing systems: The report concludes that the international financial system, which was set up at the 1944 Bretton Woods Conference, is no longer fit for purpose.
- It proposes a new coherent system that is better equipped to respond to crises, scales up investment in the SDGs especially through stronger multilateral development banks, and improves the global safety net for all countries.

Conclusion:

- The 'Financing for Sustainable Development Report 2024' serves as a stark reminder of the urgent need for increased investment in sustainable development.
- As the world stands at a crossroads, this report underscores the importance of closing financing gaps, reforming international institutions, and formulating and financing new development pathways.

India and Mauritius Relations

Syllabus: GS2/International Relations

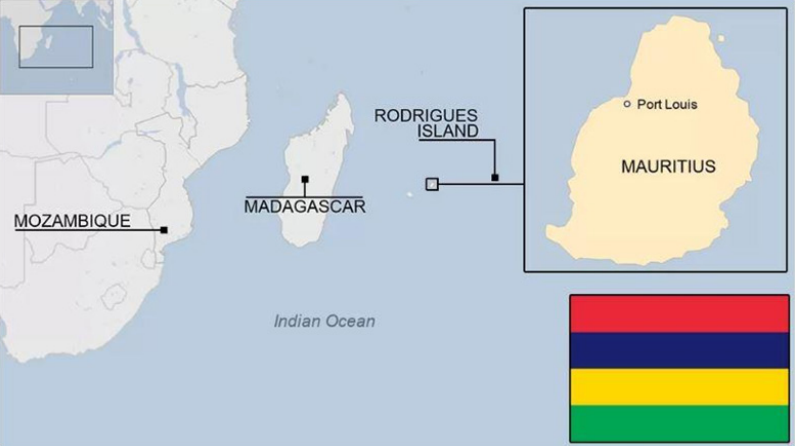
Context

- A revised tax treaty between India and Mauritius will come into effect only once the two countries sign the agreement and will not be applied retrospectively.

About

- The new provisions in the treaty include a principal purpose test, which will be used to judge whether tax benefits under the treaty will apply to investments or not.
- As per the amended treaty, tax benefits for investments will not be granted if it is ascertained that availing tax benefits was one of the reasons for the transaction.

Overview of India and Mauritius Relations

- India has close, long standing relations with Mauritius, an island nation in the Western Indian Ocean.
 - Diplomatic Relations: India and Mauritius established diplomatic relations in 1948 and have become key trading partners in the Asian continent.
 - As a tribute to Gandhiji and the Indian freedom struggle, the National Day of Mauritius is celebrated yearly on March 12 (the date of launch of Dandi Salt March).
- 
- Indian origin people comprise nearly 70% of the island's population of 1.2 million (28% Creole, 3% Sino-Mauritian, 1% Franco-Mauritian).
 - Commercial Relations: Since 2005, India has been among the largest trading partners of Mauritius.
 - For the FY 2022-2023, Indian exports to Mauritius was USD 462.69 mn, Mauritian exports to India was USD 91.50 mn and Total trade was USD 554.19 mn.
 - Cumulative FDI worth USD 161 billion came from Mauritius to India in the two decades from 2000 – 2022 (26% of total FDI inflows into India), largely due to the Double Taxation Avoidance Convention (DTAC).
 - India and Mauritius entered into the Double Taxation Avoidance Agreement in 1982 so non-residents investors can avoid paying double taxes.
 - Mauritius and India signed the Comprehensive Economic Cooperation and Partnership Agreement (CECPA) in 2021, and is the first trade agreement signed by India with an African country.
 - Defence Relations: India is the preferred defence partner of Mauritius for acquiring platforms/equipment, capacity building, joint patrolling, hydrological services, etc.
 - The first agreement relates to the transfer of a Dornier aircraft and an Advanced Light Helicopter, Dhruv, on lease to Mauritius.

- The second agreement relates to a \$100 million Line of Credit (LoC), to enable the procurement of defence equipment by Mauritius.
- SAGAR: The term SAGAR – – ‘Security and Growth for All in the Region’ was coined by PM in 2015 during his Mauritius visit with a focus on the blue economy.
- It is a maritime initiative that gives priority to the Indian Ocean region for ensuring peace, stability and prosperity of India in the Indian Ocean region.

Areas of Concern

- Tax Treaty Misuse: The Double Taxation Avoidance Agreement (DTAA) between India and Mauritius had been a point of concern due to its potential misuse for illicit activities like money laundering and round-tripping of funds.
- Security Concerns: With Mauritius emerging as an important maritime entity in the Indo-Pacific region, security concerns are paramount.
- India and Mauritius have a strong defence partnership, but maintaining and enhancing this partnership in the face of evolving regional dynamics can be challenging
- Economic Challenges: Despite being major economic partners, there are concerns regarding trade imbalances and the need to diversify the trade basket.
- Both countries may need to explore new avenues for trade cooperation and address any barriers that hinder the flow of goods and services.
- Presence of China: In recent years, several external powers, including China, have made increasing inroads in Africa and through Indian Ocean.
- In 2021, China’s Free Trade Agreement (FTA) with Mauritius came into effect.
- This agreement will help China expand the Belt and Road strategy in Africa.
- China’s increasing presence in the region will pose concerns for India.

Way Ahead

- The relationship between India and Mauritius is multifaceted and has grown stronger over the years. The two nations continue to work together in various fields, including infrastructure, FinTech, culture, and more.
- While India and Mauritius share cultural contiguity dating back to the colonial times and a special partnership in recent years, India cannot take its influence in Mauritius for granted and should continue to enhance its engagement with the important island country.

Switzerland to Host Ukraine Peace Summit

Syllabus: GS2/International Relations

Context

- Switzerland will host a high-level international conference with more than 100 countries invited to help chart a path towards peace in Ukraine after more than two years of war.

Background and Purpose of conference

- Switzerland has taken the initiative at the request of Ukraine’s President Volodymyr Zelenskyy.
- The objective of the conference is to provide a platform for a high-level dialogue on ways to achieve a comprehensive, just and lasting peace for Ukraine based on international law and the UN Charter.
- Switzerland had earlier hosted a Ukraine Recovery Conference (URC) at Lugano in July 2022, and a National Security Advisors Meeting in Davos in 2024.

Swiss history of mediation

- Neutrality is a foundational principle of Switzerland’s foreign policy. It looked after the interests of both the Kingdom of Bavaria and the Grand Duchy of Baden during the Franco-Prussian War of 1870-71.
- It acted as the protecting power during the two World Wars.
- Switzerland represented India’s interests in Pakistan and Pakistan’s in India between 1971 and 1976.
- It hosted talks between the government in Colombo and the Liberation Tigers of Tamil Eelam in 2006.
- Over the last two decades, Switzerland has been the protecting power between Saudi Arabia and Iran, the US and Iran, Russia and Georgia.

Russia’s stand

- Russia will not be a part of the first meeting. However, for the peace process Russia’s presence is necessary.
- It has said it is willing to enter talks about Ukraine, but these must respect Russia’s security interests and reflect the “new realities” on the ground.

India’s role in peace process

- Switzerland wants India to participate in the conference, to which some 120 countries will be invited at the level of Heads of State/ Government.
- From the beginning of the Ukraine conflict, India has been emphasizing on dialogue and diplomacy. It has pitched itself as being supportive of any peace process.
- India abstained from voting against Russia in several resolutions at the UN Security Council.
- India believes that it has the credibility of being a non-partisan player in the world.
- Ukraine has sought India’s support on a 10-point “peace formula”, which calls for the withdrawal of Russian troops from Ukraine, release of prisoners, restoration of Ukraine’s territorial integrity, and guarantees on nuclear safety, food and energy security.

Way Ahead

- The conference will aim to create a concrete roadmap for the peace process. However the peace effort is doomed to fail if it doesn’t take Russia’s interests into account.
- The conference is expected to be only the beginning of a process, and depending on the discussions and the course of the war, Moscow may get involved at a later stage.
- For India, which aspires to be a permanent member of the UN Security Council, the conference presents an opportunity to shape the conversation at the global high table.

India Called for UNSC Reforms

Syllabus: GS2/International Organization

Context

- India reiterated its stance on the urgent need for genuine reform of the UN Security Council.

About

- During the 6th round of the intergovernmental negotiations of UNSC, India favoured expansion of UN Security Council membership in both the permanent and non permanent categories.
- Total of 113 member states out of 122 supported expansion in both of the existing categories specified in the charter.
- This means that more than 90 percent were in favour of expansion in both categories of membership specified in the charter.

About the UNSC

- The United Nations Security Council (UNSC) is one of the principal organs of the United Nations, responsible for maintaining international peace and security.
- It was established in 1945 as part of the UN Charter and is composed of 15 member states, including five permanent members with veto power—China, France, Russia, the United Kingdom, and the United States—and ten non-permanent members elected for two-year terms by the General Assembly.
- It is headquartered in New York City.

Need for the Reforms in the UNSC

- **Under-Representation:** The current composition of the Security Council has under-representation and un-representation of key regions.
- It fails to represent the diversity of today's world, with emerging powers like India, Brazil, and South Africa, as well as regions like Africa, being underrepresented or not represented at all.
- **Inability to Address Conflicts:** The current composition of the council has an inability to address critical conflicts and maintain international peace and security.
- **Changes in World Order:** The world has undergone a sea change since 1945 and the new realities need to be reflected in the permanent membership.
- Any proposal that does not address the issue of representation of the Global South, including Africa, Asia and Latin America, in the permanent category does a grave injustice to the aspirations of developing countries for equality.
- **Veto Power:** Currently, only the five permanent members hold veto powers and through its use have stalled action in the Council to address global challenges and conflicts such as in Ukraine and Gaza.
- The remaining 10 nations in the Council are elected to sit as non-permanent members for two-year terms and do not have veto powers.
- **Legitimacy:** The disproportionate power held by the five permanent members, particularly their veto power, can lead to a perception of unfairness and lack of legitimacy.
- **Transparency and Accountability:** Critics argue that the UNSC operates with a lack of transparency and accountability, with decisions often made behind closed doors and without sufficient consultation with other UN member states.

Limitations in Introducing the Reforms in UNSC

- **Veto Power of Permanent Members:** Any reforms to the composition or working methods of the UNSC require the approval of the five permanent members.
- These countries have divergent interests and are reluctant to support changes that could diminish their influence within the Council.
- **Regional Dynamics:** Regional rivalries and geopolitical tensions complicate efforts to reform the Council.
- **Complexity of the Reform Process:** Amending the UN Charter to enact reforms requires a lengthy and complex process involving ratification by a significant number of member states, making it difficult to enact substantive reforms.
- **Chinese Opposition:** China being a permanent member blocks the growth of India becoming a Permanent Member.

Way Ahead

- It is important that both the permanent and non-permanent membership be representative of the world as it is today, not the world as it existed in the wake of the Second World War.
- Reforms in the UNSC are essential for maintaining its relevance, legitimacy, and effectiveness in addressing the complex security challenges faced by the international community.
- However, achieving consensus on such reforms among the UN's member states remains a challenging and ongoing process.

India a Top Tier Security Partner for Australia

Syllabus: GS2/IR

Context

- The new National Defence Strategy (NDS) 2024 released by Australia mentioned India as a top-tier security partner.

About

- In deepening defense partnerships, the strategy identifies key partners across multiple regions in the Indo-Pacific, including Japan and India.
- The 2024 Integrated Investment Programme (IIP) was also released which sets out the specific defence capabilities Australia will invest in to give effect to the NDS.

- The national defence strategy aims to bolster the Australian Defence Force (ADF)'s deterrence and warfighting capabilities in the Indo-Pacific, including by building stronger partnerships with key countries.
- The document mentioned that Australia will support India's role in the region and seek to drive practical bilateral and multilateral cooperation, defence industry opportunities and information sharing.

India-Australia Defence Relations

- India and Australia upgraded their bilateral relationship from a 'strategic partnership' in 2009 to a 'Comprehensive Strategic Partnership' in 2020.
- Over the past few years, several institutional mechanisms have been implemented to promote bilateral cooperation.
- Bilateral mechanisms include high-level visits, Annual Meetings of Prime Ministers, Foreign Ministers' Framework Dialogue, 2+2 Defence and Foreign Ministers' Dialogue, Joint Trade & Commerce Ministerial Commission, Defence Policy Talks, Australia-India Education Council, Defence Services Staff Talks, Energy Dialogue, JWG's on different issues etc.
- The two countries have expanded their strategic partnership, focusing on maritime security, counter-terrorism, and regional stability in the Indo-Pacific region.
- QUAD: It is known as the 'Quadrilateral Security Dialogue' (QSD) and is an informal strategic forum comprising four nations, namely — United States of America (USA), India, Australia and Japan.
- One of the primary objectives of the Quad is to work for a free, open, prosperous and inclusive Indo-Pacific region.
- Initiation of Strategic Dialogue: In 2020, Australia and India elevated their Secretaries 2+2 dialogue (Defence and Foreign Affairs) to the Ministerial level. Now the ministers meet once every two years to discuss the progress made under the Comprehensive Strategic Partnership.
- Two Navies had signed the 'Joint Guidance for the India – Australia Navy to Navy Relationship' document in 2021.
- Malabar Exercise: In 2020, Australia participated in the MALABAR naval exercise and thus joined India, the U S and Japan.
- The exercise united four regional defence partners and democracies, signifying a collective resolve to support an open and prosperous Indo-Pacific.
- AUSINDEX: It is a naval exercise between the Royal Australian Navy and the Indian Navy
- The Pitch Black exercise: A significant beginning of defence rendezvous was traversed when, for the first time, the Indian Air Force joined Exercise Pitch Black in Darwin in 2018.
- Australia's multifaceted exercise encompasses air forces from several Australian allies and partner countries.
- Mutual Logistic Support Arrangement and Defence Science & Technology Implementing Arrangement: India and Australia clinched the Mutual Logistic Support Arrangement in 2020.
- The pact enables more scholarly operational cooperation, enabling increasingly complex military engagement and excellent collective receptiveness to regional benevolent disasters.
- The shared military platforms: Indian and Australian militaries have become increasingly interoperable through the increasing number of shared media, thereby growing opportunities for shared training.
- These include C-17 strategic transport aircraft, C-130 tactical transport aircraft, P-8 maritime reconnaissance aircraft, and Chinook heavy-lift helicopters.
- The exchanges of military officials for training: India shapes its relations with its defence forces through regular personnel and training exchanges, such as short specialist courses and longer-term positions.
- Every year, India and Australia send officers to attend each other's premiere military educational institutions.



Conclusion

- Defence and strategic cooperation between India and Australia has been transformative in recent years with a series of exchanges, high-level visits and exercises, both bilateral and multilateral.

- The document emphasises that Australia will continue to support India's key role in the region by increasing the depth and complexity of defence cooperation.
- Despite a certain amount of traditional wariness among Australian analysts about the prospects of the relationship, and vice versa, there has been rapid growth in the bilateral partnership, primarily driven by the growing threat that both sides perceive from China.

Germany's Relationship with India

Syllabus: GS 2/IR

In News

- Germany has granted a licence to India to purchase small arms from German companies.

About India-Germany Relations

- Diplomatic: Germany is one of India's most important partners in Europe.
- India was also among the first countries to establish diplomatic ties with the Federal Republic of Germany after the Second World War.
- Strategic Partnership: India and Germany have a 'Strategic Partnership' since May 2000, which has been further strengthened with the launch of Intergovernmental Consultations (IGC) in 2011 at the level of Heads of Government which allows for a comprehensive review of cooperation and identification of new areas of engagement.
- High-level Engagements : There are regular high-level contacts between India and Germany. PM and Chancellor meet regularly for bilateral meetings and on the sidelines of multilateral meetings
- India is among a select group of countries with which Germany has such a dialogue mechanism.
- Multilateral Cooperation : Germany and India support each other on UNSC reforms within the framework of the G4.
- Germany joined the Coalition for Disaster Resilient Infrastructure (CDRI) in February 2020 and participated in the first Governing Council meeting in March 2020.
- In April 2021, the German Federal Cabinet approved the signing of the amended framework agreement of the International Solar Alliance (ISA), confirming Germany's accession
- Economic & Commercial Relations : Germany is currently the 12th largest trading partner for India in 2022-23.
- It was India's 11th largest trading partner in 2021-22 and 7th largest trading partner in 2020-21.
- India constitutes about 1% of Germany's total foreign trade in 2022.
- Major Indian exports to Germany include electrical products and automobiles/auto components, textile and garments, chemicals, pharma, metal/metal products, food/beverages and tobacco and leather/leather goods.
- Major exports to India include machinery automobiles/auto components, chemicals, data processing equipment, and electric equipment
- Germany is the 9th largest foreign direct investor in India (8th largest in 2021-22) with a cumulative FDI in India of US\$ 14.1 bn. from April 2000 to March 2023.
- Bilateral Cooperation : Important bilateral agreements between India and Germany are the Agreement on Avoidance of Double Taxation (DTAA), which came into force in 1996, and the Comprehensive Agreement on Social Security, which entered into force from May 2017
- The Indo-German Energy Forum (IGEF) has been promoting cooperation in the priority areas of energy security, energy efficiency, renewable energy, investment in energy projects and collaborations in R&D, taking into account the environmental challenges of sustainable development.
- Science & Technology : Bilateral Science and Technology cooperation is implemented under an Inter Governmental Agreement on 'Cooperation in Scientific Research and Technological Development' signed in 1974
- The IndoGerman Committee on S&T, established in 1994 coordinates the implementation and reviews joint activities.
- Culture : The longstanding cultural relations between India and Germany are strengthened by the cultural and intellectual exchanges between the two countries. The study of Indian literature, especially Vedas

and Upanishads, and also translation of famous works from Sanskrit to German language significantly contributed to the better understanding of India.

