



VIKRAM-S ROCKET



TECHNOLOGY
AND INNOVATION
IN HEALTHCARE



INTERNATIONAL
MARITIME
TRANSPORT

**PIB, YOJANA,
KURUKSHETRA
COMPILATION**

NOVEMBER 2022



APTI PLUS

Academy for Civil Services Pvt. Ltd.

UPSC CSE 2022 MOCK INTERVIEW PROGRAMME



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PIB

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GENERAL STUDIES-II

01

NEW LOGO AND THEME OF INDIA'S G20 PRESIDENCY

Context

- Recently, the Prime Minister unveiled the logo, theme and website of India's G20 Presidency via video conferencing.
- India will assume G20 Presidency on December 1, 2022.
- The G20 Presidency offers a unique opportunity for India to contribute to the global agenda on pressing issues of international importance.

Opportunity for India during G20 Presidency

- During G20 Presidency India will have to focus on important issues like:
 - Regulation of crypto across-border payments
 - Public investments in Renewable infrastructure energy
- The G20 presidency provides a fantastic opportunity for India to shape the global agenda on culture across multiple work streams and engagement areas.
- These include:
 - protection and restitution of cultural property
 - advancement of traditional cultural practices for sustainable living
 - promotion of cultural and creative industries for livelihood generation
 - preservation and dissemination of culture by leveraging technology



Climate and clean energy issues

1. **On climate financing:** Clear, strong, positive signals need to be given by the G20 to the COP27 in Egypt later this year, honouring, at the very least, the 2015 Paris Agreement and commitments made at COP26 in Glasgow, last year.
2. **On a clean energy transition:** The G20 will need to ensure that the IMF monitors the fiscal space impacts of the decline in fossil fuel revenues on developing country economies making the transition and help equip them to reap the benefits of the opportunities created by a clean energy economy.

02

DRAFT DIGITAL DATA PROTECTION BILL

Context

- Recently, the Centre released a revised personal data protection bill, now called the Digital Personal Data Protection Bill, 2022.
- Three months after the withdrawal of the Digital Personal Data Protection Bill from the lower house of the Parliament, the central government has now come up with a new draft Bill seeking views from the public.

Active digital citizens populations

- Presently, there are over 76 crore active digital citizens and over the next coming years, this is expected to touch 120 crores (1.2 billion).
- India is the largest connected democracy in the world and is amongst the highest consumers and producers of data per capita among the countries.

Penal provision

- The bill also imposes heavy penalties for violations of any provisions of the legislation which will be decided by the **Data Protection Board of India**– as established by the new law. However, orders of the board can be challenged in a High Court.

Seven principles of the bill

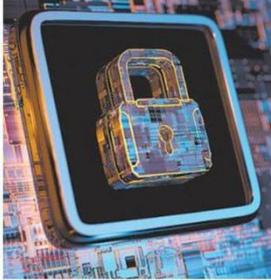
- The first is that “usage of personal data by organizations must be done in a manner that is lawful, fair to the individuals concerned and transparent to individuals.”
- The second principle states that personal data must only be used for the purposes for which it was collected.
- The third principle talks about **data minimization**
- Fourth emphasizes **data accuracy** when it comes to collection.
- The fifth principle talks of how **personal data** that is collected cannot be “stored perpetually by default,” and storage should be limited to a fixed duration.
- The sixth principal notes that there should be reasonable safeguards to ensure there is “**no unauthorised collection or processing of personal data.**”
- Finally, the seventh principle “is that the person who decides the purpose and means of the processing of personal data should be **accountable for such processing.**”

Consent of individual

- The Bill requires the consent of the individual to be the basis for the processing of their data, except in certain circumstances where seeking the consent of the Data Principal is “impracticable or inadvisable due to pressing concerns”.
- Every request for consent will need to be presented to the Data Principal in clear and plain language, and an option to access such a request for consent in English or any language specified in the **Eighth Schedule to the Constitution of India.**
- The Data Principal shall have the right to withdraw her consent at any time.

Bill's ambit

The draft Bill narrows the scope of the data protection regime to personal data protection – a move welcomed by the industry



THIS ACT APPLIES TO:	THE ACT EXCLUDES:
<ul style="list-style-type: none"> ■ Personal data collected from users online ■ Data collected offline, but later digitised 	<ul style="list-style-type: none"> ■ Personal data processed by an individual for personal or domestic purpose ■ Recorded personal data in existence for at least 100 years

Exemption from bill provisions

- The Bill also gives the power to the government to offer exemption from its provisions “in the interests of **sovereignty and integrity of India**” and **to maintain public order.**
- The revised Bill has proposed a **Data Protection Board of India**, which will be notified by the Central government.
- The government could also exempt certain businesses from adhering to provisions of the Bill based on the number of users and the **volume of personal data processed by the entity.**
- This has been done keeping in mind startups of the country who had complained that the previous version of the Bill was too “compliance intensive”.

03

INDIA'S CHAIR OF GLOBAL PARTNERSHIP ON AI (GPAI)

Context

- Recently, India has assumed the presidency of the Global Partnership on Artificial Intelligence (GPAI) for 2022-23.

About GAPI

- GPAI is an international initiative to support responsible and human-centric development and use of Artificial Intelligence (AI).
- GPAI is a first-of-its-type initiative for evolving a better understanding of challenges and opportunities around **AI using the experience and diversity of participating countries.**

- It works in collaboration with partners and international organizations, leading experts from industry, civil society, governments, and academia to collaborate to promote the responsible evolution of AI and guide the responsible development and **use of AI, grounded in human rights, inclusion, diversity, innovation, and economic growth.**

National Data Governance Framework Policy

- The NDGFP aims to ensure equitable access to non-personal data and focus on improving the **institutional framework for government data sharing, promoting principles around privacy and security by design, and encouraging the use of anonymization tools.**
- It also aims to standardize the government's data collection and management.
- The NDGFP along with the envisaged Indian Data Management Office IDMO shall catalyze the next Gen AI and Data-led research and startup ecosystem.

04 MAARG PORTAL FOR STARTUP

Context

- Recently, the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry has launched a call for startup applications for registration on the Mentorship, Advisory, Assistance, Resilience and Growth (MAARG) portal.

About the portal

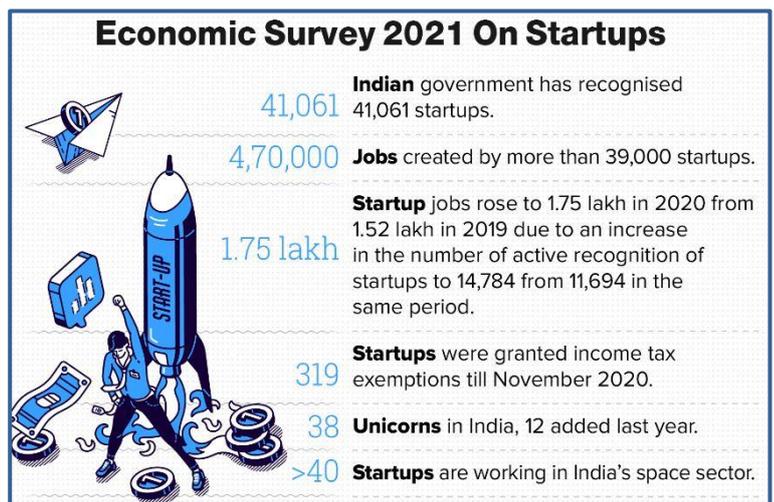
- MAARG portal (Mentorship, Advisory, Assistance, Resilience and Growth) is the **National Mentorship Platform by Startup India.**
- It is a one-stop platform to facilitate mentorship for startups **across diverse sectors, functions, stages, geographies, and backgrounds.**
- Through this portal, startups can connect with academicians, industry experts, successful founders, seasoned investors and other experts from across the globe, through artificial intelligence (AI)-based matchmaking to get personalized guidance on growth and strategy.

Objectives of the MAARG portal

- To provide sector-focused **guidance, handholding, and support to startups throughout their lifecycle**
- To establish a formalized and structured platform that **facilitates intelligent matchmaking between the mentors and their respective mentees**
- To facilitate efficient and expert mentorship for startups and build an outcome-oriented mechanism that allows timely **tracking of the mentor-mentee engagements**

Three phase operation

- The MAARG Portal is being operationalized in three phases
 1. Phase I: Mentor Onboarding: Successfully launched and executed, 400+ expert mentors are onboarded across sectors
 2. Phase II: Startup Onboarding: DPIIT is launching the onboarding of startups on the MAARG Portal
 3. Phase III: MAARG Portal Launch and Mentor Matchmaking: Final launch where the mentors will be matched to the startups DPIIT has initiated the onboarding process of startups under Phase II.





05

DRAFT NATIONAL CREDIT FRAMEWORK (NCRF)

Context

- Recently, the Government of India unveiled the draft National Credit Framework (NCrF) to enable the integration of academic and vocational domains.

About

- National Credit Framework is a next-generation, multidimensional instrument under National Education Policy (NEP).
- National Credit Framework (NCrF) aims to **enable the integration of academic and vocational domains to ensure flexibility and mobility between the two.**
- It is an umbrella framework for **skilling, re-skilling, up-skilling, accreditation & evaluation encompassing people in educational & skilling institutions and the workforce.**

The objective of NCrF

- It aims to Integration of academic and **vocational domains to ensure flexibility and mobility between the two.**
- The NCrF will Mainstream skilling and vocational education by inter-mingling school and **higher education with vocational education and experiential learning.**
- It will also enable students who have **dropped out of mainstream education to re-enter the education ecosystem**

Components of the National Credit Framework

- National Higher Education Qualification Framework (NHEQF)
- National Skills Qualification Framework (NSQF)
- National School Education Qualification Framework (NSEQF)

Academic Bank of Credits

- After student registration, an **Academic Bank of Credits (ABC) account** will be opened, where credits can be deposited. The deposit of degrees and **credits will take place in those accounts.**

Importance of NCrF system

- The NCrF system will **support educational acceleration for students with gifted learning abilities and recognition of prior learning for the workforce** that has acquired knowledge and skills informally through traditional family inheritance, work experience or other methods.
- The NCrF aims to blur the lines or remove the **"hard separation" between curricular, extracurricular, or co-curricular, among arts, commerce, and sciences, or between vocational or academic streams.**

06

25TH NATIONAL CONFERENCE ON E-GOVERNANCE (NCEG)

Context

- Recently, the Department of Administrative Reforms & Public Grievances (DARPG) and Ministry of Electronics & Information Technology (MeitY), in association with the State Government of Jammu & Kashmir inaugurated the 25th National Conference on e-Governance (NCEG) to be held in Katra, Jammu & Kashmir.
- Theme: "Bringing citizens, industry and government closer".**

Aim of the conference

- It will provide considerable momentum to the e-Governance initiatives across the country, providing opportunities for civil servants and industry **captains to showcase their successful interventions in e-Governance in improving end-to-end service delivery.**
- The Award recognizes some of the best Government to Government (G to G), Government to Citizen (G to C), and Government to Business (G to B) initiatives taken by government departments.

- It aims to recognize and promote excellence in the implementation of e-Governance initiatives.
- It also recognizes initiatives in **Start-ups, Academic Research Institutions as well as initiatives in adopting emerging technologies.**

Categories of Award

- There were 5 categories of the NAeG Scheme - 2022 to 18 e-Governance initiatives at Central, State and District levels, Academic & Research Institutions and Public Sector Undertakings.

07 INDIA'S FIRST SUICIDE PREVENTION POLICY

Context

- The Ministry of Health and Family Welfare recently announced a National Suicide Prevention Strategy, the first of its kind in the country.

About

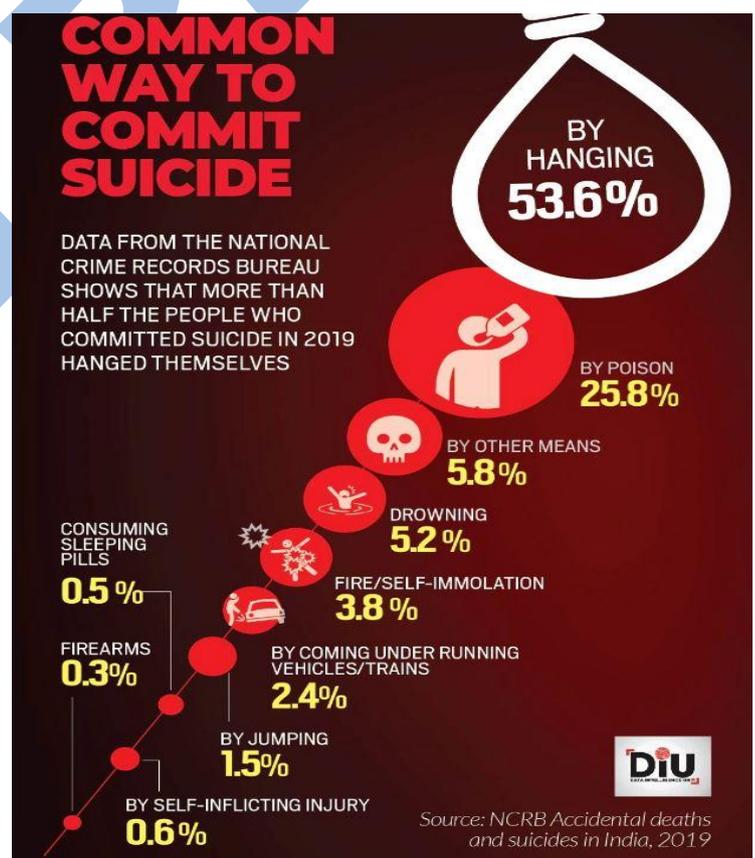
- The suicide prevention policy will be time-bound action plans and multi-sectoral **collaborations to achieve a reduction in suicide mortality by 10% by 2030.**
- Suicides impact all sections of society and thus require concerted and collaborative efforts from individuals and the community at large.

Aim

- The strategy broadly seeks to establish effective surveillance mechanisms for suicide within the next three years.
- It will establish psychiatric outpatient departments that will provide suicide prevention services through the District Mental Health Programme in all districts within the next five years.
- The policy will integrate a mental well-being curriculum in all educational institutions within the next eight years.
- It envisages developing guidelines for responsible media reporting of suicides, and restricting access to means of suicide.
- The stress is on developing community resilience and societal support for suicide prevention.
- While the strategy is in line with the WHO's **South East-Asia Region Strategy for suicide prevention.**

Death due to Suicide

- In India, more than one lakh lives are lost every year to suicide, and it is the top killer in the 15-29 years category.
- In the past three years, the suicide rate has increased from **10.2 to 11.3 per 1,00,000 population.**
- The most common reasons for suicide include family problems and illnesses, which account for **34% and 18% of all suicide-related deaths.**



GENERAL STUDIES - III

01 7TH INDIA WATER WEEK

Context

- The President of India inaugurated the 7th edition of India Water Week (IWW) at the India Expo Centre in Greater Noida, Uttar Pradesh.
- The event was organized by the Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti.
- **Theme: "Water Security for Sustainable Development and Equity".**

About India Water Week

- Every year India Water Week is organized to raise awareness and conserve and use water resources in an integrated manner.
- Indian Water Week platform is used to elicit ideas and opinions from global-level decision-makers, politicians, researchers, and entrepreneurs.

Sustainable & Equitable Management of Water

- The five-day-long program is set to bring together experts, planners, and stakeholders from across the globe. The focus is to **build dialogue, and action plans, and address issues of the sustainability of water resources development as well.**
- **Regulating over-extraction of groundwater, tracking water resources in rural-urban areas, access to installing wells, pumps etc for irrigation, protecting aquifers, rainwater harvesting structures like check dams and field bunds, and not polluting water resources** are some of the ways by which water management and its sustainability can be achieved.
- Moreover, the use of new technologies, sensors and satellite imagery is **enabling us to improve 'water accounting' and equitability in water management.**

02 VIKRAM-S ROCKET

Context

- India's first private rocket 'Vikram-S' was recently launched.
- The rocket has been developed by Skyroot Aerospace, a Hyderabad-based Aerospace company.
- With the launch of Vikram-S', India will make its **debut in the manufacturing of private entities in the Aerospace sector.**

About Vikram-S rocket

- The Vikram-S rocket is a single-stage sub-orbital launch vehicle which will carry three customer payloads and help test and validate the majority of the technologies in the Vikram series of space launch vehicles.
- It is meant to test nearly 80 per cent of all systems and processes before the launch of Vikram-1 scheduled for next year.

Prarambh Mission

- The Prarambh mission is aimed at carrying three payloads into **space, including a 2.5-kilogram payload that students have developed from several countries.**
- The Hyderabad-based startup developed the Prarambh mission and the Vikram-S rocket with extensive support from the Indian Space Research Organisation (ISRO).





Research Organisation (ISRO) and IN-SPACe (Indian National Space Promotion and Authorisation Centre).

Fun-Sat

- Spacekidz, a Chennai-based aerospace startup, will fly 'Fun-Sat', a 2.5 kg payload developed by students from India, the US, Singapore and Indonesia on the sub-orbital flight onboard Vikram-S.

03

5TH MEETING OF GOVERNING COUNCIL OF NATIONAL INVESTMENT AND INFRASTRUCTURE FUND

Context

- Recently, the Union Minister for Finance & Corporate Affairs chaired the 5th meeting of the Governing Council (GC) of the National Investment and Infrastructure Fund (NIIF).

About

- The National Investment and Infrastructure Fund (NIIF) is a fund manager that invests in infrastructure and related sectors in the country.
- The Governing Council noted that NIIF has developed into an internationally credible and commercially viable investment platform, backed by several highly respected **global and domestic investors who have invested alongside the Government of India in NIIF Funds.**

India Japan Fund

- NIIF's first bilateral fund - an **"India Japan Fund"** with a contribution from the central government has been proposed through an MoU between National Investment and **Infrastructure Fund Limited (NIIFL) and Japan Bank for International Development (JBIC).**
- The MoU was signed recently on 9 November 2022.
- This key update regarding bilateral engagements of NIIF was endorsed by the Governing Council.

Roadmap

- National Investment and Infrastructure Fund (NIIF) will leverage India's attractive **investment fundamentals to expand its operations.**
- The centre exhorted the NIIFL team also to explore opportunities under the **National Infrastructure Pipeline, PM GatiShakti and National Infrastructure Corridor**, which include a big pool of investible greenfield and brownfield investment projects, and to try and crowd in commercial capital into those opportunities
- The Governing Council was informed about the investments and performance of NIIF operating companies in sectors such as ports and logistics, renewable energy, and digital infrastructure besides its foray into sectors such as **waste management, water treatment, healthcare, and EV manufacturing.**

04

"IN OUR LIFETIME" CAMPAIGN

Context

- The Ministry of Environment, Forest and Climate Change has launched the "In Our Lifetime" campaign at a side event of COP 27 in Egypt.

About

- National Museum of Natural History (NMNH), under the Ministry of Environment Forest and Climate Change and the **United Nations Development Programme (UNDP), jointly launched the "In Our Lifetime" campaign to encourage youth between the ages of 18 to 23 years** to become message bearers of sustainable lifestyles.
- This campaign envisions recognizing youth from around the world taking climate action initiatives that resonate with the **concept of LiFE.**



Youth involvement

- The campaign will involve more youth in the conversation about climate change, adaptation, and mitigation, and provide them with a platform to share their concerns, issues and solutions with the leaders of the world.
- The youth will be encouraged to submit their climate actions that contribute to lifestyles for the environment within their capacity, which are **sustainable and scalable, and serve as good practices that can be shared globally.**
- It will amplify the voices of the youth who are **increasingly climate-conscious and provide recognition to young climate champions.**

05

NATIONAL BIO ENERGY PROGRAMME

Context

- Recently, the Ministry of New and Renewable Energy (MNRE) has notified the National Bioenergy Programme.
- MNRE has continued the National Bioenergy Programme for the period from FY 2021-22 to 2025-26.