- The visit of Nobel Laureate Gurudev Rabindranath Tagore to Germany in 1921, 1926 and 1930 bridged cultural and intellectual exchange between India and Germany, further supported by established networks in socio-cultural fields.
- Indian Diaspora : There are around 2.20 lakh (December 2022) Indian passport holders and Indian-origin people in Germany.
- There has been a significant increase in the number of qualified and highly skilled Indian professionals in the fields of IT, banking, finance, etc
- Defence: Germany has significantly simplified the licensing requirements for the sale of military equipment to India.
- Germany granted a small arms licence to India. which is a huge exception.
- Germany for some time has had a bar on the sale of small arms to third countries with the exception of European Union member states, NATO (North Atlantic Treaty Organisation) countries and NATO-equivalent countries (Australia, Japan, New Zealand and Switzerland).
- The German government has also eased the approval process for defence purchases by India.
- India has an inventory of MP5 submachine guns manufactured by Heckler & Koch.
- Germany has also approved the offer of a tank engine and propulsion system for India's indigenous light tank project.
- In August 2024, the Indian Air Force (IAF) is scheduled to hold the multilateral exercise Tarang Shakti, in which the German Air Force would be joining other countries like the U.K, France, and Spain.

U.K. Passes Rwanda Deportation Bill

Syllabus: GS2/International Relations

Context

- The Safety of Rwanda (Asylum and Immigration) Bill 2023, is passed by the government of the United Kingdom.

Background

- The deportation scheme, for asylum seekers deemed to have entered the UK “illegally”, was first proposed in 2022 as a way of tackling “small boats” crossings of the Channel from northern France.
- Under the Safety of Rwanda Bill, anyone who arrived “illegally” in Britain after January 1, 2022 will be sent to the Rwandan capital of Kigali, where they will either be granted asylum and resettled in Rwanda or be sent to a third country.

Ethical issues with the Bill

- Human rights groups have criticized the plan as inhumane and unworkable.
- In 2023, the supreme court declared the scheme unlawful, pointing out that Rwanda was not a “safe” country and the plan went against the European Convention on Human Rights (ECHR).
- Highlighting the dangers of transferring refugees and asylum seekers to third countries without sufficient safeguards, the United Nations Refugee Agency said they must not be traded like commodities and transferred abroad for processing.
- Rwanda has a known track record of extrajudicial killings, suspicious deaths in custody, unlawful or arbitrary detention, torture, and abusive prosecutions, particularly targeting critics and dissidents.

1951 Refugee Convention

- The 1951 Refugee Convention and its 1967 Protocol are the key legal documents that form the basis of United Nations High Commissioner for Refugees (UNHCR's) work.
- The Convention is both a status and rights-based instrument and is underpinned by a number of fundamental principles.
- The core principle of the Convention is non-refoulement, which asserts that a refugee should not be returned to a country where they face serious threats to their life or freedom.

- The document outlines the basic minimum standards for the treatment of refugees, including the right to housing, work and education while displaced so they can lead a dignified and independent life.
- It also defines a refugee's obligations to host countries and specifies certain categories of people, such as war criminals, who do not qualify for refugee status.
- It details the legal obligations of the States that are party to one or both of these instruments.

India's stand on refugee convention

- India is not a signatory to the 1951 UN Convention relating to the Status of Refugees and the 1967 Protocol.
- All foreign undocumented nationals are governed as per the provisions of The Foreigners Act, 1946, The Registration of Foreigners Act, 1939, The Passport (Entry into India) Act, 1920 and The Citizenship Act, 1955.
- As per the MHA foreign nationals who enter into the country without valid travel documents are treated as illegal immigrants.
- The constitution of India protects the refugees' right to life with dignity that includes right against solitary confinement and custodial violence, right to medical assistance and shelter.

Overview of migration terms

- Asylum seeker: A person who is seeking international protection. Prior to being granted legal status in the destination country, refugees are termed asylum seekers. Not all asylum seekers will be granted refugee status.
 - Internally displaced person: Someone who has been forced to flee from their home to avoid conflict, violence and disasters and has moved within an internationally recognized state border.
 - Migrant: A migrant is an “umbrella term, not defined under international law, reflecting the common lay understanding of a person who moves away from his or her place of usual residence, whether within a country or across a border, temporarily or permanently, and for a variety of reasons”.
 - Refugee: According to the 1951 United Nations Convention, refugees are individuals living outside their countries of origin who are in need of international protection because of feared persecution, or a serious threat to their life, physical integrity or freedom in their country of origin.
- a. Refugees have legal permission to remain in the host country and may have access to health care, education and welfare benefits.

Real Estate (Regulation and Development) Act, 2016

Syllabus: GS3/Economy

Context

- The Union Ministry of Housing and Urban Affairs is in the process of reviewing the functioning of the Real Estate (Regulation and Development) Act, 2016.

About

- In order to protect the interest of homebuyers and to ensure transparency and accountability in the Real Estate Sector, Parliament enacted the RERA Act.
- The key objectives of the Act are:
 - Ensuring Transparency in the real estate sector concerning the sale of flats, apartments, plots, buildings, or any kind of real estate project.
 - Establishing an adjudicating mechanism for speedy dispute redressal.
 - Protecting the interest of buyers/allottees in the real estate sector.
 - Establishing a bridge of trust between buyers and the promoters, using authority as a medium.
- The Real Estate Regulatory Authorities established under the Act are required to publish and maintain a web portal, containing relevant details of all real estate projects for which registration has been given, for public viewing.
- Reasons For Introducing RERA: Since 2012 Indian real estate sector has been facing collapse due to factors like: Unemployment, Recession, Low rental yield, Inventory pile-up, Unclear taxes and arbitration.
- Projects Under RERA
 - Commercial and residential projects including plotted development.
 - Projects measuring more than 500 sq. meters or 8 units.
 - Projects without Completion Certificate, before the commencement of the Act.

Advantages Of RERA

- RERA has brought uniformity in the real estate sector related to carpet area, common areas which will prevent malpractices like changes in layout, area, agreement, specifications, details about the broker, architect, and contractor, etc.
- Developers need to make timely delivery of the booked office spaces or homes. If not strict compensation and imprisonment can be taken against the developer.
- Completion of clearance from the government departments is compulsory before selling any house or office space.
- A separate bank account should be opened for each of the projects promoted by a developer.
- The buyer can approach the developer for any defect in the building within a year of the handover and get it rectified free of charge.

Disadvantages Of RERA

- The rules and regulations do not apply to the ongoing projects or projects that are held up due to some clearance issues.
- Government agency delay in approval and clearance may hinder the timely delivery of products.
- Small developers with projects less than 500 sq. m. do not come under the purview of this act and registration with the regulator is not mandatory for these.
- Without clearance, projects cannot be launched and so the launching of new projects may get delayed.

Conclusion

- The RERA is committed to the successful and effective implementation of the real estate law of the country and has taken relevant and consistent measures for the progressive development of the sector in the country.
- To encourage sustainable development of the RERA, along with a customer-friendly environment, various policy measures incorporated under the RERA would certainly bring remarkable changes in the economic and social transformation.

India's Coal and Lignite Production Hits All-time High

Syllabus: GS 3/Economy

In News

- India has for the first time crossed the milestone of 1 billion tonnes of coal and lignite production in the financial year 2023-24.

About the Coal Deposits

- The Indian coal deposits are primarily concentrated in the Gondwana sediments occurring mainly in the eastern and central parts of Peninsular India, although Gondwana coal deposits also occur in Assam and Sikkim in the north eastern part of the country.
- The Tertiary coal-bearing sediments are found in Assam, Arunachal Pradesh, Nagaland and Meghalaya.
- Coal resources have been found mainly in West Bengal, Jharkhand, Bihar, Odisha, Chhattisgarh, Madhya Pradesh, Andhra Pradesh, Telangana, Maharashtra and a few states of North-Eastern Region.

Do you know ?

- Lignite is a low grade brown coal, which is soft with high moisture content.
- The principal lignite reserves are in Neyveli in Tamil Nadu and are used for generation of electricity.
- A. Other areas where lignite deposits have been located are Gujarat, Jammu & Kashmir, Kerala, Rajasthan, West Bengal and Puducherry
- Coal that has been buried deep and subjected to increased temperatures is bituminous coal.
- It is the most popular coal in commercial use.
- Anthracite is the highest quality hard coal.

Status

- India's total coal and lignite output was at 937 million tonnes (MT) in the preceding 2022-23 fiscal, as per official figures.
- Owing to favourable support from the Government resulting in capacity expansion, coal and lignite production has grown by more than 70 per cent over the last 10 years.
- The world's second largest consumer, after China, had produced 937.22 mt of coal and lignite in FY23.
- India surpassed the one billion tonnes production milestone on March 22, 2024, going past FY23's entire production 25 days in advance.
- Majorly imports: Indonesia, Australia and South Africa

Importance

- Coal is the most important and abundant fossil fuel in India. It accounts for 55% of the country's energy needs.
- The country's industrial heritage was built upon indigenous coal.
- Coal accounts for over 70% of India's electricity output, and utilities account for about 75% of India's coal consumption.
- Coal plays a pivotal role in sustainable development and an essential input to most steel production
- In addition, other industries like cement, fertilizer, chemical, paper and thousands of medium and small-scale industries are dependent on coal for their process and energy requirements
- Apart from creating direct employment opportunities, mining activities also generate significant indirect employment, contributing to socio-economic development.

Issues and Challenges

- Environmental: From mining to coal cleaning, from transportation to electricity generation to disposal, coal releases numerous toxic pollutants into the air, water and land.
- These disrupt ecosystems and endanger human health

Shortage:

- As coal production is increasing, resource is depleting at a faster rate
- The biggest reason for coal shortage is the increasing power demand.
- Un-seasonal and extended Rainfall in the coal bearing areas.
- Non-Payment of commensurate Coal value along with huge outstanding dues by Power Sector consumers.
- Frequent Labour/ Industrial Relation (IR) issues in the Coal fields.
- Land acquisition issues.

Conclusion and Way Forward

- India is increasing renewable capacity but it will also have to rely on coal power until it achieves developed country status
- Countries reached a historic deal on a 'transition away from fossil fuels' at COP28 in Dubai while emerging economies like India and China strongly resisted the targeting of coal.
- There is a need to revise the emission standards for coal power plants for particulates and introduce new emission standards for other pollutants.
- Reuse and recycling can also reduce the environmental effects of coal production and use.
- India's long-term goal of reaching net-zero by 2070, it must continue to implement clean coal technologies to reduce the power sector's emissions.

Recent Coal Sector Reforms

- 1973: Nationalisation of Coal mining was done.
 - a. Pvt. Sector only uses it for captive (own) purpose.
- 2014: SC cancels Coal blocks.
- 2015: Coal Mines (Special provisions) (CMSP) Act introduced (Pvt Sector involved through auctioning)
- 2020: Mineral Laws (Amendment) Act (Removal of restriction on end-use of coal)
 - a. Right to exploit coal bed methane (CBM) and minor minerals have been provided
- Others: Prakash Portal for coordination, Infra under AtmaNirbhar Policy.
 - a. Online single-window clearance system.

RBI's Monetary Policy

Syllabus: GS3/Indian Economy

Context

- The Monetary Policy Committee (MPC) of the Reserve Bank of India (RBI), decided to keep the repo rate unchanged at 6.5 percent.

Key Decisions/Highlights from April MPC:

- RBI has forecast the Indian economy to grow at 7 percent in FY25.
- The Committee sees Q1FY25 growth rate at 7.1%, Q2 at 6.9%, Q3 and Q4 at 7% each, with risks evenly balanced.
- Forex reserves at an all time high of \$645.6 billion as of March 29.
- Inflation: Core inflation has declined steadily over the past 9 months to its lowest level in the series.
- Indian Rupee: The Indian rupee (INR) was most stable in FY24 among major economies.
- As compared to the previous 3 years, INR exhibited lowest volatility in 2023-24.
- INR stability mirrors strong fundamentals, financial stability, and external improvements.
- Food prices: An expected normal south-west monsoon should support agricultural activity.
- Low reservoir levels, especially in the southern states and outlook of above normal temperatures during April-June, also pose concern.
- Pulses and vegetable prices require close monitoring.

About RBI Monetary Policy Committee

- The Monetary Policy Committee or the MPC is a 6 member committee that is led by the RBI governor.
- The first such MPC was constituted in 2016.
- The MPC determines the policy repo rate required to achieve the inflation target.
- The MPC is required to meet at least four times in a year. The quorum for the meeting of the MPC is four members.
- Each member of the MPC has one vote, and in the event of an equality of votes, the Governor has a second or casting vote.
- Each Member of the Monetary Policy Committee writes a statement specifying the reasons for voting in favour of, or against the proposed resolution.

What is Monetary Policy?

- It is the use of operating instruments available to central banks to achieve stated objectives.
- The central bank, such as India's Reserve Bank of India (RBI), formulates and implements policy measures to achieve these objectives.
- The instruments available to CBs include fractional reserve banking, Liquidity Adjustment Facility, Open Market Operations, Forward Guidance, and Policy Communication.
- In an "Inflation Targeting" (IT) framework the CB is mandated to manage inflation.
- India adopted IT in 2016 and targets 4% of inflation with a band of 2%.

Instruments of Monetary Policy

Fractional Reserve Banking:

- CRR: RBI mandates banks to keep a fraction of deposits with RBI. This rate is called the Cash Reserve Rate. An increase in CRR would reduce the money at the disposal of banks to lend, reducing overall money supply.
- SLR: RBI also has made it statutorily mandatory for banks to invest in government bonds and safe deposits. This mandated fraction is called the Statutory Liquid Ratio (SLR). Currently, the SLR is 18%.

Liquidity Adjustment Facility (LAF):

- Repo Rate: It is the interest rate at which the bank can raise money from RBI-on an overnight basis-against the collateral of government securities. Lower Repo rate will make it easier for the bank to borrow and inject more money in the economy.
- Reverse Repo Rate: The rate at which the bank can park their collateral of government securities with RBI is called the Reverse Repo rate.
- Standing Deposit Facility (SDF) Rate: It is the rate at which RBI accepts non collateralized deposits, on an overnight basis, from all LAF participants. It is fixed 25 bps below the repo rate.
- Marginal Standing Facility (MSF) rate: It is the additional rate- fixed 25 bps above the repo rate- at which banks can borrow, on an overnight basis, from the RBI dipping into their Statutory Liquidity Ratio (SLR) portfolio up to a predefined limit of 2 percent.
- Bank Rate: The Bank Rate is the additional rate the bank has to incur for not meeting the CRR and SLR norms. It is aligned with the MSF.
- Open Market Operations: From time to time, RBI uses the sale and purchase of Government Securities intending to inject liquidity into the economy. This is called open market operations.

13th Finance Commission Chairman called for GST Reform

Syllabus: GS3/Indian Economy

Context

- Recently, Vijay Kelkar, Chairman of the Thirteenth Finance Commission and a key architect of India's tax reforms, has called for urgent reforms in the GST regime.

About

- The Goods and Services Tax (GST), introduced in India in 2017, is characterised by multiple tax rates and a compensation cess on certain goods.

- The structure, which was largely designed to maintain revenue neutrality, has been deemed counter-productive.
- High GST rates have led to an increase in tax evasion and fraud.