Sub-schemes

- The National Bioenergy Programme will comprise the following sub-schemes:
 1. Waste to Energy Programme (Programme on Energy from Urban, Industrial and Agricultural Wastes /Residues) to support setting up of large Biogas, BioCNG and Power plants (excluding MSW to Power projects).
 2. Biomass Programme (Scheme to Support Manufacturing of Briquettes & Pellets and Promotion of Biomass (non-bagasse) based cogeneration in Industries) to support setting up of pellets and briquettes for use in power generation and non-bagasse-based power generation projects.
- Biogas Programme to support setting up of family and medium size **Biogas in rural areas.**

Enhancing biomass production

- To utilize huge surplus biomass, cattle dung, and industrial and urban biowaste available in the country for recovery of energy, the MNRE has been promoting bioenergy in India since the 1980s.
- One major support extended by MNRE has been Central Financial Assistance provided for setting up of **Bioenergy projects such as Biogas, BioCNG, and Power from urban, Industrial and Agricultural Waste / Residues for reducing their capital cost/ interest on loans, therefore, increasing project viability.**

06

INDIA'S LONG-TERM LOW-EMISSION DEVELOPMENT STRATEGY

Context

- Recently, India submitted its Long-Term Low-Emission Development Strategy to the **United Nations Framework Convention on Climate Change (UNFCCC) at the ongoing 27th Conference of Parties (COP27) in Sharm el-Sheikh, Egypt.**
- The **Long-Term Low Emission Development Strategy** was launched by the Union Minister for Environment, Forest and Climate Change who is leading the Indian delegation to COP 27.

Salient features of the strategy

- The focus of the Long-Term Low-Emission Development Strategy will be on the rational utilization of national resources with due regard to energy security.
- The transitions from fossil fuels will be undertaken in a just, **smooth, sustainable and all-inclusive manner.**
- The National Hydrogen Mission launched in 2021 aims to make India a green hydrogen hub.
- The rapid expansion of green hydrogen production, increasing electrolyser manufacturing capacity in the country, and a **three-fold increase in nuclear capacity by 2032 are some of the other milestones that are envisaged alongside the overall development of the power sector.**

Four key considerations

- India's approach is based on the following four key considerations that underpin its long-term low-carbon development strategy:
 - India has contributed little to global warming, its historical contribution to cumulative global GHG emissions being minuscule despite having a share of ~17% of the world's population.
 - India has significant energy needs for development.
 - India is committed to pursuing low-carbon strategies for development and is actively pursuing them, as per national circumstances
 - India needs to build climate resilience.

Focus on alternative sources of energy

- Increased use of biofuels, especially ethanol blending in petrol, the drive to increase electric vehicle penetration, and the increased use of green hydrogen fuel are expected to drive the low carbon development of the transport sector.
- India aspires to maximize the use of electric vehicles, ethanol blending to reach 20% by 2025, and a strong modal shift to public transport for passengers and freight.
- The focus will be on improving energy efficiency through the **Perform, Achieve and Trade (PAT) scheme**, **National Hydrogen Mission**, high level of electrification in all relevant processes and activities, enhancing material efficiency and recycling leading to expansion of the circular economy, and exploring options for hard-to-abate sectors, such as steel, cement, aluminum and others.

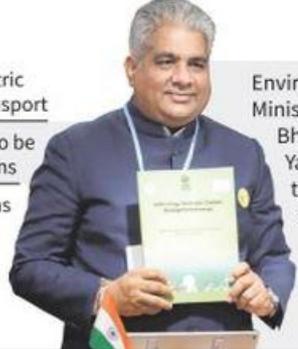
India's road to 'net zero'

At COP-27, India announced its long-term strategy to transition to a 'low emissions' pathway to become carbon neutral by 2070

KEY MILESTONES

- The National Hydrogen Mission, launched in 2021, aims to make India a green hydrogen hub
- At least a three-fold increase in nuclear capacity by 2032
- Achieving an ethanol blending target of 20% by 2025

- Maximising the use of electric vehicles, increase public transport
- Increased climate finance to be provided by developed nations
- The long-term strategy aims at keeping global temperatures well below 2 degrees Celsius and, ambitiously, 1.5 degrees Celsius by the century-end



Environment Minister
Bhupender Yadav at the COP-27 summit in Egypt on Monday.
REUTERS

Enhancing forest and tree cover

- India has a strong record of enhancing forest and tree cover in the last three decades alongside high economic growth.
- India's forest fire incidence is well below global levels, while its forest and tree cover is a net sink absorbing **15% of CO2 emissions in 2016**.
- India is on track to fulfilling its NDC commitment of **2.5 to 3 billion tonnes of additional carbon sequestration in forest and tree cover by 2030**.

India's efforts for Net Zero

- India's renewable energy targets have steadily become more ambitious, from 175 GW by 2022 declared at Paris, to **450 GW by 2030 at the UN Climate Summit**, and now **500 GW by 2030, announced at COP26**.
- India has also announced the target of **50% installed power generation capacity from non-fossil energy sources by 2030**, raising the existing target of 40%, which has already been almost achieved.
- India has also announced a **Hydrogen Energy Mission for grey and green hydrogen**.
- In energy efficiency, the market-based scheme of **Perform, Achieve and Trade (PAT) has avoided 92 million tonnes of CO2 equivalent emissions during its first and second cycles**.



07

BALLISTIC MISSILE DEFENCE INTERCEPTOR

Context

- Recently, the Defence Research and Development Organisation (DRDO) has successfully conducted the maiden flight test of phase-II ballistic missile defence (BMD) interceptor AD-1.
- The flight test was conducted from the **APJ Abdul Kalam Island off the coast of Odisha.**

About the AD-1 missile interceptor

- AD-1 is a long-range interceptor missile designed for both low exo-atmospheric and endo-atmospheric interception of long-range ballistic missiles and aircraft.
- It is propelled by a two-stage solid motor and equipped with **an indigenously developed advanced control system, navigation and guidance algorithm to precisely guide the vehicle to the target.**
- AD-1 is a unique type of interceptor with advanced technologies that are available in very few nations in the world.

India's BMD program

- **After the Kargil War in 1999, India's Ballistic Missile Defence (BMD) program was launched with Pakistan's expanding missile arsenal in mind.**
- Phase-1 of the programme is said to have been completed towards the end of the 2010s and consisted of **the advanced air defence systems and air defence systems based on the Prithvi missile.**
- The second phase, according to sources, focuses on the development of anti-ballistic defence systems like the US's Theatre High-Altitude Area Defence system, which can neutralize intermediate-range ballistic missiles.
- The goal of India's Ballistic Missile Defence (BMD) program is to **provide an air defence shield against all kinds of hostile missiles, including nuclear ones.**

08

DRAFT AIRCRAFT SECURITY RULES, 2022

Context

- Recently, the Civil Aviation Ministry has notified the draft Aircraft Security Rules, 2022.
- The rule enables the aviation security regulator, Bureau of Civil Aviation Security (BCAS), to impose penalties of up to **₹1 crore on airports and airlines for violation of security measures.**

Penal provision

- Once the draft Rules are finalised, the Bureau of Civil Aviation Security (BCAS) can impose a fine of **₹50 lakh to ₹1 crore on airports and airlines.**
- If airports and airlines fail to prepare and implement a security programme, or if they commence operations without seeking a security clearance.
- Large airports can also face a **penalty of ₹1 crore if they fail to plan the design and layout of the airport by the National Civil Aviation Security Programme.** Individuals will also face penalties ranging from **₹1 lakh to ₹25 lakh depending on the nature of the offence.**

Another important power of BCAS

- According to the proposed rules, the Bureau of Civil Aviation Security (BCAS) will also be able to suspend or cancel an **entity's airport security clearance and security programme.**
- The rules will supersede Aircraft Security Rules, 2011 and were necessary after Parliament passed the Aircraft Amendment Act, 2020, giving statutory powers to the BCAS, along with the Director-General of Civil Aviation and Aircraft Accident Investigation Bureau.
- These allow them to impose penalties which could only be imposed by courts earlier. **The Act also raised the maximum penalty from ₹10 lakh to ₹1 crore.**

NEWS IN BRIEF

Donyi Polo Airport

- Recently the Union Cabinet nods the change of name of **Greenfield Airport at Hollongi, Itanagar** as “**Donyi Polo Airport, Itanagar**.”
- Name reflects the Arunachal people’s reverence of the Sun (Donyi) and the Moon (Polo).
- Hollongi Airport will be the third operational airport in the State.

Network Readiness Index 2022

- India has improved its position by six slots and is now placed at **61st rank as per the Network Readiness Index 2022 (NRI 2022) report released recently.**
- In its latest version of 2022, the NRI Report maps the network-based readiness landscape of 131 economies based on their performances in four different pillars: **Technology, People, Governance, and Impact** covering a total of 58 variables.
- The report has been prepared by the Portland Institute, an independent non-profit, nonpartisan research and educational institute based in Washington DC.

Grievance Redressal Index

- The **Unique Identification Authority of India (UIDAI)** has been again placed at the top amongst all Group A Ministries, Departments and Autonomous Bodies for resolving public grievances in the rankings report published by the Department of Administrative Reforms and Public Grievances (DARPG) for the month of October 2022.
- This is the **third month in a row that UIDAI has topped the rankings.**
- A resident-centric coordinated approach is enabling UIDAI to resolve nearly 92% of CRM Grievances within a week.

BILATERAL AGREEMENTS AND SUMMITS

9th ASEAN Defence Ministers’ Meeting Plus

- The maiden India-ASEAN Defence Ministers' Meeting was recently held at **Siem Reap in Cambodia to commemorate the 30th Anniversary of India-ASEAN relations.**
- The year 2022 has also been designated as the ‘ASEAN-India Friendship Year’.
- The Defence Minister of India in his address highlighted the **historic and robust ties that India shares with ASEAN countries.**
- He emphasised that the centrality of ASEAN in the Indo- Pacific region is the cornerstone of **India’s” Act East Policy”.**
- The meeting was co-chaired by the Defence Minister of India and the Deputy Prime Minister and Minister of Cambodia.