Key Issues involved in GST Regime

- Multiplicity of Tax Slabs: One of the persistent challenges with the GST regime is the multiplicity of tax slabs.
- The GST regime in India is characterised by multiple tax rates and a compensation cess on certain goods.
- It, largely designed to maintain revenue neutrality, has been deemed counter-productive.
- Compliance Burden: While GST intended to simplify tax procedures, the compliance burden on businesses has increased significantly.
- Frequent changes in tax returns and reporting requirements have turned out to be a compliance nightmare.
- Delayed ITC Refunds & Penalties for Belated Filings: Delayed Input Tax Credit (ITC) refunds and penalties for belated filings are other significant issues faced by taxpayers.
- Ambiguity in Anti-Profitteering: There is ambiguity in the anti-profitteering rules under the GST regime.
- These rules are intended to ensure that businesses pass on the benefit of reduced tax incidence to consumers.
- However, the lack of clear guidelines has led to confusion.
- Technical Glitches in GST Portal: The GST portal has been a puzzle and cause of concern for many taxpayers since its inception.
- Harmony between the provisions of the law and the functionality offered on the GST portal remains elusive.

Single Tax Rate suggested by Vijay Kelkar

- Vijay Kelkar suggested switching to a single tax rate of 12% and sharing revenues with local governments and municipal corporations.
- He argued that the genesis of the current GST frauds lies in the very structure of the GST rates.
- High rates of GST make it lucrative for fraudsters to evade taxes.
- A single GST rate of 12%, with revenues shared equally with all tiers of the government and Union Territories, should be introduced at the earliest.

Benefits of a Single GST Rate

- Most developed and emerging market economies have a policy of a single GST or Value Added Tax (VAT) rate on goods and services.
- Countries with a single rate and simple GST or VAT laws have been successful in optimising tax revenue and minimising tax disputes.
- Of countries with GST or VAT systems, 80% have opted for a single tax rate, including Singapore, New Zealand, the United Arab Emirates, and Japan.

Conclusion

- The GST regime in India is in urgent need of reform. Simplifying the structure and switching to a single tax rate would not only make the system more efficient but also curb tax evasion and fraud.
- It's time for the government to take decisive action and make the necessary changes to the GST regime.

Will new solar power rules boost production?

Syllabus: GS3/Economy

Context

- The Ministry of New and Renewable Energy (MNRE) has brought into effect the Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order, 2019.

Background

- The order was first issued by the MNRE in 2019 and requires makers of solar modules to voluntarily submit to an inspection of their manufacturing facilities by the National Institute of Solar Energy.
- Being on the list as an 'approved' manufacturing facility certifies a company as a legitimate manufacturer of solar panels and not a mere importer or assembler.

What are solar modules?

- Solar Modules are multiple solar panels joined together and Solar panels are an assembly of solar cells.
- The solar cells absorb sunlight as a source of energy to generate electricity. An array of modules are used to supply power to buildings.
- They are manufactured from semiconductor materials like crystalline silicon.

Significance of being in the list

- The major advantage of being on the list is eligibility to compete for tenders issued by the government for its flagship solar energy programmes.
- The manufacturers, certified as part of the Approved Models and Manufacturers (AMM) list, would be eligible for various government schemes like,
- PM Surya Ghar Muft Bijli Yojana, subsidizing rooftop solar installations for nearly one crore households in the country involving an estimated subsidy of 75,000 crore.
- PM KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyaan), that aims to provide solar pumpsets and rural electrification.
- Production Linked Incentive Scheme, targeted at incentivising domestic manufacture of solar panels and their components.

Solar module production in India

- The installed capacity of solar PV module manufacturing capacity in the country is around 50 GW.
- The installed capacity of solar cell manufacturing in the country is around 6 GW.
- Import: Around 11,171 Million USD of solar cells and modules have been imported into the country in the last five years, which is around 0.4% of total India's merchandise imports during the same period.
- Export: Solar panels worth 1.03 billion USD exported from India in 2022-23.

Why is India reliant on imports?

- India has limited capacity to make the raw material of a cell — ingots, wafers — and is dependent on imported cells.
- Lack of Skilled labor which is essential for manufacturing high-quality solar components.
- Lack of an integrated set-up and the economies of scale (despite 100 per cent FDI in the renewable energy sector) translates into higher cost of domestic production.

Targets set by India

- India has ambitious plans of sourcing about 500 GW, nearly half its requirement of electricity, from non-fossil fuel sources by 2030.
- This would mean at least 280 GW from solar power by that year or at least 40 GW of solar capacity being annually added until 2030.
- The difficulty is that meeting the targets requires many more solar panels and component cells than India's domestic industry can supply.

Approved list of Models and Manufacturers (ALMM)

- The ALMM Order states that ALMM shall consist of;
 - a. LIST-I, specifying models and manufacturers of Solar PV Modules and
 - b. LIST-II, specifying models and manufacturers of Solar PV Cells.
- Only the models and manufacturers included in ALMM List-I (of solar PV modules) are eligible for use in Government Projects/ Government assisted Projects/ Open Access / Net-Metering Projects, installed in the country.
- The word "Government" includes Central Government, State Governments, Central Public Sector Enterprises, State Public Sector Enterprises, and Central and State Organizations / Autonomous bodies.

Way Ahead

- The country has achieved self-sufficiency in the production of solar modules / panels but the country is yet to achieve substantial capacity in production of solar cells.
- The creation of such a list will help to restrict imports from China, which controls nearly 80% of the global supply.

Surge in Steel Imports

Syllabus: GS 3/Economy

In News

- Recently, the Indian steel industry has expressed concern over India becoming a net importer of steel in 2023-24.

About the Steel Sector

- Steel has traditionally occupied a top spot among metals.
- Steel production and consumption are frequently seen as measures of a country's economic development because it is both a raw material and an intermediary product.
- The Indian steel industry is classified into three categories – major producers, main producers and secondary producers.
- India has set a target of having an installed steel manufacturing capacity of 300 MT by 2030.

Importance

- The steel sector plays a pivotal role in crucial sectors such as construction, infrastructure, automobile, engineering and defence.
- Over the years, the steel sector has witnessed tremendous growth and India has emerged as a global force in steel production and the 2nd largest producer of steel in the world.
- The growth in the Indian steel sector has been driven by the domestic availability of raw materials such as iron ore and cost-effective labour.
- The Indian steel industry is modern, with state-of-the-art steel mills.
- It has always strived for continuous modernisation of older plants and up-gradation to higher energy efficiency levels.
- Consequently, the steel sector has been a major contributor to India's manufacturing output.

Related Steps

- The Union Cabinet gave its approval for National Steel Policy (NSP) 2017 which enshrines the long term vision of the Government to give impetus to the steel sector.
- It seeks to enhance domestic steel consumption and ensure high quality steel production and create a technologically advanced and globally competitive steel industry.
- In October 2021, the government announced guidelines for the approved specialty steel production-linked incentive (PLI) scheme.
- FDI: The Government has allowed 100% FDI through automatic route for the steel sector in India.

Concerns

- Low investment in technology and Infrastructure
- Raw material availability is the key challenge for the steel industry.
- India has registered a 38% surge in imports of finished steel to 8.319 million tonnes (MnT) over 6.022 MnT imported during the preceding 2022-23 fiscal.
- The surge in predatory imports from China is a big threat to the Atma Nirbharta in steel.
- Health and safety are the most neglected concerns in Indian steel sector.
- Steel production is an energy intensive process that has a significant environmental impact.

Conclusion and Way Forward

- The steel industry has emerged as a major focus area given the dependence of a diverse range of sectors on its output as India works to become a manufacturing powerhouse through policy initiatives like Make in India.
- There is a need to ensure a sustainable supply of crucial raw materials, such as iron ore and coking coal, along with enhancing export competitiveness that will be vital for achieving this ambitious goal.
- India's steel industry faces threat from predatory imports.
- Restricting steel imports is crucial to safeguard investments and ensure robust GDP growth.
- It becomes imperative for the industry to strategize ways to enhance the cost competitiveness of products.

Horticulture Cluster Development Programme (CDP)

Syllabus: GS3/Economy, Agriculture

Context

- The government has come up with a new platform to disburse subsidies to horticulture farmers under the Cluster Development Programme (CDP) known as CDP-SURAKSHA.

CDP-SURAKSHA

- The CDP-SURAKSHA is essentially a digital platform. SURAKSHA stands for “System for Unified Resource Allocation, Knowledge, and Secure Horticulture Assistance.”
- The platform will allow an instant disbursement of subsidies to farmers in their bank account by utilising the e-RUPI voucher from the National Payments Corporation of India (NPCI).
- The voucher is a one-time payment mechanism that can be redeemed without a card, digital payments app or internet banking access, at the merchants accepting e-RUPI.
- e-RUPI can be shared with the beneficiaries for a specific purpose or activity by organisations or government via SMS or QR code.
- Significance: The CDP-SURAKSHA platform will provide subsidies to farmers upfront, at the time of purchasing the planting material.
- Vendors, who will supply planting materials to farmers, will receive their payment only after farmers verify the delivery of their orders.
- The move seeks to push the growth of India’s horticulture sector.

Horticulture Sector in India

- Horticulture is the science and art of cultivating fruits, vegetables, flowers, and ornamental plants.
- It encompasses a wide range of activities including plant propagation, production, management, and marketing.
- The Indian horticulture sector contributes about 33% to the agriculture Gross Value Added (GVA) making a very significant contribution to the Indian economy.
- India is currently producing about 320.48 million tons of horticulture produce which has surpassed the food grain production, that too from much less area.
- Productivity of horticulture crops is much higher compared to productivity of food grains.
- At present, India is the second largest producer of vegetables and fruits in the world.
- India ranks first in the production of a number of crops like Banana, Lime & Lemon, Papaya, Okra.
- India’s advantage lies in being a low-cost producer of fruits and vegetables because of a combination of factors such as favourable agro-climatic conditions, availability of labour, and low input costs.
- As a result, fruits and vegetables account for almost 90% of the total horticulture production in the country.

Challenges Faced by the Sector

- Lack of Infrastructure: Insufficient infrastructure for post-harvest handling, storage, and transportation leads to significant losses of perishable horticultural produce.
- Water Management: Horticulture is water-intensive, and water scarcity or inefficient water management practices affect crop yields and quality.
- Pest and Disease Management: Pests and diseases cause significant damage to horticultural crops, and the misuse of pesticides lead to environmental pollution and health hazards.
- Market Linkages: Limited market linkages and price fluctuations affect farmers’ income and discourage investment in horticultural production.
- Climate Change: Erratic weather patterns, including unpredictable rainfall and temperature fluctuations, pose challenges to horticultural production and require adaptation strategies.
- Quality Standards and Certification: Meeting quality standards and obtaining certification for export markets can be challenging for small-scale horticultural producers.

Government of India Initiatives for the Promotion of Horticulture Sector

- National Horticulture Mission (NHM): Launched in 2005-06, NHM aims to promote holistic growth of the horticulture sector by enhancing production, productivity, and quality of horticulture crops.

- It focuses on creating infrastructure, providing technical assistance, and promoting market linkages.
- National Horticulture Board (NHB): NHB provides financial assistance, technical guidance, and market intelligence to horticulture growers, processors, and exporters to promote production, processing, and marketing of horticultural crops.
- Cluster Development Program (CDP): The CDP is a component of the central sector scheme of NHB.
- It is aimed at leveraging the geographical specialisation of horticulture clusters and promoting integrated and market-led development of pre-production, production, post-harvest, logistics, branding, and marketing activities.
- So far, 55 horticulture clusters have been identified, out of which 12 have been selected for the pilot.
- Mission for Integrated Development of Horticulture (MIDH): MIDH, launched in 2014, integrates various horticulture development schemes under one umbrella to provide holistic support for the entire value chain, from pre-production to post-harvest management and marketing.
- Rashtriya Krishi Vikas Yojana (RKVY): RKVY supports states in planning, implementing, and monitoring their horticulture development strategies by providing financial assistance for infrastructure development, capacity building, and other interventions.
- Sub-Mission on Agriculture Mechanization (SMAM): SMAM supports the adoption of mechanization in horticulture for activities like land preparation, planting, harvesting, and post-harvest management to improve efficiency and reduce labor dependency.

Global Trade Outlook and Statistics Report

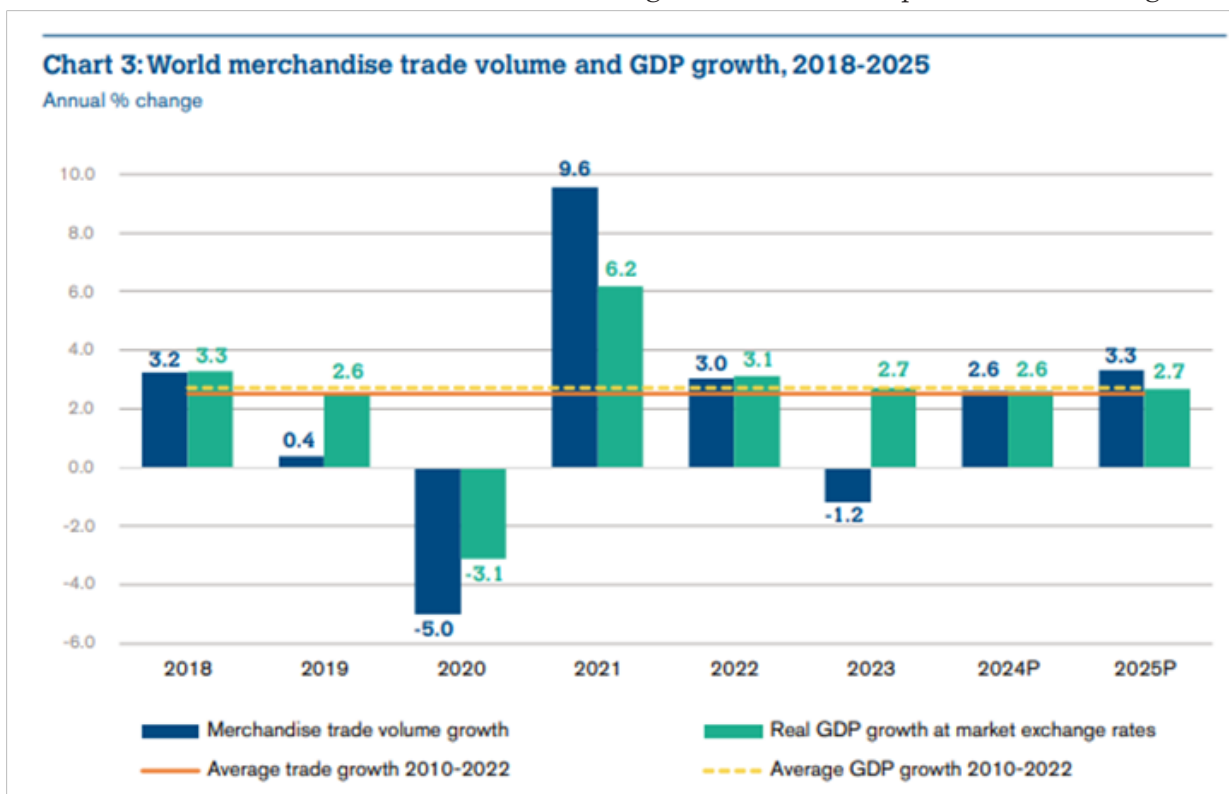
Syllabus: GS3/ Economy

Context

- According to the World Trade Organization's (WTO), Global Trade Outlook and Statistics, Global goods trade is expected to pick up in 2024 following a contraction in 2023.

Key Findings

- World merchandise trade volume is expected to increase by 2.6% in 2024 and 3.3% in 2025 after a decline of 1.2 per cent in 2023.
- World real GDP growth at market exchange rates slowed from 3.1% in 2022 to 2.7% in 2023 but is expected to remain stable over the next two years at 2.6% in 2024 and 2.7% in 2025.
- The US dollar value of world merchandise trade fell 5% in 2023 to US\$ 24.01 trillion but this decline was mostly offset by a strong increase in commercial services trade, which rose 9% to US\$ 7.54 trillion.
- Trade in services: World commercial services trade grew 9% in 2023 despite a decline in freight transport.