Initiative for Women in UN Peacekeeping Operations

- During this maiden **India-ASEAN defence ministers meeting**, India proposed two major initiatives for further expanding the scope and depth of the India-ASEAN defence relations.
- First, the proposal of the ‘**India-ASEAN Initiative for Women in UN Peacekeeping Operations**’ which includes the conduct of tailor-made courses for women peacekeepers of ASEAN member states at the Centre for United Nations Peacekeeping in India.
- Second is the conduct of a ‘**Table Top Exercise**’ in India for women officers from ASEAN, incorporating facets of UN peacekeeping challenges.
- India also underlined the importance of women officers in peacekeeping missions for ensuring lasting peace.

Maritime security

- India has categorically mentioned the continued advocacy for a **free, open, inclusive and rules-based Indo-Pacific**, suggesting the need for India and ASEAN to work together for maritime security in the region.
- The India-ASEAN relationship was elevated recently to a Comprehensive Strategic Partnership during the **ASEAN-India Summit held in Cambodia on November 12.**

Initiative on Marine Plastic Pollution

- The other major initiative announced by India was the '**India-ASEAN Initiative on Marine Plastic Pollution**' which includes channelizing the energy of the youth towards addressing the critical issue of marine pollution.
- The Defence Minister of India informed the ASEAN members of the significant work done by the National Cadet Corps (NCC) in the **cleaning of Indian beaches and raising awareness about plastic pollution in India's coastal community.**

India-Gulf Cooperation Council Free Trade Agreement (FTA) Negotiations

- Recently, India and the Gulf Cooperation Council (GCC) have decided to pursue the resumption of **Free Trade Agreement (FTA) negotiations.**
- With forward-looking and solution-oriented deliberations, bilateral engagements witnessed significant progress on all matters of mutual interest across the entire gamut of **bilateral economic relations between India and the GCC nations.**

Focus of FTA

- Both sides emphasized that the FTA will create new jobs, raise living standards, and provide wider social and economic opportunities in India and all the GCC countries.
- Both sides agreed to significantly expand and diversify the trade basket in line with the enormous potential that exists on account of the complementary business and economic ecosystems of India and the GCC.

India-GCC trade relations

- The GCC is currently India's largest trading partner bloc with bilateral trade in FY 2021-22 valued at over USD 154 billion with exports valued at approximately USD 44 billion and imports of around USD 110 billion (non-oil exports of USD 33.8 Billion and non-oil imports of USD 37.2 Billion).
- Bilateral trade in services between India and the GCC was valued at around USD 14 billion in FY 2021-22, with exports valued at USD 5.5 Billion and imports at USD 8.3 Billion.
- GCC countries contribute almost **35% of India's oil imports and 70% of gas imports.**
- Investments from the GCC in India are currently valued at over USD 18 billion.

Ninth Round of India-ROK CEPA

- The 9th round of the India-Republic of Korea (ROK) Comprehensive Economic Partnership Agreement (CEPA) up-gradation negotiation was held in Seoul from November 3-4, 2022.
- The two sides underlined the need to have negotiations, which are based on a win-win approach, are **forward-looking and outcome-oriented.**
- Both sides shared the hope that the CEPA upgradation negotiations would play an important role in **strengthening and deepening economic cooperation between both countries.**
- Both sides agreed to work closely to address **tariff and non-tariff barriers and deepen the relationship in the services sector.**
- It was agreed that the 10th round of CEPA upgradation negotiations will be hosted by India in early 2023.

MILITARY EXERCISES AND INITIATIVES

Goa Maritime Symposium - 2022

- Recently, the Fourth edition of the biennial Goa Maritime Symposium was conducted successfully by the Indian Navy at Goa.
- Representatives from Navies and Maritime Agencies from 12 Friendly Foreign Indian Ocean littoral countries, which included **Bangladesh, Comoros, Indonesia, Madagascar, Malaysia, Maldives, Mauritius, Myanmar, Seychelles, Singapore, Sri Lanka and Thailand, besides India, attended the Symposium, conducted by the Naval War College, Goa.**
- India has consistently advocated the concept of '**Collective Responsibility**' for maritime security in the **Indian Ocean Region.**
- The Goa Maritime Symposium and the Goa Maritime Conclave, conducted by the Indian Navy in alternating years are a manifestation of such efforts.

- **Theme:** The theme for GMS-22 was 'Maritime Security Challenges in the Indian Ocean Region: Converting Common Maritime Priorities into Collaborative Mitigation Frameworks'.

Exercise Garuda-VII

- The seventh edition of the bilateral air exercise between the Indian Air Force (IAF) and the French Air and Space Force (FAF), 'Exercise Garuda-VII' was recently concluded at **Air Force Station, Jodhpur, Rajasthan**.
- The FAF participated in the exercise with Rafale fighter aircraft and A-330 Multi Role Tanker Transport (MRTT) aircraft, while the IAF contingent comprised Su-30 MKI, Rafale, LCA 'Tejas' and Jaguar fighter aircraft.
- Exercise Garuda-VII provided the two Air Forces with the opportunity for professional interaction and sharing of operational knowledge and experience.
- The exercise also provided a **platform for cultural exchange between the Air Force personnel of both countries**.

Exercise "YUDH ABHYAS 22"

- The 18th edition of Indo - US joint training exercise "YUDH ABHYAS 22" was recently conducted in Uttarakhand.
- The Exercise is conducted annually between **India and USA** to exchange best practices, Tactics, Techniques and Procedures between the Armies of the two nations.
- The training schedule focuses on the **employment of an integrated battle group under Chapter VII of the UN Mandate**.
- The exercise involved exchanges and practices on a wide **spectrum of combat skills including combat engineering, employment of UAS/Counter UAS techniques and information operations**.
- The exercise also facilitated both Armies to share their wide experiences and skills and enhance their techniques through information exchange.

Green Mobility Initiative by IAF

- To achieve a reduction in **carbon footprint** and keeping with the central government initiative on the introduction of green mobility, IAF has inducted a fleet of **Tata Nexon Electric Vehicles**.
- Indian Air Force is planning to enhance the usage of electric vehicles progressively by procuring e-vehicles against downgraded conventional vehicles. Augmentation of the e-vehicles ecosystem, **including installation of charging infrastructure at various Air Force bases**.

Exercise Sea Vigil-22

- The third edition of 'Sea Vigil-22' was commenced on the **eastern seaboard as part of the nationwide coastal defence exercise**.
- The exercise involved the participation of more than 17 Government agencies from nine Coastal States and four Union Territories that are involved in the Coastal Defence Mechanism and Coastal Security construction.
- This exercise was undertaken along the **7,516 km coastline of the country, covering the Exclusive Economic Zone (EEZ) of India**.
- The exercise also validated the technical surveillance infrastructure called the **National Command, Control, Communication and Intelligence (NC3I) Network**.

Indo-Pacific Regional Dialogue 2022

- The Indo-Pacific Regional Dialogue is an annual international conference that seeks to foster the exchange of ideas and promote deliberations on maritime issues relevant to the Indo-Pacific.
- The main highlighting of the dialogue include:
- Importance of the **Indo-Pacific in the prevailing geopolitical scenario**
- Focusing especially upon India's maritime policy encapsulated by the acronym **SAGAR (Security and Growth for All in the Region)**

Bilateral exercise 'Naseem Al Bahr'

- The Indian Navy's guided missile stealth frigate, **INS Trikand**, offshore patrol vessel, **INS Sumitra**, and Maritime Patrol Aircraft, (MPA) **Dornier**, participated in the 13th Edition of the Indian Navy (IN) - Royal Navy of Oman (RNO) bilateral exercise 'Naseem Al Bahr' (Sea Breeze).

- The exercise was conducted off the coast of Oman and had three phases: harbour phase, sea phase and debrief.
- The sea phase included tactical maritime exercises involving **surface action, air defence, maritime surveillance and interdiction.**
- Naval exercises have added strength and substance to these bilateral ties. The first IN-RNO exercise was conducted in 1993. This year marks 30 years of IN-RNO bilateral exercises.

Humanitarian Assistance and Disaster Relief (HADR) Exercise 'Samanvay 2022'

- Recently, the Indian Air Force conducted the Annual Joint Humanitarian Assistance and Disaster Relief (HADR) Exercise 'Samanvay 2022' at Air Force Station Agra, Uttar Pradesh.
- The exercise witnessed the participation of representatives from the ASEAN countries as well.
- Samanvay 2022 will promote a synergistic approach towards HADR by various national and regional stakeholders involved in Disaster Management including the Civil Administration, the Armed Forces, NDMA, NIDM, NDRF, DRDO, BRO, IMD, NRS and INCOIS.
- The exercise also aims to provide a unique platform for the exchange of domain knowledge, experience and best practices with the participating ASEAN member countries.

Exercise Harimau Shakti -2022

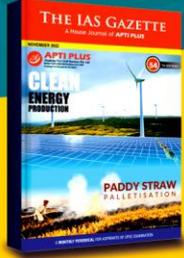
- India - Malaysia joint military Exercise "Harimau Shakti -2022" was recently commenced at Pulai, Kluang, Malaysia.
- It is an annual training event between the Indian and Malaysian Army which is being conducted since 2012.
- The exercise will enhance the level of defence cooperation between the Indian Army and the Malaysian Army, which in turn will further foster the bilateral relations between the two nations.
- The joint exercise schedule includes the establishment of a joint command post, joint surveillance centre, sharing expertise in the employment of aerial assets, technical demonstrations, casualty management & casualty evacuation apart from planning logistics at the Battalion level.