Regional trade outlook

- Africa's exports will grow faster than those of any other region in 2024, up 5.3%.
- North America (3.6%), the Middle East (3.5%) and Asia (3.4%) should all see moderate export growth. European exports are expected to lag behind those of other regions, with growth of just 1.7%.
- Merchandise exports of least-developed countries (LDCs) are forecasted to grow 2.7% in 2024, down from 4.1% in 2023, before growth accelerates to 4.2% in 2025.
- Imports by LDCs should grow 6.0 percent this year and 6.8 percent next year following a 3.5% contraction in 2023.

Downside risks

- Red Sea crisis: Attacks on commercial ships in the Red Sea and the Gulf of Aden have caused the average number of weekly passages to plunge more than 45% (264 in 2024, compared to 489 a year earlier).
- The monthly volume of shipments through the Suez Canal in metric tons has fallen 54%.
- Energy Prices: Red sea crisis raised concerns about a potential temporary oil shortage in certain regions potentially contributing to additional inflationary pressures.

World Trade Organization (WTO)

- WTO is the international organization that deals with the rules of trade between countries.
- History: WTO was founded in 1995. It is the successor to the General Agreement on Tariffs and Trade (GATT) established in the wake of the Second World War.
- Headquarters: Geneva, Switzerland
- Member: The WTO is run by its 164 members.
- Mandate: Its aim is to promote free trade, which is done through trade agreements that are discussed and signed by the member states.
 - a. The WTO also provides a forum for countries to negotiate trade rules and settle economic disputes between them.

WTO's Ministerial Conference

- The Ministerial Conference is the WTO's top decision-making body. It usually meets every two years.
- All members of the WTO are involved in the Ministerial Conference and they can take decisions on all matters covered under any multilateral trade agreements.

Asian Development Outlook (ADO), 2024

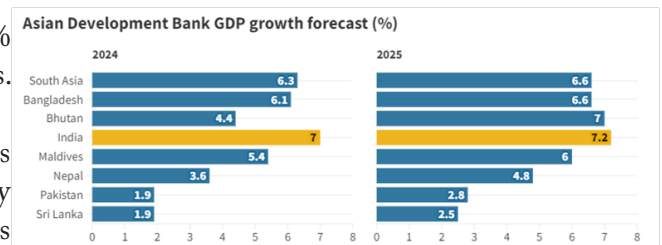
Syllabus: GS3/Economy

Context

- The Asian Development Bank (ADB) has prepared the Asian Development Outlook (ADO), 2024.

Key Findings

- Asia's economy expanded by 5.0% in 2023 from 4.3% in 2022, but growth was uneven across subregions. Growth will remain at 4.9% in 2024 and 2025.
- Export growth for high-income technology exporters turned positive in the last quarter of 2023, rising by 5.4% as demand for semiconductors and electronics began to gain traction.
- International tourism continued to recover, reaching 73% of pre-pandemic levels by the end of 2023.
- Asia's inflation is projected to fall from 3.3% in 2023 to 3.2% in 2024 and 3.0% in 2025.



Issues and Concerns

- There are several risks to developing Asia's growth outlook, including the current conflicts in the Middle East and geopolitical tensions.
- Uncertainty about US interest rates, intensified weakening of the property sector in the People's Republic of China, and the effects of extreme weather also weigh on the region's outlook.

Indian Scenario

- ADB revised its GDP growth forecast for India, raising it to 7% for the fiscal year 2023-24 from its previous projection of 6.7%.
- India's 'persistent' food inflation is expected to drop to 5.7% as farm output returns to trend this year.
- As India accounts for 80% of South Asia's GDP, it is still the fastest-growing sub-region with improving domestic demand as prices moderate in most economies.
- India's growth will be driven by public and private sector investment demand and by gradual improvement in consumer demand as the rural economy improves.
- Foreign direct investment inflow will likely remain muted in the near term due to tight global financial conditions but will pick up in 2025-26 with higher industry and infrastructure investment.

Suggestions for Boosting Trade

- India's growth strategy is predicated on substantial export growth. It can be achieved through integration into global value chains (GVCs).
- A target of \$2 trillion in exports of goods and services has been set by the government to be achieved by 2030.
- Participation in GVCs encourages FDI, which can generate spillover benefits in terms of productivity improvement and technology upgrades.
- India has been a global leader in service trade. Its share of global service exports increased from 3.5% in FY2017 to 4.6% in FY2022. However, goods exports have a larger impact on employment and growth than do service exports.
- A simplified tariff policy is needed along with continued efforts to improve trade and logistics infrastructure

Asian Development Bank

- ADB is a regional development bank established in 1966 for Social and Economic Development. It has 68 members.
- It is a multilateral development bank, which seeks to help its developing member countries to reduce poverty and improve their people's quality of life through inclusive economic growth, environmentally sustainable growth and regional integration.
- Headquarters: Manila, Philippines.

Gas Based Power Generation in India

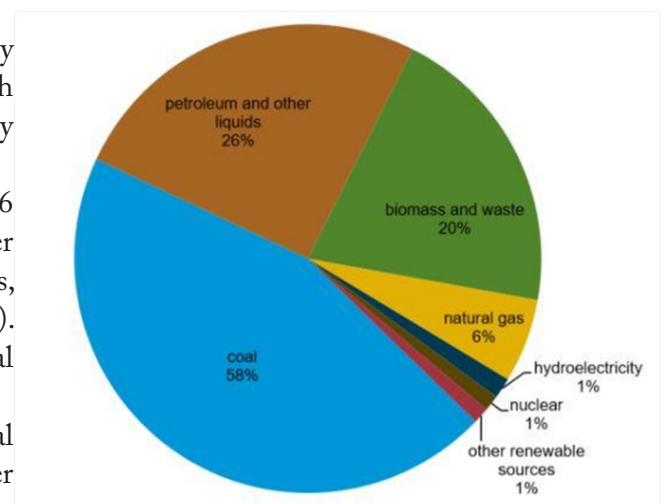
Syllabus: GS3/Indian Economy

Context

- The Centre has directed all gas-based power generating stations to operationalise their plants from May 1 to June 30 in view of rise in electricity demand due to an early onset of the heat wave this summer.

India's Gas Based Energy Sector

- The Central Electricity Authority under the Ministry of Power, monitors 62 gas based power stations, with a total capacity of 23,845 MW using gas as primary fuel.
- India's natural gas demand is expected to rise by 6 percent in 2024 with a rise in consumption in fertiliser units, power generation and industrial sectors, according to the International Energy Agency (IEA).
- India is the 4th largest importer of liquefied natural gas (LNG).
- Significance: Gas-based power plants offer several advantages, including lower emissions and quicker ramp-up times compared to coal-based plants.
- However, the share of gas-based power generation in India's total power mix remains relatively small compared to coal and renewable energy sources.



Need for the Gas Based Power Generation in India

- **Cleaner Energy Source:** Gas-based power generation emits fewer pollutants compared to coal-based power plants, making it a cleaner option, especially in urban areas where air quality is a significant concern.
- **Flexibility and Efficiency:** Gas-based power plants are highly efficient and offer greater operational flexibility compared to coal-based plants.
- **Reduced Dependence on Coal:** India heavily relies on coal for electricity generation, but diversifying the energy mix with gas can reduce this dependence, enhancing energy security and reducing vulnerability to supply disruptions.
- **Rapid Deployment:** Gas-based power plants can be constructed relatively quickly compared to large-scale coal or nuclear plants.
- This rapid deployment capability makes them a viable option for meeting short-term increases in electricity demand.

Challenges Faced by the Sector

- **Import of Natural Gas:** India has limited domestic natural gas reserves, and the majority of its natural gas consumption is met through imports.
- Despite efforts to explore and exploit domestic reserves, India still relies heavily on imported natural gas, primarily from countries like Qatar, Australia, and the United States.
- **Infrastructure Constraints:** The development of infrastructure, including pipelines, LNG terminals, and city gas distribution networks, is essential for the efficient transportation and distribution of natural gas.
- However, the expansion of infrastructure in India has been hampered by factors such as land acquisition issues, regulatory hurdles, and funding constraints.
- **Competitive Pricing:** Natural gas competes with other energy sources such as coal, renewable energy, and imported liquefied petroleum gas (LPG) in India.
- The pricing of natural gas relative to these competing fuels influence its attractiveness for various applications, including power generation, industrial use, and transportation.
- **Environmental Concerns:** While natural gas is considered a cleaner alternative to coal and oil, its extraction, transportation, and combustion still produce greenhouse gas emissions.
- Addressing environmental concerns related to methane leakage, air pollution, and carbon emissions is crucial for the sustainable development of the gas-based energy sector.

Government Initiatives to Increase Gas Based Energy

- **Infrastructure Development:** A total of 23,391 km of the natural gas pipeline is operational and about 4,125 km of the gas pipeline is under construction as of Feb 2024.
- Target to increase the pipeline coverage by ~54% to 34,500 km by 2024-25 and to connect all the states with the trunk natural gas pipeline network by 2027.
- **Pradhan Mantri Urja Ganga (PMUG):** Launched in 2016, PMUG aims to develop the natural gas pipeline infrastructure in eastern India, connecting gas sources and major demand centers.
- The project involves the construction of a pipeline connecting Uttar Pradesh to West Bengal, passing through Bihar, Jharkhand, and Odisha.
- **City Gas Distribution (CGD) Network Expansion:** The government has been promoting the expansion of CGD networks across India to increase access to piped natural gas (PNG) for households, industries, and commercial establishments.
- Under the CGD bidding rounds, licenses are awarded to entities for developing CGD networks in geographical areas identified by the Petroleum and Natural Gas Regulatory Board (PNGRB).
- **Natural Gas Marketing Reforms:** The government has introduced reforms in the marketing of natural gas to enhance transparency, promote competition, and attract investment in the sector.
- **Gas Price Rationalization:** Reforms such as the New Domestic Gas Pricing Guidelines (2014) and the introduction of the Hydrocarbon Exploration and Licensing Policy (HELP) have aimed to provide pricing incentives for domestic gas producers while balancing the interests of consumers.
- **Natural Gas Infrastructure Development Fund (NGIDF):** The government has set up the NGIDF to provide financial support for the development of natural gas infrastructure in India.
- **Promotion of LNG Imports and Terminals:** The government has encouraged investment in LNG import terminals to diversify gas supply sources and enhance energy security.

Tamil Nadu's Decentralised Industrialisation Model

Syllabus: GS3/Economy

Context

- Tamil Nadu is India's No.1 state in terms of economic complexity, measured by the diversity of its gross domestic product (GDP) and employment profile.

About

- About 45.3% of TN's farm Gross Value Added (GVA) comes from the livestock subsector, the highest for any state and way above the 30.2% all-India average.
- TN is home to India's largest private dairy company (Hatsun Agro Product), broiler enterprise (Suguna Foods), egg processor (SKM Group) and also "egg capital" (Namakkal).

Features of the TN's Industrialisation Model

- Development of Clusters: TN's economic transformation has been brought about not by so-called Big Capital as much as medium-scale businesses with turnover range from Rs 100 crore to Rs 5,000 crore.
- Its industrialisation has also been more spread out and decentralised, via the development of clusters. Many cluster towns are hubs for multiple industries.
- Employment Generation: Most of these clusters have come up in small urban/peri-urban centres, providing employment to people from surrounding villages who may otherwise have migrated to big cities for work.
- They have, moreover, created diversification options outside of agriculture, reducing the proportion of TN's workforce dependent on farming.
- Entrepreneurship: TN's early industrialists were mainly Nattukottai Chettiars and Brahmins.
- The disruptions from World War II and the Burmese nationalist movement led many to redirect their investments back home.
- The remarkable thing about TN's entrepreneurial culture is its percolation among diverse communities and in a range of industries.
- The drivers of TN's more recent decentralised industrialisation have been entrepreneurs from more ordinary peasant stock and provincial mercantile castes.

Conclusion

- The entrepreneurship from below combined with its high social progress indices from public health and education investments explains Tamil Nadu's relative success in achieving industrialisation and diversification beyond agriculture.

Growth in Agriculture and Allied Sectors

Syllabus: GS3/Agriculture and Economy

Context

- According to NITI Aayog, The agriculture and allied sectors may register more than 6% growth in 2024-25.

About

- The year 2024-25 will be highly favorable for agriculture, mainly due to two factors.
- One, the monsoon rainfall will be normal or above normal, as per reports by various agencies. Even in terms of regional distribution, the forecasts are encouraging.
- Two, the agriculture growth in 2023-24 was 0.67%, which means the base for 2024-25 is low.

Agriculture Sector in India

- India is one of the major players in the agriculture sector worldwide and it is the primary source of livelihood for ~55% of India's population.
- It is the second-largest producer of fruit, vegetables, tea, farmed fish, sugarcane, wheat, rice, cotton, and sugar.
- India occupies fifth place globally with a total area of 2.66 million hectares in organic farming.

Recent Trends

- The share of agriculture in total Gross Value Added (GVA) of the economy has declined from 35% in 1990-91 to 15% in 2022-23, mainly due to rapid expansion in the industrial and service sector GVA.
- In growth terms, the agriculture and allied sector has registered an average annual growth of 4% during the last five years.
- Fall in the Agricultural Prices: The stagnation or fall of agricultural prices in the market was not ameliorated by equivalent rise in minimum support prices (MSP).
- For major foodgrain crops, the MSPs rose by an average 5% per annum between 2013-14 and 2023-24.
- Real Income of Farmers: The real incomes of agricultural households from cultivation fell by about 1.4% between 2012-13 and 2018-19.
- The fall of incomes from cultivation was not only owing to the stagnation or fall of agricultural prices, but also due to a sharp rise in the costs of inputs in agriculture, particularly fertilizers.
- Public Investment: The public investment in agriculture, in general as well as in specific fields like agricultural research and extension, were stubbornly stagnant, and occasionally even fell, over the past decade.
- Consequently, capital investment in agricultural and allied sectors did not rise.
- Rising prices: The real prices of agriculture have been rising for several years. The wholesale price index (WPI) of agri-commodities is rising faster than non-agri-commodities.

Major Challenges Faced by the Agricultural Sector

- Water scarcity & irrigation: India's agriculture is heavily dependent on monsoon rain, making it vulnerable to droughts and inconsistent rainfall patterns.
- Access to irrigation facilities and water management are crucial challenges, particularly in regions with limited water resources.
- Lack of access to credit & finance: Small and marginal farmers often face difficulties in accessing credit and financial services.
- Limited availability of affordable credit restricts their ability to invest in modern farming equipment and quality seeds and fertilizers, hampering their productivity.
- Small landholdings: Average farmers are small landholders, leading to fragmented and uneconomical farming practices.
- This makes it challenging for them to adopt modern agricultural methods and technologies, resulting in lower productivity.
- Outdated farming practices: A significant portion of Indian farmers still rely on traditional and outdated farming methods.
- Limited access to information, lack of awareness about modern techniques and resistance to change hinder the adoption of advanced farming practices.
- Market volatility & price fluctuations: Farmers in India often face price volatility due to lack of effective market linkages, intermediaries and price information.

Developmental programmes implemented by government

- Pradhan Mantri Kisan Samman Nidhi (PM-KISAN): It is an income support scheme providing Rs. 6000 per year in 3 equal installments.
- Pradhan Mantri Krishi Sinchai Yojana (PMKSY): This scheme focuses on improving water use efficiency in agriculture.
- It includes components such as micro-irrigation, watershed development, and the promotion of efficient water management practices.
- Pradhan Mantri Fasal Bima Yojana (PMFBY): It was launched in 2016 addressing problems of high premium rates for farmers and reduction in sum insured due to capping.
- Per Drop More Crop: The scheme aims to increase water use efficiency, reducing cost of inputs and increasing productivity at the farm level through Micro Irrigation technologies.
- PM-AASHA (Pradhan Mantri Annadata Aay Sanrakshan Abhiyan): This scheme aims to ensure that farmers get remunerative prices for their produce.
- It comprises Price Support Scheme (PSS), Price Deficiency Payment Scheme (PDPS), and Pilot of Private Procurement & Stockist Scheme (PPPS).

- **Namo Drone Didi:** The scheme aims to provide drones to 15000 selected Women SHGs for providing rental services to farmers for agriculture purposes (application of fertilizers and pesticides).
- **Kisan Credit Card (KCC) Scheme:** The KCC scheme provides farmers with credit at subsidized interest rates, facilitating timely access to credit for agricultural and allied activities.
- **National Agriculture Market (e-NAM):** The e-NAM is an online platform that aims to create a unified national market for agricultural commodities.
- It enables farmers to sell their produce to buyers anywhere in the country, promoting transparency and fair pricing.