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APTI PLUS

* The table of content is segregated as per its relevance with Mains Syllabus of CSE Examination.
* The article mention under GS paper in table of content might be important for many other topics in GS Papers as well.
* The details relevance of each article/Topics with respect to GS syllabus has been mention at the starting of each article.

01

INTERNATIONAL MARITIME TRANSPORT

GS Syllabus Covered

GS-II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS-III: Indian Economy and issues relating to planning, mobilization, of resources, growth and development.

Introduction

- Maritime transport is the **backbone of international trade and the global economy**.
- **Over 80%** of the volume of international trade in goods is carried by sea, and the percentage is even higher for most developing countries.
- The creation of maritime containers in the middle of the 1960s vastly **encouraged the development of maritime transport**.
- As industrialization and international trade expanded, countries increasingly invested in **seaports, airports, produced storage, and large ocean-going ships**.

Status and Challenges

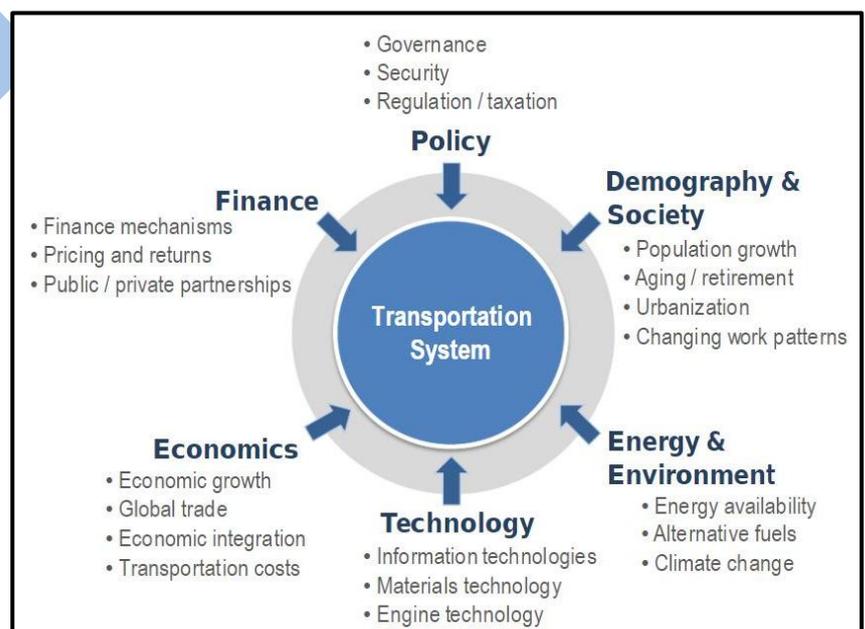
- A major disruption in the sector was caused by the **pandemic's pause**.
- Prior to and during these periods, decarbonization had been the major challenge.
- Shipping costs, fuel costs, freight and logistics costs had increased and were yet to find firm levels.
- The **Drewry World Container Index (composite)**, an indicator of the container spot rates had climbed 5 to 6 times since end-2020.
- During the lockdown and the low trade movement periods of 2020, the new ship deliveries shrank further but the order books have been active since 2021.
- A challenge in perpetuity that maritime transport faces is the regulatory maze due to multiple regulations.
- The greatest challenge will however be the efforts towards **decarbonization**.
- The drivers will be the technologies which prove to be reliable and realizable.

Impact of Modern Technology

- In shipbuilding, preference for lightweight components, superior hull coatings, energy-efficient main and auxiliary machinery, condition monitoring, predictive maintenance regimes etc., will continue to improve.
- **Machine learning, AI and Blockchain** will proliferate.
- **E-documents, paperless smart technologies** for swifter truck movement, digital tracking of containers etc., are changing the business processes in shipping.
- In the current context, the major point of inflexion is undoubtedly the pandemic.

Opportunities for Improvement

- **Globalization** is the process by which businesses or other organizations develop international influence or start operating internationally.
- This is now well embedded in India's growth plans.



- The **Chabahar port (Iran)**, the management of petroleum requirements under changing geopolitical scenarios, trade equations with China, persisting border tensions, and the opening up of inland waterways, all stand as evidence.
 - However, the following are some challenges that still remain.
1. **Structure favourable tax regimes and incentivize shipping:** India is placed 35th amongst 46 countries in the **PRIME (Protectionism in Maritime Economies) index, implying a high level of protectionism.**
 - Economists advise that countries may lessen incentives and shun protectionism so that shipbuilding and operations become **competitive and efficacy improves.**
 2. **Low tonnage and dependence on foreign vessels for overseas trade:** This is largely attributed to the poor vessel turnaround and ageing Indian fleet.
 - This causes a bleed of **foreign exchange also.**
 - Another factor affecting this is the port calling costs in India, which had generally been higher by 3 to 5 times the costs in **neighbouring ports, and high logistics costs. Improved hinterland connectivity, easing port congestion** and investment in infrastructure etc., can help with fighting these challenges.
 3. **Development delays in Ports Sector:** The integration of inland waterways with ocean transport would pave way for reducing congestion and costs.
 - The connectivity with the country's corners (NER) and neighbors (BIMSTEC/ Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation Members) may be swiftly enhanced.
 4. **Manpower:** India has the right mix of the young populace (skilled and ready to be skilled), a long coastline, land for development (warehouses, hubs, freight stations) and scope for infrastructure improvement.
 - Presently, **India has 12 major ports, and 200 minor ports spotting 7157 km of coastline.**
 - Though India remains among the top seafarer-supplying nations, less attraction to sea careers amongst youth has dented the workforce's quantity and quality.

Maritime India Vision 2030

- Maritime India Vision 2030 has identified 150+ initiatives across ports, shipping & waterways sub-sectors which will propel the Indian maritime sector to its next level of growth in the new decade.
- The Maritime India Vision 2030 will create the **Waterways Connectivity Transport Grid, a project that will develop connectivity with Bangladesh, Nepal, Bhutan and Myanmar.**
- It will supersede the **Sagarmala initiative and aims to boost waterways,** give a fillip to the shipbuilding industry and encourage cruise tourism in India.

Conclusion

- Maritime transport will be a major mode of trade across the globe, especially considering the volumes.
- For sustainable development, three major factors namely, **geopolitics, environment and technology** will have to be kept in the scheme of things.
- Risk prediction management, management of stocks and inventory etc., will be part of all planning processes.





GS Syllabus Covered

GS- II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS-III: Conservation, environmental pollution and degradation, environmental impact assessment.

Introduction

- **Coastal erosion** is the process by which local sea level rise, strong wave action, and coastal flooding wear down or carry away rocks, soils, and/or sands along the coast.
- Erosion occurs when the material is removed exceeds the rate of supply finally resulting in the landward shifting of the shoreline.
- The developmental activities have put tremendous pressure on the **fragile coastal environment and about 20% of the Indian population** resides in the coastal area.

History of Coastal Erosion in India

- **Kerala** is the state which is worst affected by coastal erosion in India.
- In the original assessment in the 1960s, about 57% of the coastline was identified as vulnerable.
- An assessment made in the late 1980s indicated that almost **85% length of Kerala's coastline was in the grip of erosion.**
- Later, it was found that **Karnataka and Maharashtra** were also affected badly by sea erosion.
- The **first anti-sea erosion measure in Puducherry** was initiated by the French in the early 1920s when a 1.75 km long retaining wall was constructed along the urban coastline in Puducherry.

Causes of Coastal Erosion

- The shoreline or coastline, the boundary between land and sea, keeps changing its shape and position continuously due to dynamic environmental conditions.
- The causes of erosion are either **natural or manmade.**
- Sometimes, it is a combination of both **natural and man-made factors.**
- The effects of climate change, sea-level rise and other long-term causes of erosion are still unaccounted for.

Natural Causes

- Natural factors influencing coastal erosion are **waves, winds, tides, near-shore currents, storms, sea level rise, etc.**
- Another important factor here is an **increasing gradient in transport rate** in the direction of the net transport, e.g. consider the gradient in the wave conditions due to certain relief features or bathymetric conditions.
- The **rise in the sea level rise** is also one of the major factors behind coastal erosion.
- Another factor is the **phenomenon of subsidence.**
- **Subsidence** is a regional phenomenon that lowers the surface area in a specific region.

Man-induced erosion

- Most of the human-induced erosion is due to human interventions in the **natural transportation** process as well as in the sediment load of the rivers.
- **Coastal activities** can also directly or indirectly result in beach erosion.
- The following are some examples:
- **Building houses via land reclamation** or within sand dune areas have a long-term impact on coastal processes and sediment stability.
- **Sand removal above replenishable quantities** from the coast upsets the longshore sand transport budget and can result in **erosion down drift.**
- **Coral mining** and other means of spoiling the protective coral reefs will also cause **coastal erosion and beach degradation.**

Damage due to coastal erosion

Coastal Protection Measures

- **Coastal protection measures** moderate the long-term average erosion rate of shoreline change from natural or man-made causes.
- Protection of the coastline from erosion is provided by nature in the form of a **stable beach, capable of dissipating incident wave energy**.
- Protection works to prevent erosion should be on a long-term basis and must be planned to suit the site conditions on the basis of thorough field investigation and available data which require observations over an extended period of time.
- The measures to control erosion include **non-structural and structural or their combination**.