Way Ahead

- Substantial increase in farmers income and transformation of agriculture require a paradigm shift in the entire approach towards the agriculture sector.
- Advancement in science led technology, enhanced role of private sector in both pre and post harvest phases, liberalized output market, active land lease market, and emphasis on efficiency will equip agriculture to address challenges.
- A well co-ordinated action and strategy between the Centre and the states is needed to ensure that agriculture marches to the next stage of development along with other sectors.

Advance Pricing Agreements

Syllabus: GS3/Economy

Context

- The Central Board of Direct Taxes (CBDT) has entered into a record 125 Advance Pricing Agreements (APAs) in FY 2023-24 with Indian taxpayers.

About

- This marks the highest ever APA signings in any financial year since the launch of the APA programme in 2012.
- During FY 2023-24 CBDT also signed the maximum number of Bilateral APAs in any financial year till date.
- The BAPAs were signed as a consequence of entering into Mutual Agreements with India's treaty partners namely Australia, Canada, Denmark, Japan, Singapore, the UK and the US.
- An advance pricing agreement (APA) is a formal arrangement between a tax authority and a multinational enterprise (MNE) in which the parties jointly agree on the MNE's transfer pricing methodology, estimated taxable income, and tax payments for a fixed period, thus reducing the likelihood of an income tax dispute.
- The APA program addresses actual or potential disputes and provides tax certainty to MNCs by allowing them to negotiate how profit margins for India operations will be calculated.

Imported inflation

Syllabus: GS3/Economy

Context

- The Asian Development Bank (ADB) recently warned that India could face imported inflation as the rupee could depreciate amid the rise in interest rates in the West.

Imported Inflation

- It refers to the rise in the prices of goods and services in a country, caused by an increase in the price or the cost of imports into the country.
- It is believed that a rise in input costs pushes producers to raise the price they charge from their local customers.

Causes

- **Depreciation of a Currency:** When a country's currency depreciates, people in the country will have to shell out more of their local currency to purchase the necessary foreign currency required to buy any foreign goods or services.

- It effectively means that they will be paying more for anything that they import.
- Rise in International Crude Oil Prices: It is due to a fall in oil output. It is expected to cause prices to rise across an economy which imports oil to produce goods and services.

Impact

- Imported inflation can lead to higher prices for goods and services, which can reduce purchasing power and lead to a decrease in consumer spending.
- It can slow down economic growth and lead to economic instability.

Fiscal Challenges Confronting Low-income Nations

Syllabus: GS3/Economy

Context

- The International Monetary Fund (IMF) has expressed its concern over the debt and fiscal challenges confronting low-income nations.

Background

- The IMF lowered its 2024 growth forecast for low-income countries as a group to 4.7% from an estimate of 4.9% in January.
- Meanwhile, the World Bank noted a concerning trend where half of the world's 75 poorest countries are experiencing a widening income gap with wealthier economies, marking a reversal in development progress seen earlier this century.

Fiscal challenges of low-income countries

- In Sub-Saharan Africa, currently countries face debt service payments of 12% on average, compared to 5% a decade ago.
- In some countries debt payments are up to 20% of revenues. Those countries had far fewer resources to invest in education, health, infrastructure and jobs.
- High interest rates in advanced economies have lured away investments from low income countries, and raised their cost of borrowing.
- There are concerns regarding debt trap challenges from China and other emerging official creditors. Almost 40 countries saw external public debt outflows in 2022.

How does the IMF help countries?

- Countries seek help from the IMF (bailout) usually when their economies face a major macroeconomic risk, mostly in the form of a currency crisis.
- The IMF basically lends money, often in the form of special drawing rights (SDRs), to troubled economies that seek the lender's assistance.
- SDRs simply represent a basket of five currencies, namely the U.S. dollar, the euro, the Chinese yuan, the Japanese yen, and the British pound.
- The IMF carries out its lending to troubled economies through a number of lending programs such as the extended credit facility, the flexible credit line, the stand-by agreement, etc.
- Countries receiving the bailout can use the SDRs for various purposes depending on their individual circumstances.
- The IMF usually imposes conditions on countries before it lends any money to them.
- For example, a country may have to agree to implement certain structural reforms as a condition to receive IMF loans.

Significance of IMF bailouts

- IMF bailouts provide a source of financial support to stabilize a country's economy, prevent further economic decline and restore confidence in the country's ability to repay its debts.
- IMF bailouts help prevent financial crises from spreading to other countries by containing the economic damage and stabilizing the financial system of the affected country.
- IMF bailouts often come with conditions for economic policy changes and structural reforms that help

the country address its underlying economic problems and put it on a sustainable path to growth and development.

Way Ahead

- Affected countries needed to increase their domestic revenues by raising taxes, continuing to fight inflation, paring back spending and developing local capital markets.
- It is vital for these countries to make themselves more attractive to investors, and the IMF needs to engage with countries to help them do that.

IRDAI marks 25th anniversary

Syllabus: GS3/Economy

Context

- The Insurance Regulatory and Development Authority of India (IRDAI) celebrated its Silver Jubilee on April 19.

Insurance Regulatory and Development Authority of India (IRDAI)

- IRDA was constituted in 1999 as an autonomous body after the recommendations of the Malhotra Committee report to regulate and develop the insurance industry.
- It was incorporated as a statutory body on April 19, 2000.
- The Authority has the power to frame regulations under Section 114A of the Insurance Act, 1938.
- Objective: The main objective of the IRDA is to protect the interests of the policyholder and regulate the insurance industry.
- IRDAI is under the jurisdiction of the Ministry of Finance, Government of India.
- It has framed regulations ranging from registration of companies for carrying on insurance business to protection of policyholders' interests.

Recent Initiatives by IRDAI

- IRDAI has lifted the age cap on purchasing health insurance policies, effective from April 1, 2024. Previously, individuals were restricted to buying new insurance policies only until the age of 65.
- Bima Sugam initiative: It aims to empower all insurance stakeholders by connecting them all through a single platform.
- The platform uses advanced technology to simplify processes for insurance companies, policy holders', intermediaries, insurance repositories and external data sources etc.
- It has replaced 34 regulations with six regulations to enhance clarity and coherence in the regulatory landscape.
- Mandatory e-insurance: IRDAI mandated the digitisation of insurance policies across all categories to streamline processes, enhance efficiency, and improve accessibility for policyholders.
- IRDAI has decreased the health insurance waiting period from 48 months to 36 months.
- The waiting period refers to the duration during which policyholders are not eligible to claim benefits for any pre-existing health conditions they might have during the purchase of the insurance policy.

Concluding Remarks

- Over the past two decades, IRDAI has played a pivotal role in fostering innovation, safeguarding consumer interests, and propelling industry advancement.
- It has revolutionized the sector by actively engaging with policyholders and prioritizing their well-being with its unwavering commitment to excellence and regulatory standards.

Net Direct Tax Collections Exceed 2023-24 Target

Syllabus: GS3/Economy

Context

- India's net direct tax collections grew 17.7% in 2023-24 to hit 19.58 lakh crore.

About

- The Budget Estimates (BE) for Direct Tax revenue in the Union Budget for FY 2023- 24 were fixed at Rs. 18.23 lakh crore which were revised and the Revised Estimates (RE) were fixed at Rs. 19.45 lakh crore.
- The provisional Direct Tax collections (net of the refunds) have exceeded the BE by 7.40% and RE by 0.67%.

Direct Tax collection

- The Net collections (provisional) of Direct Tax collections for the FY 2023-24 show that Net collections are at Rs. 19.58 lakh crore, compared to Rs. 16.64 lakh crore in the preceding Financial Year i.e. FY 2022-23, representing an increase of 17.70%.
- The Gross collection (provisional) of Direct Taxes (before adjusting for refunds) for the FY 2023-24 stands at Rs. 23.37 lakh crore showing a growth of 18.48% over the gross collection of Rs. 19.72 lakh crore in FY 2022-23.

Corporate Tax

- The Gross Corporate Tax collection (provisional) in FY 2023-24 is at Rs. 11.32 lakh crore and has shown a growth of 13.06% over the gross corporate tax collection of Rs. 10 lakh crore of the preceding year.
- The Net Corporate Tax collection (provisional) in FY 2023- 24 is at Rs. 9.11 lakh crore and has shown a growth of 10.26% over the net corporate tax collection of Rs. 8.26 lakh crore of the preceding year.

Personal Income Tax

- The Gross Personal Income Tax collection (including STT) (provisional) in FY 2023- 24 is at Rs. 12.01 lakh crore and has shown a growth of 24.26% over the Gross Personal Income Tax collection (including STT) of Rs. 9.67 lakh crore of the preceding year.
- The Net Personal Income Tax collection (including STT) (provisional) in FY 2023-24 is at Rs. 10.44 lakh crore and has shown a growth of 25.23% over the Net Personal Income Tax collection (including STT) of Rs. 8.33 lakh crore of the preceding year.
- Refunds of Rs. 3.79 lakh crore have been issued in the FY 2023-24 showing an increase of 22.74% over the refunds of Rs. 3.09 lakh crore issued in FY 2022-23.

What is Direct Taxes?

- Direct taxes are imposed on the basis of individuals ability to pay principle, which says that those individuals or entities having access to more resources and earning a higher income need to pay higher taxes.
- The direct rules are framed such that taxes turn out to be a method to redistribute money in the country.

Types of Direct Taxes

- Estate Tax: It is also called Inheritance Tax and is paid based on the value of the estate or the money that an individual has left after his/her death.
- Income tax: It is a tax charged on the annual income of an individual or business earned in a financial year.
- Wealth Tax: The tax must be paid on a yearly basis and depends on the ownership of properties and the market value of the property.
- Corporate Tax: A corporate tax is a tax on the profits or net income of a corporation.
 - a. Corporate tax is paid on a company's taxable income which includes company's revenue after deductions such as cost of goods sold (COGS), general and administrative (G&A) expenses, selling and marketing, depreciation, research & development etc.
- Capital Gains Tax: It is a form of direct tax that is paid due to the income that is earned from the sale of assets or investments. Investments in farms, bonds, shares, businesses, art, and home come under capital assets.

Reforming Multilateral Development Banks

Syllabus: GS3/Economy

Context

- Recently, the International Monetary Fund (IMF) and World Bank focus on reforming Multilateral Development Banks (MDBs) to address 21st-century challenges.

About the MDBs and India

- MDBs play a crucial role in global economic development, providing financial and technical assistance to developing countries for development programs by promoting economic growth, particularly in low and middle-income countries.
- India, as one of the largest economies in the world, has a significant relationship with MDBs, which has evolved over time.

India's Engagement with MDBs

- India has been actively engaging with MDBs to address its development needs and to contribute to global economic stability.
- The country has been a recipient of financial and technical assistance from MDBs for various development projects, including infrastructure development, poverty reduction, and climate change mitigation.

Need for Reform

- The current legal and institutional framework of MDBs, established in the aftermath of World War II, is increasingly seen as outdated and inadequate to deal with the complexities of the 21st-century global ecosystem.
- The framework does not reflect the contemporary realities and aspirations of developing countries, especially those of the Global South.
- MDBs are facing several challenges that affect their relevance and performance.
- These include the need to enhance coordination among MDBs, address the rising demand for their resources, and evolve their operational strategies and business models.

Reform Agenda

- It encompasses efforts being undertaken by various MDBs to evolve their vision, incentive structures, operational approaches, and financial capacities.
- The aim is to equip MDBs to address the challenges of the 21st century in addition to the development needs of low and middle income countries.
- A key element of the reform agenda is to enhance coordination among MDBs.
- Addressing new global challenges will require resources and capabilities of a magnitude beyond the capability of any single MDB.

India's G20 Presidency and MDB Reforms

- The current dynamism on the reform agenda stems primarily from the pressure exerted by the shareholders via various forums, including the UN, the G7, and the G20.
- Among these, the role of the G20 has been particularly crucial.
- The G20 has set up an Independent Expert Group (IEG) to construct a roadmap for 'Multilateralism 2.0'.
- It proposed a 'Triple Agenda' for MDBs.

Triple Agenda

– The Independent Expert Group (IEG) has proposed a triple agenda for MDBs.

– It includes:

- a. Efforts to tackle global challenges, alongside their core mission of poverty reduction and shared prosperity;
- b. To triple their sustainable lending level by 2030; and
- c. To enhance their financial strength through capital adequacy improvements and general capital increases.

- During its G20 presidency in 2023, India emphasised the need for comprehensive reforms of MDBs.
- It highlighted the importance of strengthening MDBs to address shared global challenges, such as climate change and sustainable development.
- Under the aegis of India's G20 Presidency, an Expert Group on 'Strengthening Multilateral Development Banks (MDBs)' was constituted.

MDBs and India's Development Goals

- India has leveraged MDBs' resources and expertise to achieve its development goals.

- It has sought MDBs' assistance for various development projects, including infrastructure development, poverty reduction, and climate change mitigation.
- India has reached out to MDBs to draw a roadmap for becoming a developed nation by 2047.
- It has asked MDBs to share their project implementation expertise and help in this endeavour.

Conclusion

- India's relationship with MDBs is a strategic partnership that has evolved over time and has leveraged MDBs' resources and expertise to achieve its development goals and contribute to global economic stability.
- The reform of MDBs is a complex and challenging task that requires a concerted effort from all stakeholders, including MDBs themselves, their shareholders, and the international community.
- However, with the right vision, strategies, and actions, MDBs can be transformed into more effective and responsive institutions, better equipped to address the development challenges of the 21st century.

India's Patent Amendments

Syllabus: GS3/Economy

Context

- The recent amendments to the rules governing India's Patent Act has gained widespread criticism.

Background

- The Ministry of Commerce and Industry notified the Patents (Amendment) Rules, 2024 .
- The amended rules aim to introduce substantial changes to align with international standards, promote innovations among innovators, and protect their rights.
- The amendments target key areas of concern in the Indian Patent practice and procedures and are poised to stimulate an increase in patent filing and processing within the nation.

What is a patent?

- A patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem.
- To get a patent, technical information about the invention must be disclosed to the public in a patent application.

India's patent regime

- Indian patents are governed by the Indian Patent Act of 1970. Under the act, patents are granted if the invention fulfills the following criteria:
 - It should be novel
 - It should have inventive step/s or it must be non-obvious
 - It should be capable of Industrial application
 - It should not attract the provisions of sections 3 and 4 of the Patents Act 1970.
- Alignment with international regimes: It became a party to the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement following its membership to the World Trade Organisation on January 1, 1995.
- It amended its internal patent laws to comply with TRIPS, most notably in 2005, when it introduced pharmaceutical product patents into the legislation.
- The original Indian Patents Act did not grant patent protection to pharmaceutical products to ensure that medicines were available to the masses at a low price.
- India is also a signatory to several IPR related conventions including:
 - The Berne Convention which governs copyright,
 - The Budapest Treaty,
 - The Paris Convention for the Protection of Industrial Property
 - The Patent Cooperation Treaty (PCT) all of which govern various patent-related matters.

Features of the Revamped Rules

- Unique provision for New 'Certificate of Inventorship' has been introduced to acknowledge the contribution of inventors in the patented invention.

- Grace period: Provision for claiming benefits of Grace period under section 31 has been streamlined by incorporating new forms, i.e., Form 31.
- First examination report: Time limit to furnish foreign application filing details in Form 8 has been changed from six months from the date of filing of application to three months from the date of issuance of first examination report.
- Statements of working: Frequency to file the statements of working of patents in Form 27 has been reduced from once in a financial year to once in every three financial years.
- The provision to condone delay in filing of such statements for a period up to three months upon a request in prescribed manner has been incorporated.
- Renewal fee has been reduced by 10% if paid in advance through electronic mode for a period of at least 4 years.

Criticism of the new rules

- Though the changes bring India's patent law "almost in line" with those of the US, it underscores the serious consequences for patient and voluntary groups that campaign on public health concerns.
- To accommodate the demands of the industrialized countries and to sign free trade agreements, the government has withdrawn those provisions that foreign manufacturers, especially pharma companies, have found troublesome.
- There was no discussion in Parliament and no information on the people consulted, nor any data provided to justify the amendments, despite the significant nature of the changes.
- Patient health groups who want to access the patent system in an effort to improve access to life-saving medications, now require to pay substantial fees to file pre-grant oppositions. There were no fees earlier.
- Discretionary powers with the patent controller to determine who may file pre-grant oppositions runs counter to previous judicial decisions, which unambiguously permitted both organizations and individuals to submit pre-grant oppositions.
- The Indian Patent Office faces a glut of patent applications, straining its capacity to handle the workload effectively.