Non-structural measures

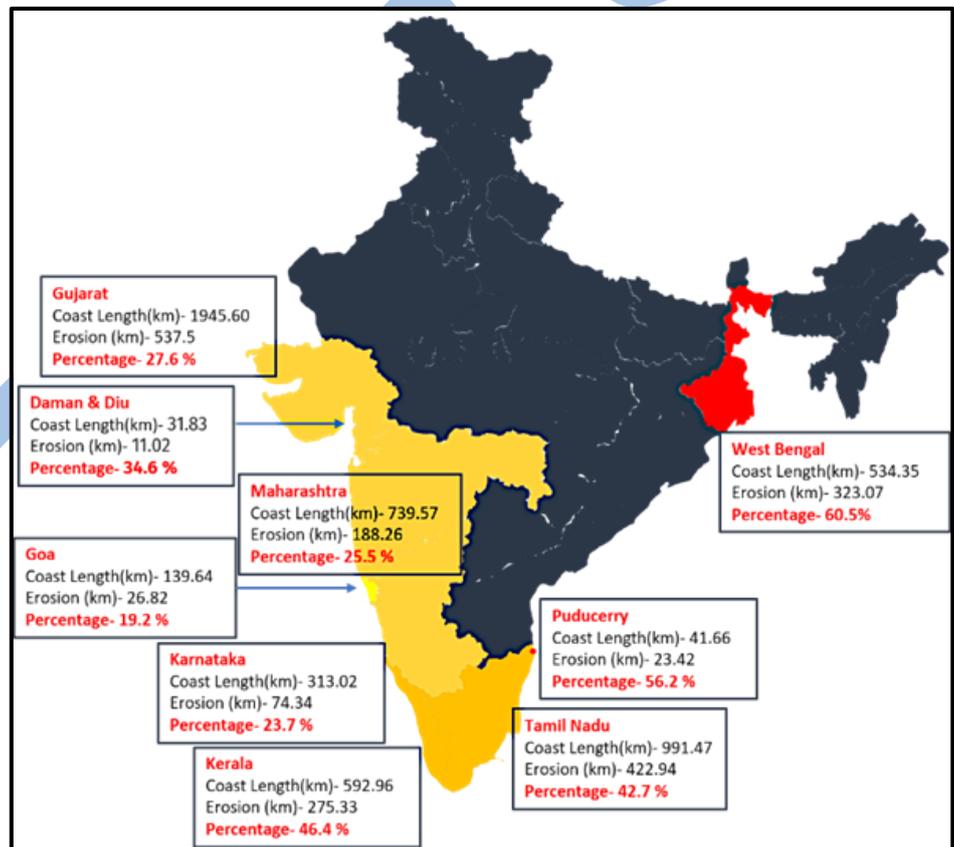
- The Non-structural measures aim at the dissipation of the wave energy by mirroring the natural forces and maintaining the natural topography of the coast.
- These measures are also called soft solutions. Some of these are:
- Artificial nourishment of beaches
- Coastal vegetation such as mangrove and palm plantation
- Sand bypassing at tidal inlets
- Dune reconstruction/rehabilitation

Structural Measures

- The structural measures, also known as the hard structural/engineering measures use physical structures constructed near the coast to prevent or restrict water from reaching the potential damaged areas.
- These solutions influence the **coastal processes to stop/reduce the rate of coastal erosion**.
- The structural measures used for coastal erosion prevention include:
- Seawalls, revetment, offshore breakwaters, groins/groynes/spurs, offshore reefs, and artificial headland.
- Among all seawall is popular and generally used in almost all maritime states in varying proportions.

Combination of the Structural and Non-Structural Measures

- It has already been stated that using a combination of structural and non-structural measures helps in providing better efficacy and efficiency.
- The combination gives synergetic outcomes and provides an environmentally and economically acceptable coastal protection system.
- These combinations act as interim hard structures and some of the common approaches of combinations are:
- Combining beach nourishment with artificial headlands/groynes.
- Revegetation with temporary offshore breakwaters/ artificial reefs is commonly used.



GS Syllabus Covered

GS-II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation

GS-III: Indian Economy and issues relating to planning, mobilization, of resources, growth and development.

Introduction

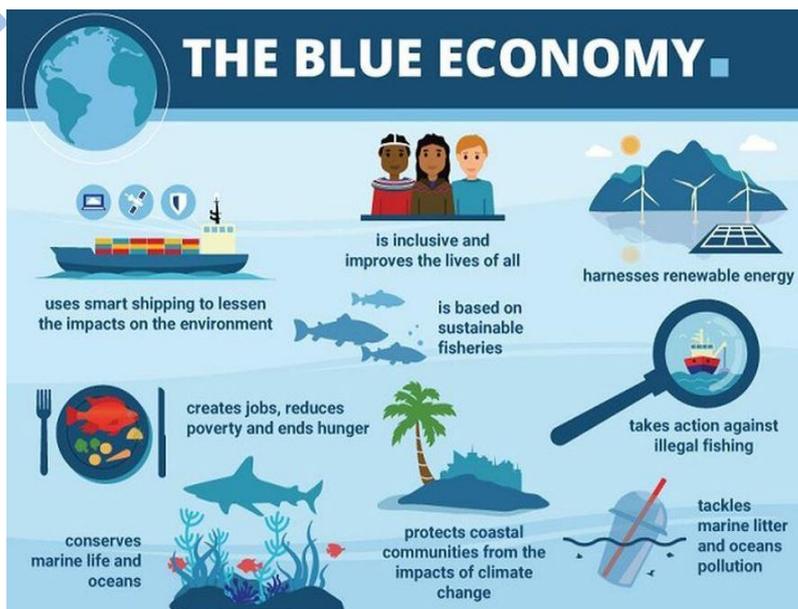
- According to the World Bank, the blue economy is the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem".
- India has been leading the Blue Economy discourse at the highest level of the Government, with a greater focus on the **Indian Ocean region**.
- The Indian Ocean's Blue Economy has become a **global economic corridor**.
- It is the world's **third-largest body of water**, covering 68.5 million square km and rich in oil and mineral resources, and countries around the ocean's periphery are home to about one-third of humanity.

Maritime Governance and Blue Economy

- India has been leading the Blue Economy discourse at the highest level of the Government, with a greater focus on the Indian Ocean region.
- The essence of this approach was spelt out by Government for seeking "**Security And Growth for All in the Region**" (SAGAR).
- The Indian Ocean is vital to the economies, security, and livelihoods of its littoral states. India is focusing on overall maritime governance including:
 - Economies based on marine resources assured
 - Advancing the blue economy through sustainable management
 - Utilization of the ocean's resources
 - Food security
 - Livelihoods for achieving Sustainable Development Goals (SDG)

Concept of Blue Economy

- The Blue Economy encompasses a wide range of economic activities pertaining to the sustainable development of resources and assets in the oceans, **related rivers, water bodies, and coastal regions in a manner that ensures equity, inclusion, innovation, and modern technology**.
- The Blue Economy is a newer and more contemporary term, popular with **Small Island Developing States (SIDS)** as well as **international organizations, media, experts, and governments in a growing number of countries**.
- The Blue Economy is viewed as an **integral element of Sustainable Development Goals**.



Overview of India's Blue Economy

- The Blue Economy of India is a subdivision of the national economy that includes the complete ocean resources system as well as human made economic infrastructure in the country's legal jurisdiction marine, maritime, and onshore coastal zones.



- India's Blue Economy concept is **multi-faceted and plays an important role** in the country's **economic growth because of its enormous maritime interests**.
- India is the **second largest fish-producing nation** in the world and has a fleet of 2,50,000 fishing boats.
- It accounts for roughly **4% of the GDP** and is estimated to increase once the mechanism is improved.
- **Nine of India's states have access to the coastline.**
- The sector has stood strong despite the challenges caused by the Covid-19 pandemic and has recorded exports worth US\$ 7.2 billion between April 2021- February 2022.

The Blue Revolution: Integrated Development and Management of Fisheries

- Centrally Sponsored Scheme (CSS) was established in 2015-16 with a five-year budget of Rs. 3,000 crores.
- The **'Fisheries and Aquaculture Infrastructure Development Fund (FIDF)** was established in 2018-19 to provide concessional credit to state/ UT governments, their entities, and the private sector to fill significant gaps in the fisheries infrastructure.
- The Government of India launched the **Pradhan Mantri MatsyaSampada Yojana (PMMSY)**, in May 2020, with the highest investment of Rs. 20,050 crores to bring about a **Blue Revolution** through sustainable and responsible development of the country's fisheries sector.

Maritime Security Strategy

- India's maritime security strategy focuses on all aspects of the challenges including the **ocean economy** that are affecting the health and the future of oceans and countries.
- It provides a cohesive definition that is apt to address prevalent challenges such as:
 - Environmental degradation
 - Ocean trade security
 - Migration
 - Climate change
 - Energy security
 - Drug trafficking
 - Piracy among other non-traditional challenges
- With nations committed to fulfilling the Sustainable Development Goals (SDGs) towards Blue Economy, the role of oceans is significant.

Indian Coast Guard (ICG): A Maritime Blue Economy Enabler

- The duties of the Indian Coast Guard as enshrined are in consonance with the **blue economy vision of the Government**.
- Indian Coast Guard is one of the major maritime law enforcement agencies in the Indian Ocean Region.
- India focuses on the development of sectors viz. **fisheries, shipping, port, and maritime logistics, marine coastal tourism and leisure, conventional minerals exploration and production, and marine construction activities**.
- The Indian Coast Guard has been carrying out duties such as **oil spill response, helping mariners in distress at sea, warning vessels during bad weather, offering assistance during scientific experiments, and augmenting the national defence resources**.
- These duties coupled with other challenges would be the focus area of various enablers of the Blue Economy.

Conclusion

- The blue economy occupies a vital potential position in India's economic growth.
- Several countries have undertaken initiatives to utilize their blue economy.
- For instance, **Australia, Brazil, the United Kingdom, the United States, Russia, and Norway** have developed dedicated national ocean policies with measurable outcomes and budgetary provisions.
- With a draft blue economy policy framework of its own, India is now all set to harness the **vast potential of its ocean resources**.



04

MARINE PLASTICS POLLUTION

GS Syllabus Covered

GS-III: Conservation, environmental pollution and degradation, environmental impact assessment.

Introduction

- Marine pollution is a **combination of chemicals and trash**, most of which comes from land sources and is washed or blown into the ocean.
- This pollution results in damage to the environment, the health of all organisms, and economic structures worldwide.
- **Marine Plastics pollution is a global menace.**

Background

- Every year, humans produce 300 million tons of plastic waste including 11 million tons of plastic waste that eventually wind up in the ocean.
- In fact, by 2050, there could be **more plastics than fish in the ocean.**

Land-based sources

- It is estimated that the global amount of plastic waste that entered the ocean in 2010 was from coastal populations living within **50 km of the coastline.**
- Based on a fixed percentage of mismanaged plastic waste entering the oceans (15% for the low-range estimates and 40% for the high-range estimates).