Way Ahead

- India is regarded as the pharmacy of the world and has now become the most populous country. Hence it is even more imperative for the government to ensure high-quality medications remain within reach and economically viable for the vast segments of the population.
- The amendments are anticipated to negatively impact the availability and accessibility of medicines. They would also encourage monopolies and profiteering by big pharma.
- So the government must reconsider the proposed amendments to safeguard the accessibility of affordable medicines and remove those suggested provisions which benefit the big global pharma industry.

"Special 301" Report 2024

Syllabus: GS3/Economy

Context

- The United States Trade Representative (USTR) placed India in the 'priority watch list' of countries on its 2024 Special 301.

About

- The "Special 301" Report is an annual review of the global state of IP protection and enforcement.
- The Report identifies a wide range of concerns that limit innovation and investment, including:
 - The deterioration in the effectiveness of IP protection and enforcement,
 - Reported inadequacies in trade secret protection in countries around the world,
 - Market access barriers, including non-transparent, discriminatory or otherwise trade-restrictive measures
 - Ongoing, systemic IPR enforcement issues at borders and in many trading partner markets around the world.
 - The continuing challenges of copyright piracy and the sale of counterfeit trademarked products on the Internet.

Key highlights of the report

- Indonesia, Chile, and Argentina also feature in the ‘priority watch list’ of seven countries.
- Twenty trading partners are on the ‘watch list’, which include countries that the US believes merit bilateral attention to address underlying IP problems but are better than the ‘priority watch list’ countries.
- USTR removed the Dominican Republic from the Watch List this year.

Concerns raised by the report

- According to the USTR office, serious problems exist in the country like Inadequate IP enforcement, including high rates of online piracy, an extensive trademark opposition backlog, and insufficient legal means to protect trade secrets.
- India still needs to fully implement the WIPO Internet Treaties and ensure that copyright statutory licenses do not extend to interactive transmissions.
- The potential threat of patent revocations and the procedural and discretionary invocation of patentability criteria under the Indian Patents Act impact companies across different sectors is also troubling for the USA.

India’s initiative in safeguarding IPR

- National IPR Policy 2016 encompassing all IPRs into a single vision document setting in place an institutional mechanism for implementation, monitoring and review of IP laws.
- The policy encourages innovation and creativity by providing stronger protection and incentives for inventors, artists, and creators.
- Cell for IPR Promotion and Management (CIPAM): It has been set up to coordinate the implementation of the National IPR Policy.
- National Intellectual Property Awareness Mission (NIPAM), a flagship program to impart IP awareness and basic training in educational institutes.
- Scheme for Facilitating Startups Intellectual Property Protection (SIPP): it is introduced to foster innovation and entrepreneurship by providing a supportive ecosystem for startups to protect and manage their IP assets.

Concluding Remarks

- While there has been progress under the US-India Trade Policy Forum in addressing certain issues with trademark infringement investigations and pre-grant opposition proceedings, numerous long-standing concerns remain.
- India has always maintained that its intellectual property laws were in strict adherence to the WTO’s Trade Related Intellectual Property Rights (TRIPS) Agreement and that it was not bound by any global rules to make changes in its laws.
- No action is threatened by the US against countries on the ‘priority watch list’, but if a country slips further and is categorized as a ‘priority country’, the USA may impose ‘retaliatory’ measures.

India’s Chinese Import Bill Rise

Syllabus: GS3/Economy

Context

- According to a report by the Global Trade Research Initiative (GTRI), Goods imports from China have risen 2.3 times faster than India’s total imports over 15 years.


Key Findings

- India’s imports from China crossed \$101 billion in 2023-24 from about \$70 billion in 2018-19, and the country’s share of India’s industrial goods imports has risen from 21% to 30% over 15 years.
- India’s total merchandise imports stood at \$677.2 billion in 2023-24, of which 15% or \$101.8 billion worth goods were sourced from China.
- China is the top supplier in eight major industrial sectors, including machinery, chemicals, pharmaceuticals, textiles etc.

Lion’s share
The table lists commodities imported by India, where China accounts for the largest share in total imports

	Commodity	China’s share in imports
1	Electronics/ telecom/ electrical products	43.9%
2	Machinery	39.7%
3	Textile and clothing	38.2%
4	Chemicals and pharmaceuticals	26.8%
5	Automobiles	26%

Source: GTRI Data as of 2022



- Trade deficit concern: Between 2018-19 and 2023-24, India's exports to China have stagnated around \$16 billion annually while imports have surged, resulting in a cumulative trade deficit exceeding \$387 billion over six years.

Concerns of India- China Trade Relations

- Trade Imbalance: India imports far more goods from China than it exports, leading to a large trade deficit.
- This trade imbalance has been a persistent issue and has raised concerns about the impact on India's domestic industries and employment.
- Quality and Safety of Chinese Goods: There have been concerns in India about the quality and safety of some Chinese goods, particularly in sectors such as electronics and consumer products.
- Incidents of substandard or counterfeit products entering the Indian market have raised regulatory and consumer protection concerns.
- Dumping Practices: India has accused China of engaging in dumping practices, whereby Chinese companies allegedly flood the Indian market with cheap goods at prices below production costs.
- This harms domestic industries in India by undercutting their competitiveness and market share.
- Market Access and Non-Tariff Barriers: Issues such as restrictions on foreign investment, complex approval processes, and intellectual property rights protection have hindered Indian businesses' efforts to expand into China.
- Strategic Competition: India and China are also engaged in strategic competition, both regionally and globally.
- Their growing influence in South Asia and the Indian Ocean region has led to geopolitical rivalries, which can affect trade relations.
- Security concerns related to Chinese investments in critical infrastructure projects in India have also raised alarms.
- India has been cautious about allowing Chinese companies to participate in sensitive sectors such as telecommunications and infrastructure, citing national security concerns.

Concluding Remarks

- The strategic implications of the dependency on China are profound and affect not only economic but national security dimensions.
- There is a need for reassessment of India's import strategies. This is imperative not only to mitigate economic risks but also to bolster domestic industries and reduce dependency on single-country imports.

Corporate Governance Charter for Startups

Syllabus: GS3/Economy

Context

- Confederation of Indian Industry (CII) launched a corporate governance charter for startups, including a self-evaluative scorecard.

About

- It will provide suggestions on corporate governance tailored for startups and offer guidelines suitable for different stages of a startup which is aiming to enhance governance practices.
- It comes at a time when startups such as Byju's, BharatPe, and Zilingo have raised concern over governance standards in the past 12-18 months.
- Corporate governance in India is a set of rules, practices and processes by which a company is guided and controlled.
- Self Evaluative Governance: The charter includes an online self-evaluative governance scorecard that startups can use to evaluate their current governance status and its improvement over time.
- The tool allows startups to measure their governance progress, with score changes indicating improvements in governance practices as assessed against the scorecard from time to time.
- Startups will be structured across four key stages: inception, progression, growth and going public.
- At the Inception stage, the startups must focus on board formation, setting the tone at the top, compliance monitoring, accounting, finance, external audit, policies for related-party transactions, and conflict resolution mechanisms.

- In the Progression stage, a startup may additionally focus on the expansion of board oversight, monitoring key business metrics, maintaining internal controls, defining a hierarchy of decision-making, and setting up an audit committee.
- For the Growth stage, the startups must also focus on building stakeholder awareness towards the vision, mission, code of conduct, culture, and ethics of an organisation, form board committees, ensure diversity and inclusion on the board and fulfill statutory requirements, according to the Companies Act 2013 and other applicable laws and regulations.
- At the Going Public stage, a startup must expand its governance in terms of monitoring the functioning of various committees, focus on fraud prevention and detection, minimise information asymmetry, plans for succession, and evaluate board performance.
- Valuation: Startups may strive for long-term value creation rather than short-term valuations. The valuations of businesses should be kept as realistic as possible.
- Long Term Goals: The needs of the business entity should be separated from the personal needs of its founder(s), but at the same time, the goals and needs of the founders, promoters, and initial investors should be aligned with the long-term goals of the business.
- Separate Legal Entity: The startup should be maintained as a separate legal entity with the organisation's assets distinct from the founders' assets.

Confederation of Indian Industry (CII)

- The Confederation of Indian Industry (CII) is a non-government, not-for-profit, industry-led and industry-managed business association organization playing a proactive role in India's development process.
- Founded in 1895, CII has members from the private and public sectors, including small and medium-sized enterprises and multinational corporations, and an indirect membership of enterprises from national and regional sectoral industry bodies.
- CII charts change by working closely with governments and thought leaders and enhancing efficiency, competitiveness and business opportunities for industry.

What is Corporate Governance?

- Corporate governance is the system of rules, practices, and processes by which a company is directed and controlled.
- It involves balancing the interests of a company's stakeholders i.e. shareholders, customers, suppliers,, the government, and the community.
- Corporate Governance consists of;
- Explicit and implicit contracts between the company and the stakeholders for distribution of responsibilities, rights and rewards.
- Procedures for reconciling the conflicting interests of stakeholders in accordance with their duties, privileges and roles.
- Procedures for proper supervision, control, and information that flows to serve as a system of checks and balances.

Regulatory Framework for Corporate Governance in India

- The Companies Act, 2013: It contains provisions like Composition of Board of Directors, Admitting Woman Director and Independent Director, Directors Training and Evaluation, Constitution of Audit Committee, Risk Management Committee, Subsidiaries Companies Management etc.
- Securities and Exchange Board of India (SEBI): SEBI is a regulatory authority to curb the malpractices in the financial market and protect the interest of its investors. It regulates the activities of Stock Exchange and to ensure the healthy development in the financial market.
- Standard Listing Agreement of Stock Exchanges: It is the basic document which is executed between companies and the Stock Exchange when companies are listed on the stock exchange. The main purpose of it is to ensure that companies are following good corporate governance.
- Institute of Chartered Accountants of India (ICAI): It issues accounting standards for disclosure of financial information.
- Institute of Company Secretaries of India (ICSI): It issues secretarial standards as per the provision of the Companies Act,2013.

Challenges in Corporate Governance In India

- Getting the board right: In India, it is a common practice for friends and family of promoters to be appointed as board members.
- Performance evaluation of directors: To achieve the desired results on governance practices, there is often a call for results of performance evaluation to be shared in public. But corporate firms do not share it sometimes to avoid public scrutiny and negative feedback.
- Removal of Independent Directors: In most of the cases, the major issue in corporate governance arises as independent directors were easily removed from their positions by the promoters if they do not side with promoters' decisions.
- Founders Control and Succession Planning: In India, founders' ability to control the affairs of the company has the potential of derailing the entire corporate governance system. Unlike developed economies, in India, the identity of the founder and the company is often merged.
- Risk Management: The board is only playing an oversight role on the affairs of a company. However there is a need for framing and implementing the risk management policy.

Committees for Resolving Issues

- Kumar Mangalam Birla Committee: It was set up to suggest suitable recommendations for the Listing Agreement of Companies with their Stock Exchanges.
- The Committee evolved a Code of Governance which was accepted by SEBI and a new Clause 49 was inserted into the Listing Agreement of Companies with their Stock Exchanges.
- N R Narayan Murthy Committee: Based on the recommendations of this committee SEBI published a revised Clause 49 which included amendments /additions to provisions relating definition of independent directors, strengthening the responsibility of Audit Committees and requiring Boards to adopt a formal Code of Conduct.

Importance of corporate governance

- Strengthens investors confidence: Strong corporate governance maintains investors' confidence in the financial market, as a result of which companies can raise capital efficiently and effectively.
- International flows of capital: It enables companies to reap the benefits of the global capital markets which will contribute to economic growth.
- Increased Productivity: It also minimizes wastages, corruption, risks and mismanagement.
- Brand Image: It helps in brand formation and development of a company. It ultimately increases capital flows from foreign institutional investors (FII) and foreign direct investment (FDI).

Startups in India

- An entity shall cease to be a Startup on completion of ten years from the date of its incorporation/ registration or if its turnover for any previous year exceeds one hundred crore rupees.
- There are over 99000+ startups recognized by the government of India as of 2023.
- A. 49% of them have a base in Tier 2 – Tier 3 cities.
- B. These startups are spread over 669 districts from 36 States and Union Territories of India.
- As of 2023, India is home to 108 unicorns with a total valuation of \$ 340.80 Bn.
- A. Unicorn is a term used in the venture capital industry to describe a privately held startup company with a value of over \$1 billion.

Foreign Exchange (Forex)

Syllabus: GS 3/Economy

In News

- The Reserve Bank of India (RBI) has cautioned banks and customers again about unauthorised entities offering foreign exchange trading using the banking channels.

About Forex

- Foreign exchange (Forex) refers to exchanging the currency of one country for another at prevailing exchange rates
- Foreign Exchange Rate is the price of one currency in terms of another.
- It links the currencies of different countries and enables comparison of international costs and prices
- Need: People demand foreign exchange because: they want to purchase goods and services from other countries; they want to send gifts abroad; and they want to purchase financial assets of a certain country.
- A rise in the price of foreign exchange will increase the cost (in terms of rupees) of purchasing a foreign good.
- This reduces demand for imports and hence demand for foreign exchange also decreases, other things remaining constant.

Chapter- 9

Yojana May 2024

1-Geological Ecosystem

- India is the 5th largest country in the world and has rich geographical and geological diversity, ranging from the mighty Himalayas which are one of the highest mountain ranges in the world to low-lying coastal plains overseeing the vast Indian Ocean.
- The Himalayas are the highest mountain range in the world, separates the Indian landmass from the Tibetan Plateau.
- It has been formed by the collision of the Indian plate with the Eurasian plate, resulting in the formation of a large fold mountain system, running along the northern fringes of the Indian sub-continent.
- It runs from west-northwest to east-southeast direction in the form of an arc for about 2,400 km, extending across five southeast Asian countries.
- Its width varies from 350 km in the west to 150 km in the east.
- It consists of four parallel mountain ranges namely, the Shivalik Hills, the Lower Himalayan Range or Himachal, the Great Himalayan Range or Himadri, and the Tibetan Himalayas from south to north.
- The Great Himalayas are home to some of the highest peaks in the world such as Mount Everest, Kanchenjunga, Nanga Parbat, etc.
- Several glaciers are present within the range, including Gangotri Glacier and Satopanth Glacier.
- The Northern Plains also referred to as 'Great Plains of India' is one of the most extensive alluvial tracts in the world.
- It runs for roughly 2400 km from west to east and stretches 240 to 320 km from north to south.
- It has formed from sediments brought by rivers, originating from uplifting Himalayas, and deposited in a foreland basin.
- As the rivers originating from the Himalayas descend the hills, their velocity decreases and as a result, they dump much of their denser and coarser sediment fraction along the foothills in a narrow, porous, thin strip called Bhabar which is around 8 to 16 km wide.
- The Terai belt is located south of the Bhabar belt where streams go underground in the Bhabar belt resurfaces.
- Terai region is densely forested and has diverse flora and fauna and houses some of the famous national parks such as Jim Corbett National Park in Uttarakhand and Kaziranga National Park in Assam.
- Bhangar, which is an older alluvium that forms a terrace above the floodplain.
- It is frequently covered in calcareous stone-like pebbles known as 'Kankar'.
- The rivers of northern plains are laden with sediment deposits, their sediment load at the mouth forms the largest delta in the world called Sundarbans.
- The mangrove forest presents a natural barrier against tropical cyclones and tsunamis.
- The area is known for its wide range of fauna, including many bird species, the Bengal Tiger, and other threatened species such as the estuarine crocodile and the Indian Python.
- The Peninsular Plateau is the largest physiographic entity of the Indian landmass.
- It has a table-land type of topography.
- It has elevations of about 900-1200 m above mean sea level,
- dissected by numerous rivers, forming broad valleys.
- The plateau stretches from the Aravalli Range in the west to the Chota Nagpur Plateau in the east.
- It comprises important mountain ranges of Central India such as Vindhya, Satpura, Mahadeo, Maikal and Sarguja ranges as well as the Western and Eastern Ghats.
- It is rich in mineral resources. It contains mineral deposits, such as iron, bauxite, mica, gold, copper, manganese, etc.



- It has well-known mines like Kolar, Hutti, Bailadila, Singhbhum, Korba, Malanjkhand, etc.
- Most of the Gondwana coal deposits of India are found in the Peninsular Plateau.
- A large part of the plateau is covered with fertile black soil which is extremely useful for growing cotton.
- The Thar Desert, also known as the 'Great Indian Desert'; is a vast arid region, located primarily in the northwestern part of the Indian subcontinent.
- It consists of sand dunes, rocky terrain, salt flats, and sparse vegetation.
- The sand dunes, known as 'bhakhar', can reach heights of up to 150 m and constantly shift with the wind.
- The desert also features dry riverbeds called 'nullahs; which occasionally fill with water during the monsoon season.
- The region is rich in oil reserves and is home to one of the largest onshore oil fields in India in Barmer Basin.
- The region also has one of the largest salt marshes in the world called the 'Great Rann of Kutch' Kutch is one of the major salt-producing districts in India.
- The Andaman and Nicobar Islands form an archipelago, consisting of around 572 islands, out of which only about 37 are inhabited.
- These islands are known for their pristine beaches, lush tropical forests, and diverse marine life.
- These are mainly volcanic in origin, formed by the eruption of lava due to plate movements.
- Barren Island in the Andaman Sea is the only active volcano in India.
- Another group of islands from the west coast of India is Lakshadweep, which is an archipelago of 36 islands. These are mainly coral islands with unique marine flora and fauna.



Conclusion

- India is endowed with great mineral wealth and is one of the largest producers of coal, iron ore, bauxite, manganese, mica, and zinc in the world. Geological ecosystems have not only played a major role in defining India's mineral wealth but also have shaped its unique geographical landscape.

2- Holistic Exploration of Western Ghats

About Western Ghats

- The Western Ghats (also known as the Sahyadri Mountain Range) are recognized as a global biodiversity hotspot and often referred to as the Great Escarpment of India.
- It holds the prestigious designation of a UNESCO World Heritage Site.
- It stretches from a latitudinal extent of 8°-22°N from the river Tapti in the north to Kanyakumari in the South.
- It encompasses regions in six states: Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu, and one Union Territory (Dadra & Nagar Haveli).

Topography and Natural Resources

- It holds significant importance from several perspectives-
- its geomorphic value belongs to the Malabar Rainforest Biogeographic Province.
- Their positioning makes the Western Ghats biogeographically distinct and exceptionally biodiverse- a valuable repository of biological wealth.
- These are older than the Himalayas and hold the distinction of being an 'evolutionary ecotone, providing evidence for both the 'Out of Africa' and the 'Out of India' hypotheses.
- These mountains took shape millions of years ago during the collision of the Indian subcontinent with the Eurasian plate.
- As a result of this collision, the land was thrust upward, giving rise to the majestic mountains of the Western Ghats.
- They have an average elevation of around 1,200 metres (3,900 ft), with several peaks reaching heights of up to 2,600 metres (8,500 ft). Anamudi, located in Kerala, is the highest peak in the Western Ghats.



- The region is a watershed for several major rivers, including the Godavari, Krishna, Kaveri, and Tungabhadra, which provide water for irrigation, drinking, and hydropower generation to millions of people.
- These mountains play a pivotal role in modulating India's climate by intercepting monsoon winds, preventing them from reaching the Deccan Plateau, and thus maintaining its cool, dry conditions.

Subdivision of Western Ghats

The Western Ghats can be subdivided into three primary parts:

1. The Northern Ghats: From Gujarat to Maharashtra and represents the lowest and least rugged section of the Western Ghats.
2. The Central Ghats: They extend from Karnataka to Kerala and represent the highest and most rugged section of the Western Ghats.
3. The Southern Ghats: The area extends from Kerala to Tamil Nadu and represents the most dissected section of the Western Ghats.

Local names of Western Ghats

Sahyadri	It means 'the abode of Sahya' (a mythological rain serpent), also known as the 'benevolent mountain' due to its verdant landscapes. This range stretches from Gujarat in the north to Maharashtra and Karnataka in the south.
Nilgiri Hills	Signifying 'blue mountains, this name is attributed to the southernmost section of the Western Ghats, located at the junction of Karnataka, Kerala, and Tamil Nadu.
Sahya Parvatam	It means 'Sahya Mountains' and is commonly used in Kerala, particularly in the southern reaches of the range
Cardamom Hills	Located on the Kerala-Tamil Nadu border, these hills derive their name from the cardamom plant, a prominent spice cultivated in the region.
Anaimalai Hills	Situated in the southern reaches of the Western Ghats along the Kerala-Tamil Nadu border, these hills derive their name from the Tamil word 'aanai, meaning 'elephant'.

Biodiversity

- It is home to one of the highest levels of endemism globally.
- A total of 4,000 vascular plant species, of which 1,500 were endemic, accounting for 37.5% of the total.
- Specifically, of the nearly 650 tree species identified in the Western Ghats, 352 (54%) are found nowhere else.
- Animal diversity is equally remarkable, with amphibians (up to 179 species, 65% endemic), reptiles (157 species, 62% endemic), and fishes (219 species, 53% endemic), highlighting high levels of endemism.
- The climatic and altitudinal gradient of the Western Ghats has led to a diverse range of vegetation types, including evergreen, semievergreen, moist deciduous, and dry deciduous vegetation.
- Western Ghats have the following forest types- (i) dry scrub vegetation (ii) dry deciduous forests (iii) moist deciduous forests (iv) semi-evergreen forests (v) evergreen forests (vi) shoals; and (vii) high-altitude grasslands.
- The Western Ghats are home to a minimum of 325 species listed as globally threatened according to the IUCN Red List.

Some of the Fauna Groups found in the Western Ghats

Mammals	Around 139 species of mammal of which 16 being endemic is found here. Among the most threatened species are the Nilgiri Tahr, Lion-tailed Macaque, Gaur, Tiger, Asian Elephant, Sloth Bears, Nilgiri Langur, Indian Leopard, and Nilgiri Marten. The Malabar large-spotted civet is critically endangered.
Birds	There are 508 bird species in the Western Ghats, including 16 endemics. Notable species include the Broad-Tailed Grassbird, Nilgiri Wood Pigeon, Nilgiri Pipit, Black, Rufous-Breasted Laughing Thrush, Rufous Flycatcher, Crimson-Backed Sunbird, Malabar Grey Hornbill, and Grey-Headed Bulbul.

Reptiles	Approximately 124 reptile species inhabit the Western Ghats, with Melanophidium, Teretrurus, Plecturus, and Rhabdops being common endemic shield-tailed snakes. Endemic venomous snakes include the Malabar pit viper, striped coral snakes, and the horseshoe pit viper.
Amphibians	Nearly 80% of amphibian species in the Western Ghats are endemic. Endemic frogs include the Malabar frog, Micrixalus, and Indirana, while Mercurana, Ghatixalus, and Beddomixalus are among the endemic tree frogs. Ghatophryne and Pedostibes are endemic toads.
Fish	The Western Ghats are home to over 288 freshwater and 35 marine fish species, with 118 being endemic. Of the freshwater species, 97 are threatened, with 12 critically endangered, 31 vulnerable, and 54 endangered.
Invertebrates	Over 331 butterfly species and 174 dragonfly species can be found in the Western Ghats, with 69 dragonflies being endemic.

Threats

Western Ghats are confronted with numerous threats such as-

- Habitat loss and fragmentation, primarily driven by the cultivation of coffee, tea, palm, rubber, and other crops, leading to widespread deforestation.
- Wildlife poaching, deforestation, overfishing, and livestock grazing.
- Excessive use of agrochemicals in various plantations contributes to the deterioration of natural habitats.
- Construction of railway lines, mining operations, and tourist infrastructure in the mountainous areas.

Conservation and Management

- Efforts have been made to provide legal protection to wildlife and habitats, designate protected areas, and recognize the rights of forest-dwelling communities.
- It includes laws such as the Environment (Protection) Act, Wildlife (Protection) Act, and Forest Rights Act, declaration of Eco-Sensitive Zone (ESZ) etc,
- Institutions and agencies like the Ministry of Environment, Forests, and Climate Change, State Forest Departments, and the National Biodiversity Authority play pivotal roles in overseeing conservation efforts.
- However, challenges persist, including the effective implementation of policies, balancing development with conservation, ensuring interstate coordination, and addressing emerging climate change issues.

Way Forward

- Priorities should include strengthening enforcement mechanisms, promoting sustainable development practices, enhancing collaboration among stakeholders, investing in research and monitoring, and addressing the challenges posed by climate change.
- Collaboration among the Government, local communities, NGOs, and other stakeholders remains crucial for the successful conservation of the Western Ghats.

3- Soil Ecosystem

- The soil ecosystem is a remarkable and complex network of organisms and abiotic factors that interact in a dynamic environment.
- It supports a diverse array of life forms, playing a critical role in sustaining terrestrial ecosystems and human societies alike.

Components of the Soil Ecosystem

1. **Physical Environment:** It includes texture, structure, and moisture content, create the foundation for the soil ecosystem. These factors influence the distribution and behavior of organisms within the soil profile.
2. **Organic Matter:** It comprises of dead plant and animal material, along with living organisms such as microbes' fungi, and earthworms. Organic matter provides nutrients and energy to support soil life and plays a crucial role in soil fertility and structure.
3. **Micro-organisms:** Bacteria, fungi, protozoa etc are vital for nutrient cycling, decomposition, and soil health. They break down organic matter, fix nitrogen, and contribute to the formation of soil aggregates.
4. **Macro-organisms:** larger organisms, including earthworms, insects, nematodes, and small mammals, inhabit

the soil and play various roles in nutrient cycling, soil aeration, and soil structure formation. Their activities influence soil fertility and ecosystem functioning.

5. **Plant Roots:** They exudates fuel microbial activity and contribute to soil organic matter, shaping soil microbial communities and nutrient cycling processes. Plant root exudates are fluids emitted through the roots of plants.

Functions of the Soil Ecosystem

1. **Nutrient Cycling:** Soil organisms decompose organic matter, releasing nutrients such as nitrogen, phosphorus, and potassium into the soil. These nutrients are then taken up by plants, fueling growth and productivity.
2. **Decomposition:** Microorganisms and detritivores break down organic matter, recycling nutrients and returning them to the soil. Decomposition processes contribute to soil fertility and organic matter accumulation.
3. **Soil Formation:** Through weathering and biological processes, soil develops over time from parent material.
4. **Water Regulation:** Soil acts as a reservoir for water, storing and releasing it slowly over time. Soil influences water infiltration, retention, and drainage, affecting plant growth, groundwater recharge, and flood mitigation.
5. **Habitat Support:** Soil provides a habitat for a vast array of organisms, ranging from microscopic bacteria to larger mammals.



Interconnections in the Soil Ecosystem

- The components and functions of the soil ecosystem are interconnected through intricate networks of relationships and feedback loops. For example, plant roots exude sugars and other compounds, fueling the growth of soil microbes. In return, microbes aid in nutrient uptake by plants and contribute to soil aggregation and structure formation.

Conclusion

- The soil ecosystem is a dynamic and diverse community of organisms and abiotic factors that sustain life on Earth. Soil plays a vital role in terrestrial ecosystems and human wellbeing.
- Understanding the complexity of the soil ecosystem is essential for sustainable land management and ecosystem conservation, ensuring the continued health and productivity of soils for future generations.

4- Sacred Groves

- Sacred Groves are the area of “natural” vegetation preserved through local taboos and sanctions that entail spiritual and ecological values. The ecological values are found in the traditional association of the sacred groves with wildlife and physical landscape such as streams.

Types of Sacred Groves

Based on the deities, cultural, and the religious importance, and their association.

1. **Temple Groves:** These groves are associated with temples due to their religious importance; generally, they are protected by the government, the temple trust, or village committees.
2. **Traditional Sacred Groves:** These are the places where the folk deities reside. They often contain a rich variety of plant and animal life.
3. **Religious Groves:** Where they are associated with Hinduism, Buddhism, Jainism, Islamism, and Sikhism.
4. **Island Groves:** Island groves can be categorized based on the habitat type-specific ecological importance, for example, mangroves and coastal/reverie areas in Andhra Pradesh.
5. **Burial/Cremational/Memorial Groves:** They are associated with burial places. These are seen as places of reverence for the deceased and are believed to be inhabited by the spirits of ancestors.

Significance of Sacred Groves

1. **Protection of Ecosystems:** They often serve as protected areas, safeguarding biodiversity by restricting human activities that can harm the environment.

2. **Traditional Knowledge:** Local communities that manage sacred groves often possess a deep understanding of the local ecology and traditional practices that have been passed down through generations.
3. **Biodiversity Conservation:** They can act as refuge for a wide range of plant and animal species, especially in areas where habitat loss is a major threat.
4. **Cultural Preservation:** They are important repositories of cultural and religious practices of local communities.
5. **Community Empowerment:** They are often managed by local communities.
6. **Environmental Benefits:** They play a vital role in maintaining the ecological balance of an area.
7. **Community Conservation:** It is protecting biodiversity, preserving natural resources, and managing natural resources sustainably for future preservation.

Biodiversity Heritage Site

- It is a unique conservation approach recognized under Section 37 (1) of the Biological Diversity Act, 2002. Under this, the State Government may, from time to time, in consultation with the local bodies, notify in the official Gazette of areas of biodiversity importance as Biodiversity Heritage Sites. So far, 44 Biodiversity Heritage Sites have been notified by 16 states.

Challenges

Sacred Groves have been legally protected under the Community Reserves in the Wildlife (Protection) Amendment act, 2002 but, in the modern era, the groves are facing serious threat due to:

- Habitat loss
- Climatic change
- Global warming
- Invasive/ Alien species
- Other challenges such as Anthropogenic pressure, encroachment, deforestation, cultural degradation, pollution, and no proper legislations, etc.

Conclusion

- Sacred groves have been legally protected under community reserves under the Wildlife (Protection) Amendment Act, 2002.
- These are the best examples of community conservation and unique source for in-situ conservation, but in the modern era, the groves are facing serious threats due to rapid urbanization, cultural shifting, anthropogenic pressure, global warming, and climatic change, etc, leads to rapid erosion of the sacred groves, their ecology, floral & faunal compositions, and sociocultural significance.

5- Blue Economy

- According to the World Bank, the blue economy is defined as the sustainable development of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of the ocean ecosystem.
- It emphasizes the integration of the development of the ocean economy with social inclusion and environmental sustainability, combined with innovative business models.
- Around 3-5% of global GDP derived from oceans and it has great potential for boosting economic growth by providing opportunities for income generation, jobs, etc.
- Over 80% of international goods being transported by sea
- The UN has declared the period 2021-2030 as the 'UN Decade of Ocean Science for Sustainable Development'.

India's Scenario

- India has a coastline of more than 7500 km and an Exclusive Economic Zone (EEZ) of more than 2.2 million sq km.
- 9 of India's states have access to the coastline.
- India comprises 200 ports, of which 12 are major ports that handled 541.76 million tonnes in FY21, the highest being Mormugao Port, located in Goa.
- India is the second-largest fish-producing nation in the world and has a fleet of 2,50,000 fishing boats.
- India's blue economy accounts for roughly 4% of the GDP and is estimated to increase over the period of time.

Activities in Blue Economy

The blue economy encompasses a diverse range of activities that are critical for sustainable development. Some are listed below:

1. **Renewable Energy:** Sustainable marine energy such as offshore wind and wave energy promotes sustainable developing and helps in reducing reliance on nonrenewable energy sources.
2. **Fisheries:** Sustainable fisheries management ensures more revenue, a continuous supply of fish, and contributing to the restoration of fish stocks, thus supporting both economic and environmental goals.
3. **Maritime Transport:** It is a cornerstone of the global economy, connecting nations and facilitating trade.
4. **Tourism:** Ocean and coastal tourism offer recreational opportunities, contribute to job creation and economic growth, making it a key component of the blue economy.
5. **Climate Change:** Oceans act as crucial carbon sinks, absorbing and storing carbon dioxide, a phenomenon known as 'blue carbon'.
6. **Waste Management:** Proper waste disposal practices prevent pollution, marine debris, and environmental degradation, fostering ocean recovery.

Importance of the Blue Economy for India

- Ocean and Resources

The ocean and its EEZ offer great economic opportunities, having both living and non-living resources.

Fisheries

- Fisheries can be categorized as marine fisheries and inland fisheries.
- Fisheries have contributed Rs. 46,663 crores to the economy through exports in 2019-20.
- In 1950-51, fish production amounted to 0.75 MMT (million metric tonnes), and in 2019- 20, it was 14.2 MMT.
- Out of 14.2 MMT production, marine fish production was 3.7 MMT, and inland fish production was 10.4 MMT (Annual Report of the Ministry of Fisheries, Animal Husbandry and Dairying, 2021).