Ocean-based sources

- Plastic waste can also enter the ocean directly from ocean-based sources such as the **fishing industry, commercial and recreational shipping, and offshore platforms.**
- In 1988, the International Convention for the Prevention of Pollution from Ships (MARPOL) prohibited waste dumping from vessels.

Marine Plastics Survey in India

- Under the **Coastal Ocean Monitoring and Prediction System (COMAPS) programme** (one of the longest systematic ocean data collections for 3 decades), by ICMAM-PD now the National Centre for Ocean Research of the Ministry of Earth Sciences, accumulation of marine debris was reported along the coast of Great Nicobar Island, Andaman.
- This accumulation might have been due to surface ocean currents prevailing leading to the transportation of solid waste dumped by passing ships/fishing vessels.
- It is reported that **8% of the total solid waste produced** is plastic waste and the top three cities that contribute most to pollution are **Delhi, Kolkata, and Ahmedabad.**
- **Plastic production in India increased by 39.7%** and now stands at 9.46 million tonnes of plastic waste per year when five years ago it was **5.7 million tons per year.**

Tamil Nadu Coast

- Tamil Nadu has a long coastline but stands **second in plastic production in India.**
- The Government of Tamil Nadu banned the usage of thin plastic (polymers of thickness below 40 microns).
- Despite such laws being passed, Chennai is the major cause of plastic production in Tamil Nadu.
- The major contributors to the discharge of plastic into the ocean are the Adyar and the Cooum rivers which run through the heart of the city **accounting for 81% and 19% of total riverine discharge from Chennai, respectively.**

OUR OCEANS ARE INUNDATED WITH PLASTIC

- 8mn metric tonnes of plastic leak into oceans worldwide every year
- 323 mn tonnes plastic produced in 2015 = 900 Empire state buildings
- 5-13mn tonnes of plastic entered the marine environment in 2010
- \$13 bn tonnes the cost of the environment damage caused by plastics
- About 60-90% of marine litter is made up of plastic -- bags, polymers, fishing gear, food and beverage containers
- 1,200 total affected species and the number is rising

In India, seas near Mumbai, Kerala and the Andaman and Nicobar Islands among the worst polluted in the world



Biodiversity - Gulf of Mannar

- The **Gulf of Mannar biosphere reserve** is an important biodiversity hotspot as it supports numerous marine ecosystems and provides a sense of economic security for Tamil Nadu due to its fisheries resources.
- **Anthropogenic influences** on the environment leading to pollution and climate change are the major causes of biodiversity degradation worldwide.

Microplastics

- Plastics are made from nonrenewable resources such as crude oil and hence they are hard to decompose as the polymers are bonded through covalent bonds, a strong bonding force.
- **Microplastic is about 5 mm in diameter** and is always disposed into the environment through **anthropogenic sources**.
- Another major issue with microplastics is that they show a high affinity to other toxicants, making them more dangerous to the organisms ingesting them.
- Under the Marine Plastics survey programme of NCCR, the distribution of microplastics was studied in Coastal locations in the Bay of Bengal (BoB) and Arabian Sea (AS) in particular along the international shipping routes.
- Global research is focused on the use of plastic degrading enzymes is a promising future prospect in managing and recycling robust plastics such as PET.

Swachh Sagar, Surakshit Sagar

- Commemorating the 75th year of India’s independence, a coastal cleanup drive was carried out at 75 beaches across the country for 75 days over a 7500 km long coastline. This unique first-ever national campaign culminated on **“International Coastal Clean-up Day” in September 2022**.
- This drive was aimed to remove 1,500 tonnes of garbage from the sea coast which will be a huge relief to marine life and the people staying in coastal areas.

Way forward

- The biodiversity of India is unique, and steps must be taken to ensure its safety.
- Consumption and discharge have increased but no steps have been taken by India to study, monitor, and reduce plastic usage.
- Millions of people’s livelihood depends on the biodiversity of India so care must be taken to protect and boost environmental health.
- The major challenge, however, is the segregation and re-aggregation of plastic waste streams such as packaging waste, including laminated plastic.

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05

INDIAN COASTAL COMMUNITY AND CLIMATE CHANGE

GS Syllabus Covered

GS- II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation

GS-III: Conservation, environmental pollution and degradation, environmental impact assessment.

Introduction

- India's coastal regions are low-lying and densely populated, with nearly **250 million people living within 50 km of the coast.**
- The country has a total of 1382 offshore islands, comprising **514 Islands along the mainland coast and 868 Islands in the island territories (Andaman & Nicobar and Lakshadweep).**
- As per the Census data of 2011, there are 486 census towns along the coast of India, accounting for a population of 41.7 million constituting **20.7% of the total coastal population.**

Climate change

- India's coast is vulnerable to exponential developmental activities coupled with climate change impacts.
- Climate change refers to long-term shifts in temperatures and weather patterns.
- The likely scenarios of climate change and associated variability pose the greatest risk to the socio-economic and environmental functioning of coastal regions.

Climate change impacts on economic activities

- Important coastal economic generation activities such as **fishing, salt production, agriculture, aquaculture, animal husbandry, and other major and minor coastal industries** have been affected by climate change.
- The coastal communities such as fishermen, salt workers, farmers, and industrialists have been directly or indirectly affected by climate change.



National Environment Policy 2006

- The National Environment Policy (NEP) by the Ministry of Environment and Forests (MoEF) aims at **mainstreaming environmental concerns into all developmental activities.**
- It emphasizes the conservation of resources and points out that the best way to aid conservation is to ensure that people dependent on resources obtain better livelihoods from conservation than from degradation of the resources.
- It argues that **environmental degradation often leads to poverty and poor health outcomes among populations.**

Objectives of the policy

- Conservation of critical environmental resources
- Intra-generational equity
- Livelihood security for the poor
- Inter-generational equity
- Integration of environmental concerns in economic and social development
- Efficiency in environmental resource use
- Environmental governance



- Enhancement of resources for environmental conservation

Coastal Regulation Zone Notification

- The Coastal Regulation Zone Notification (2019) under **Environment Protection Act (1986)** directs to clear the developmental projects in the coastal areas after considering the disaster risks including **climate change risks such as Sea Level Rise (SLR) and other natural disasters.**

Sea Level Rise (SLR)

- Globally, the rate of sea-level rise is about 4.5 mm per year.
- SLR is a major impact on coastal regions that cause a combination of **risks in retreat, submersion, erosion, and increased vulnerability to extreme marine events.**
- SLR is a predicted consequence of climate change however, regional variations due to local subsidence and tectonic upliftment differentiate the rate of local level SLR.

Increased Sea Surface Temperature (SST)

- Sea surface temperature (SST) is the water temperature close to the ocean's surface. As greenhouse gases trap energy from the sun, the oceans absorb heat, resulting in an increase in SST.
- **Changes in ocean temperatures and currents increase in SST** and lead to alterations in climate patterns around the world.
- Sea surface temperature affects **fish migrations, fish physiology, fish breeding, fish recruitment, and habitat loss.**
- An increase in SST enhances **ocean acidification, salinity, and longshore current patterns** that influence the primary production and fish stock in the sea.

Shoreline Change (SLC)

- The wave energy closer to the shore leads to an increase in shoreline changes in soft rocks and beaches.
- Shorelines at different temporal scales from 1970 were studied to estimate the shoreline trends in the coastal stretches of India.
- Based on the results of trend analysis, the coastal stretches of India have been classified as **stable, accreting, low erosion, medium erosion, and high erosion coasts.**
- Shoreline changes cause social and economic effects on **livelihoods, property, recreation and tourism, ecosystem services, resilience, and vulnerability.**

Frequency of cyclones and floods

- The coastline has undergone physical changes throughout its geological past due to **continuous wave actions, floods, cyclones, earthquakes, and tsunamis.**
- Besides **cyclones, tidal range, storm period, high tide water level, shoaling waves, river discharge, and rainfall-driven runoff also contribute to flooding** in coastal areas.
- During the 21st century, there has been an increase in the occurrence and severity of flood hazards in India.
- National Disaster Management Authority (NDMA) and the India Meteorological Department (IMD) Government of India have prepared a Hazard Profile Map (HPM) of India (Cyclone), where the cyclone, storm, and flood-prone districts have been classified as **Not Affected (NA), Moderate Affected (MA), High Affected (HA) and Very High Affected (VHA).**
- This HPM helps to determine the vulnerability status of a particular area.

Saltwater Intrusion

- Saltwater intrusions in **near-shore areas** are very common in many coastal districts of India.
- Seawater intrusion problem takes place in the dug wells and bore wells of households and enterprises which are close to the shore, during the summer months.
- In addition, overharvesting of water from coastal aquifers, SLR by variations in **atmospheric pressures, expansion of summer, and melting of ice sheets and glaciers impose additional saline water intrusion.**
- Similar to drought, saltwater intrusion affects the productivity of horticulture and livestock.

Drought

- Climate change parameters also increase drought conditions in coastal areas.
- Drought affects the coastal village through **prolonged shortages in the water supply on the surface and groundwater.**
- An increase in **water demand for drinking, domestic purposes, and agricultural and industrial usage** are the major consequences of drought.