Minerals

- The continental margins of India has an extensive variety of terrigenous, biogenous, and homogenous mineral deposits.
- Heavy minerals like ilmenite, magnetite, monazite, zircon, and rutile were reported from the beaches of Indian coastal states.

Hydrocarbons

- The sea beds are the major source of hydrocarbons. India has 26 sedimentary basins, spread across a total area of 3.4 million square kilometers.
- India has about 34 MMT of oil and 33 BCM of gas production.
- The current annual oil and natural gas consumption is about 1.3 billion barrels and 65 billion cubic meters, which is not met with internal resources, raising dependence on imports.

Renewable Energy

- It includes energy from natural phenomena like sunlight, Onshore wind, Offshore wind, hydroelectric, tides, waves, etc.
- Technologies like tidal lagoons, tidal reefs, tidal fences, and tidal barrages are used for tidal energy generation.
- Renewable energy in offshore regions has tremendous potential in the form of offshore wind, waves, ocean currents, including tidal currents, and thermal energy.
- Out of all the different renewable energies generated from oceans, the offshore wind energy industry is the most developed.
- Ports, Shipping, and Marine Tourism
- India has a network of 12 major ports and 187 non-major ports.
- Approximately 95% of the country's trade by volume and 68% by value is moved through maritime transport.
- India has one of the largest merchant shipping fleets among the developing countries and ranks 17th in the world, thus shipping sector is also one of the key livelihoods providers in the blue economy.

- Marine tourism is the fastest growing globally, and in India, coastal tourism has contributed largely to both the state economies and livelihood creation.
- Ocean Science and Services
- Observations, data, and information services: Ocean and coastal observations, data, and information services are of paramount importance for all Blue Economy stakeholders. Operational services such as Marine Fishery Advisories, Ocean State Forecasts, Tsunami and Storm Surge Early Warnings, Sea Level Rise, Oil Spill Trajectories, Marine Search and Rescue Information, Water Quality Forecasts, Coral Bleaching Alerts, Harmful Algal Blooms, Coastal Vulnerability, etc. are key to enhancing the safety of lives and livelihoods of coastal communities, the efficiency of maritime.
- Impact of climate change and disasters on the blue economy: The ocean holds vast natural capital (Ocean Asset Value), estimated at USD 24 trillion. However, ocean warming, sea-level rise, ocean acidification, and marine pollution are damaging marine ecosystems, productivity, and the lives and livelihoods of those dependent.
- Marine Biodiversity: Its Conservation and sustainable use of marine and coastal biodiversity is essential to ensuring that the world's oceans, seas, and marine living resources remain vital for current and future generations.
- Healthy Oceans: The Sustainable Development Goals (SDG 14), Life Below Water, of the UN call for conservation and sustainable use of oceans and marine resources. The growing menace of marine pollution, especially from plastics and microplastics, has to be addressed by a robust Plastic Elimination and National Marine Litter policy involving multiple stakeholders.
- Research Gap: Blue economy is a new topic that has gained importance in 21st century. There are many studies on the blue economy at the national and international level in marine biology, marine technology, marine chemistry, geology, shipping, oceanography, etc.

Niche areas

- Coastal and Marine Spatial Planning: It is a science-based approach that can be used to analyze and allocate coastal and marine uses over space and time to address specific ocean management challenges and advance goals for economic development and conservation.

Source of Employment in the Blue Economy

- Fishing and Aquaculture: Traditional sectors like fishing, aquaculture, and fish processing have been significant sources of employment in the blue economy for many decades.
- Marine Tourism: activities like cruise travel, boating, scuba diving, and more, contributes to employment and economic growth in coastal regions.
- Shipping and Ports: The growth in the logistics sector, driven by industrial demand, emphasizes the increasing role of ports in future employment.
- Shipbuilding: It holds significant potential and employs individuals with diverse skills.
- Offshore Wind and Marine Biology: Emerging sectors like offshore wind and marine biology provide new employment opportunities.
- Skill Development Initiatives: The blue economy has the potential to engage a large workforce and has been doing so for the past many decades.

Conclusion

- From traditional fishing practices to innovative sectors like offshore wind and marine biology, the blue economy is evolving. Skill development initiatives, youth involvement, and the preservation of traditional knowledge are integral to harnessing the full potential of the blue economy and ensuring prosperity for all.

6- The Ramsar Convention on Wetlands

About Ramsar Convention

- It is an international treaty for “the conservation and sustainable use of wetlands”.
- It is also known as the Convention on Wetlands.
- It is named after the city of Ramsar in Iran.

- The Convention was signed on 2nd of February 1971.
- The 2nd of February each year is World Wetlands Day.
- Number of parties to the convention (COP) is 172.
- This aims for wise use of wetlands i.e. maintenance of ecological character within the context of sustainable development.
- COP is the policy-making organ of the Convention which adopts decisions (Resolutions and Recommendations) to administer the work of the Convention.
- Every three years, representatives of the Contracting Parties meet as the Conference of the Contracting Parties.

Why needed?

- 64% of the world's wetlands have already depleted in the last century.
- Wetlands are indispensable for the many benefits or "ecosystem services" that they provide ranging from freshwater supply, food and building materials, and biodiversity, flood control, groundwater recharge, and climate change mitigation.

What is a Wetland?

- It includes all lakes and rivers, underground aquifers, swamps and marshes, wet grasslands, peatland, oases, estuaries, deltas and tidal flats, mangroves and other coastal areas, coral reefs, and all human-made sites such as fishponds, rice paddies, reservoirs and salt pans.
- The Montreux Record is a register of wetland sites on the List of Wetlands of International Importance where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments, pollution or other human interference.
- It is maintained as part of the Ramsar List.

Criteria

To be Ramsar site, however, it must meet at least one of nine criteria as defined by the Ramsar Convention, such as:

- Supporting vulnerable, endangered, or critically endangered species or
- Threatened ecological communities or,
- If it regularly supports 20,000 or more waterbirds or,
- Is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks are dependent upon.

Ramsar Wetlands Sites in India (Total 80 sites as of February 2024)

S.No.	Ramsar Site	Ramsar Site
1	Ankasamudra Bird Conservation Reserve	Karnataka (Added in January 2024)
2	Aghanashini Estuary –	Karnataka (Added in January 2024)
3	Magadi Kere Conservation Reserve	Karnataka (Added in January 2024)
4	Longwood Shola Reserve Forest	Tamil Nadu (Added in January 2024)
5	Karaivetti Bird Sanctuary –	Tamil Nadu (Added in January 2024)
6	Chilika Lake	Odisha
7	Keoladeo National Park	Bharatpur Rajasthan
8	Harike Wetland	Harike, Punjab
9	Loktak Lake	Bishnupur, Manipur
10	Sambhar Lake	Rajasthan
11	Wular Lake	Jammu and Kashmir
12	Kanjli Wetland	Kapurthala Punjab
13	Ropar Wetland	Ropar, Punjab
14	Ashtamudi Wetland	Kollam district, Kerala
15	Bhitarkanika Mangroves	Odisha India
16	Bhoj Wetland	Bhopal, Madhya Pradesh

17	Deepor Beel	Guwahati, Assam
18	East Kolkata Wetlands	Kolkata West Bengal
19	Kolleru Lake	Andhra Pradesh
20	Point Calimere Wildlife and Bird Sanctuary	Tamil Nadu
21	Pong Dam Lake	Kangra, Himachal Pradesh
22	Sasthamkotta Lake	Kollam, Kerala
23	Tsomoriri	Ladakh
24	Vembanad-Kol Wetland	Kerala
25	Chandra Taal	Lahul, Himachal Pradesh
26	Hokera Wetland	Zainakote, Jammu and Kashmir
27	Renuka Lake	Simaur, Himachal Pradesh
28	Rudrasagar Lake	Melaghar, Tripura, India
29	Surinsar-Mansar Lakes	Jammu and Kashmir
30	Upper Ganga River (Brijghat to Narora Stretch)	Uttar Pradesh
31	Nalsarovar Bird Sanctuary	Ahmedabad, Gujarat
32	Sundarban Wetland	West Bengal
33	Nandur Madhameshwar	Nashik, Maharashtra
34	Nawabganj Bird Sanctuary	Unnao, Uttar Pradesh
35	Sarsai Nawar Jheel	Etawah, Uttar Pradesh
36	Beas Conservation Reserve	Harike Punjab
37	Keshopur-Miani Community Reserve	Punjab
38	Nangal Wildlife Sanctuary	Nangal, Punjab
39	Sandi Bird Sanctuary	Hardoi, Uttar Pradesh
40	Samaspur Bird Sanctuary	Uttar Pradesh
41	Parvati Aranga Bird Sanctuary	Gonda, Uttar Pradesh
42	Saman Bird Sanctuary	Mainpuri, Uttar Pradesh
43	Asan Barrage	Uttarakhand
44	Kanwar Taal or Kabar Taal Lake	Begusarai, Bihar
45	Sur Sarovar	Agra, Uttar Pradesh
46	Lonar Lake	Buldhana, Maharashtra
47	Tso Kar	Leh, Ladakh
48	Bhindawas Wildlife Sanctuary	Haryana
49	Sultanpur National Park	Haryana
50	Thol Lake Wildlife Sanctuary	Gujarat
51	Wadhvana Wetland	Gujarat
52	Haiderpur Wetland	Uttar Pradesh
53	Khijadiya wildlife sanctuary	Gujarat
54	Bakhira wildlife sanctuary	Uttar Pradesh
55	Pallikaranai Marsh Reserve Forest	Tamil Nadu
56	Kaikill Bird Sanctuary	Tamil Nadu
57	Pichavaram Mangrove	Tamil Nadu
58	Pala wetland	Mizoram
59	Sakhya Sagar	Madhya Pradesh
60	Tampara Lake	Odisha
61	Hirakud Reservoir	Odisha
62	Ansupa Lake	Odisha

63	Yashwant Sagar	Madhya Pradesh
64	Chitrangudi Bird Sanctuary	Tamil Nadu
65	Suchindram Theroor Wetland Complex	Tamil Nadu
66	Vaduvur Bird Sanctuary	Tamil Nadu
67	Kanjirankulam Bird Sanctuary	Tamil Nadu
68	Thane Creek	Maharashtra
69	Hygam Wetland Conservation Reserve	Jammu and Kashmir
70	Shallbugh Wetland Conservation Reserve	Jammu and Kashmir
71	Koonthankulam Bird Sanctuary	Tamil Nadu
72	Udhayamarthandapuram Bird Sanctuary	Tamil Nadu
73	Vedanthangal Bird Sanctuary	Tamil Nadu
74	Vellode Bird Sanctuary	Tamil Nadu
75	Vembannur Wetland Complex	Tamil Nadu
76	Gulf of Mannar Marine Biosphere Reserve	Tamil Nadu
77	Sirpur wetland	Madhya Pradesh
78	Ranganathittu BS	Karnataka
79	Nanda Lake	Goa
80	Satkosia Gorge	Odisha

Chapter- 10

Kurukshetra May 2024

1. Rural Tourism in India

What is Rural Tourism?

- Focuses on exploring and experiencing rural lifestyle and culture.
- Takes place in non-urban areas showcasing art, culture, heritage, and native life.
- Activities include farming, fishery, crafts, and various aspects of rural life.
- Targets areas with low population density, dominated by agriculture, forestry, and traditional social structures.
- High potential to stimulate rural economic growth and social change.
- Aligns with “Atmanirbhar Bharat” (self-reliant India) and “Vocal for Local” initiatives.
- Prioritized for development since the 11th five-year plan (2007-2012).

Strategies for Development

- Ministry of Tourism has formulated two strategies:
- National Strategy and Roadmap for Development of Rural Tourism in India
- National Strategy for Promotion of Rural Homestays in India
- Focus on a holistic approach for developing rural tourism and uplifting the rural economy.

Key strategic pillars:

- Benchmarking state policies and best practices
- Digital technologies and platforms for rural tourism
- Developing clusters for rural tourism
- Marketing support for rural tourism
- Capacity building of stakeholders
- Governance and Institutional Framework

Mapping Rural Tourism Potential

- Ministry of Tourism launched:
- Best Tourism Village Competition – identified 35 best tourism villages from 795 applicants.
- Best Rural Homestay Competition

Positioning at Global Level

- Pochampally village, Telangana (2021) and Dhordo village, Gujarat (2023) recognized as UNWTO Best Tourism Villages.

From Last Village to First Village

- Vibrant Village Program for India’s Border Villages – focuses on holistic development of villages in border areas.
- Upgrading infrastructure, healthcare, education, and fostering economic growth.
- Key areas of development:
- All-weather roads
- Drinking water
- 24/7 electricity (solar and wind focus)
- Mobile and internet connectivity

Community Reinforcement

- Ministry of Tourism strategizes capacity-building initiatives for stakeholders.
- Establishing Capacity Building Resource Centers at National, State, and Cluster levels.
- Centers will:

- Facilitate knowledge exchange
- Foster interaction among stakeholders (practitioners, institutions, government agencies, volunteers)
- Serve as repositories for tourism knowledge

Conclusion

- Rural tourism plays a pivotal role in fostering rural development by providing a range of benefits and avenues for growth.

2.Amenitisation of Rural India for Nature Tourism

True Potential of Rural Tourism

- Lies in experiencing open areas, nature, and folk culture.
- Rural India acts as a custodian of nature, but rapid urbanization threatens this.
- Rural tourism can create entrepreneur-based jobs and discourage urban migration.

Nature Tourism Activities

- Nature walks: Showcase real rural life with authentic experiences (e.g., interacting with cattle).
- Volunteer tourism: Tourists contribute to villages (teaching, creating art) while enjoying their stay.

Benefits of Rural Tourism

- Low-carbon development strategy: Reduces pollution, emissions, and energy demand in cities.
- Sustainable carbon dioxide sink: Creates a natural way to absorb carbon dioxide.

Amenitisation

- Creating an enabling environment for rural tourism.
- Multistakeholder engagement involving various parties.
- Three categories of amenities:

1. Affirmative Amenities (Essential)

- Access to healthcare
- Sanitation and waste management
- Safe drinking water
- Green power
- Street lighting
- Smart security solutions

2. Supportive Amenities (Enhance Experience)

- Digital services
- Travel connectivity
- Awareness of local customs and traditions for tourists
- Access to conveniences (shops, ATMs)

3. Value Adding Amenities (Memorable Experience)

- Digital skills for village hosts to interact with tourists
- Hospitality skills for professional guest treatment
- “Village Kutir Udyam”: Local businesses offering crafts, food, wellness experiences, and outdoor activities.
- Local community connection: Connecting tourists with volunteer groups.

Government Schemes Promoting Tourism

- Swadesh Darshan Scheme (2014-15): Develops themed tourist circuits focused on value, competitiveness, and sustainability.
- PRASHAD Scheme (2014-15): Improves pilgrimage and heritage destinations.
- Adopt a Heritage Scheme (2017): Encourages public-private partnerships to improve amenities at tourist sites.

Conclusion

- Rural tourism can transform villages. Stakeholders must work together to ensure sustainable development through rural tourism initiatives.

3. Different Hues of Rural Tourism

Tribal Tourism

- Majuli Island, Assam:
- Scenic river island on the Brahmaputra River.
- World's largest river island with a tribal population.
- Assam's cultural capital known for Satriya culture and Neo-Vaishnavism.
- Araku Valley, Andhra Pradesh:
- Rich cultural history with beaches, temples, and hill stations.

Agricultural Tourism

- Farm of Happiness, Ratnagiri District, Maharashtra:
- 20-acre organic farm stay with opportunities for visitors to participate in farming activities.
- Konyak Tea Retreat, Mon District, Nagaland:
- Upscale farmhouse located on a private tea estate.
- Offers organic vegetables, orange orchard, and activities like nature treks and helping in rice fields.

Eco Tourism

- Kumarakom, Kerala:
- Offers opportunities to witness the eco-friendly craft of coconut frond weaving.
- Malarickal, Kottayam, Kerala:
- Backwaters and natural beauty attracting tourists.
- Madla, Madhya Pradesh:
- Unique town with all three natural geographic features (hills, plains, and rivers) within 1 km.
- Offers experiences like folk music, dance, and regional cuisine.

Art and Culture Tourism

- Ajrakhpur, Gujarat:
- Art and craft town known for Ajrakh print, a block printing technique with natural dyes.
- The craft originated from the Muslim Khatri community.
- Chanderi, Madhya Pradesh:
- 11th-century town known for charming forts, hand-woven Chanderi sarees, and rolling hills.
- Offers a variety of weaves like pure Chanderi silk and Chanderi cotton-silk.

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