Reduction in capture fishery

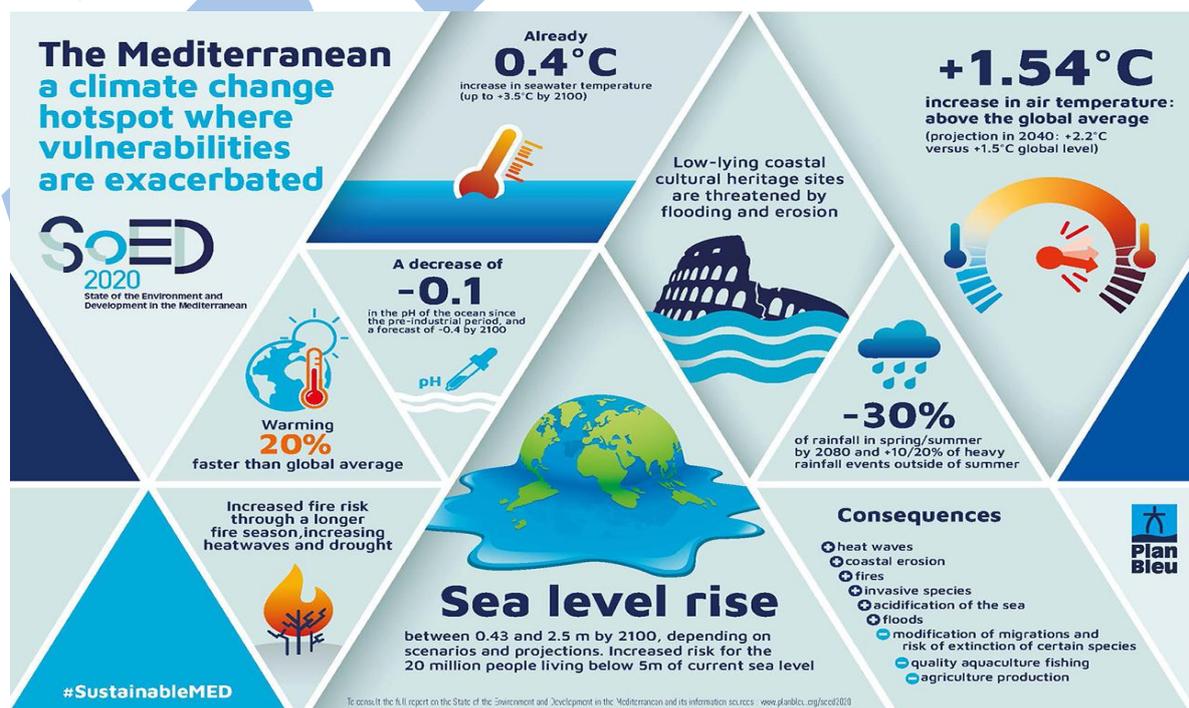
- Climate change impacts the productivity of marine fisheries due to the increase of **Sea Surface Temperature**, changing current patterns, and upwelling affecting fish biology, especially **reproductive biology, alteration of habitat, and migratory routes.**
- The fishery is the source of income, source of protein, vitamins, and micronutrients for the coastal community.
- A decrease in capture fishery influences in per capita income, revenues, wealth, and socio-economic status of the fishing community.

Recommendations

1. **Livelihood Vulnerability Index:** To tackle climate change risks; prioritization of problems due to climate change based on the risk and vulnerability using the **Livelihood Vulnerability Index** shall support identifying the location-specific problems to mitigate climate change risks.
2. **Water tanks:** In the potential saltwater intrusion areas and drought-prone areas, sites for water tanks in the coastal habitats to mitigate the water scarcity problems due to climate change shall be constructed.
3. **Fish stock trends and assessments:** To maintain the fish stock in the coastal zone, **fish stock trends and assessments shall be conducted** to develop policies and schemes to replenish the economically important fishery resources with the involvement of local stakeholders.
4. **Mariculture activities under PPP:** To reduce captured fishery demand from the natural coastal environment, **near-shore cage culture, aquaculture, and mariculture activities** shall be encouraged with the participation of local communities under **Public- the Private Partnership (PPP) mode.**

Conclusion

- The efficient use of hazard lines, disaster management plans, Hazard Profile maps, and other relevant local management plans support the mitigation of climate change risks experienced by the coastal communities.
- Creating awareness and mock drills on natural disasters through the **district disaster management plan, Panchayat plans, and Hazard line map** by the district disaster management authority would keep the coastal community prepared.



06

PORT-LED DEVELOPMENT

GS Syllabus Covered

GS- II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS-III: Indian Economy and issues relating to planning, mobilization, of resources, growth and development.

Introduction

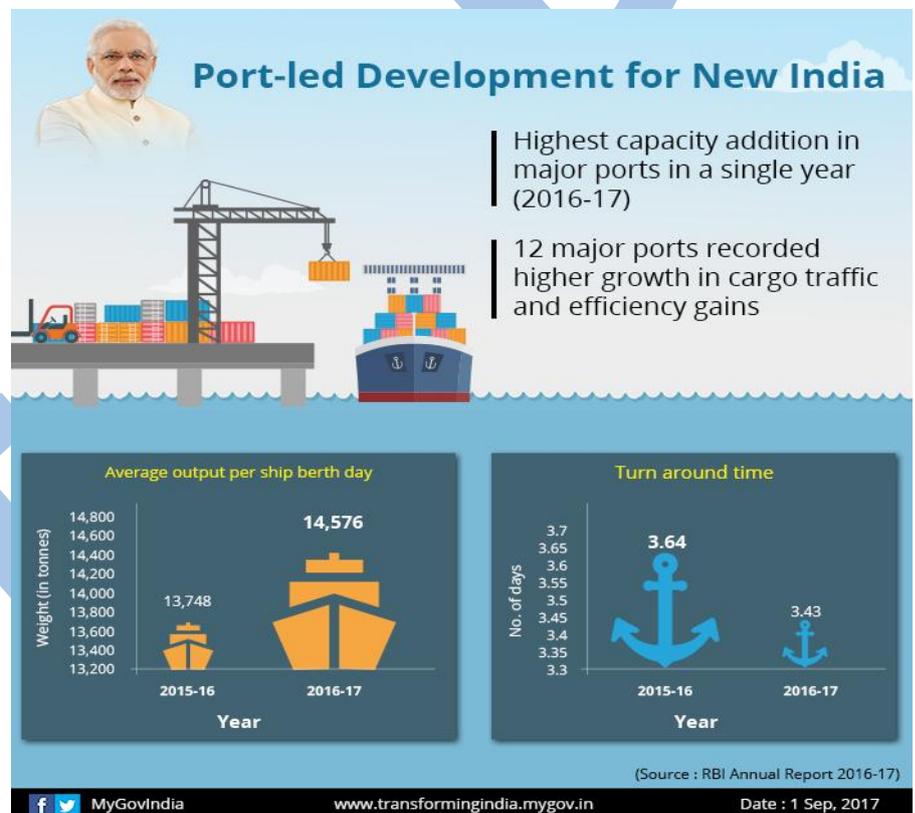
- India is one of the **fastest-growing economies** in the world.
- One of the major reasons behind this progress is **India’s Maritime Sector**.
- The ports in India serve as a backbone for international trade, coastal shipping, and cruise shipping, resulting in the achievement of high trade growth.

Sagarmala Project

- Sagarmala is the flagship programme of the **Ministry of Shipping** to promote port-led development in the country through harnessing **India’s 7,500 km long coastline, 14,500 km** of potentially navigable waterways and strategic location on key international maritime trade routes.
- The main vision of the **Sagarmala Programme** is to **reduce logistics costs for international and domestic trade with minimal infrastructure investment**.

The objective of Sagarmala Project

- The prime objective of the Sagarmala Project is to **promote port-led direct and indirect development and to provide infrastructure to transport goods to and from ports quickly, efficiently and cost-effectively**.
- The Project aims to **develop access to new development regions** with intermodal solutions and promotion of the optimum modal split, enhanced connectivity with main economic centers and beyond through expansion of **rail, inland water, coastal and road services**.
- Under Sagarmala Programme, an integrated approach is being adopted for improvement in quality of life with a focus on **skill building and training, upgrading of technology in traditional professions focused, and a time-bound action plan for improving physical and social infrastructure** in collaboration with the coastal states.



Pillars of Development

- The Sagarmala initiative addresses challenges by focusing on three pillars of development, namely:
 - Supporting and enabling Port-led Development through appropriate policy and institutional interventions and providing for an institutional framework for ensuring inter-agency and ministries/departments/states’ collaboration for integrated development
 - Port Infrastructure Enhancement, including modernisation and setting up of new ports

- Efficient Evacuation to and from the hinterland

Coastal Community Development Plan

- The main features of the Coastal Community Development plan include **Skill development, Coastal tourism, Development of fishing harbours, and R&D in the Port and Maritime Sector.**
- **Coastal tourism projects**
 - Key coastal tourism projects include:
 - Development of Coastal Circuits under the Swadesh Darshan Scheme of the Ministry of Tourism
 - Development of infrastructure for promoting Cruise tourism
 - Development of lighthouses
 - National Maritime Heritage Museum Complex at Lothal
 - Underwater viewing gallery and restaurant at Beyt Dwarka

Way ahead

- Sagarmala programme in coordination with related central Ministries and State Governments aims to fund **capacity building, infrastructure, and social development projects related to value addition in fisheries, aquaculture, and cold chain development.**

Infrastructure
Sagarmala Programme
Promoting Port-Led Development

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- Harnesses the potential of India's 7,500 km long coastline and 14,500 km of potentially navigable waterways
- 802 projects worth Rs. 5.53 lakh crore for implementation under the Sagarmala Programme by 2035
- Average turnaround Time (TRT) of ships at Major Ports have been reduced from 87.36 hours in 2015-16 to 25 hours in 2019-20
- Average turnaround time for container vessels has reduced from 44.64 hours in 2015-16 to 36.94 hours in 2019-20

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07

PARADIGM OF COASTAL SECURITY

GS Syllabus Covered

GS-II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS-III: Various Security forces and agencies and their mandate.

Introduction

- India's coasts have always been **vulnerable to anti-national activities.**
- Numerous cases of the **smuggling of goods, gold, narcotics, explosives, arms and ammunition** as well as the infiltration of terrorists into the country through these coasts have been reported over the years.

India's Coastline

- India has a coastline of **7,516.6 km.** bordering the mainland and the islands with the **Bay of Bengal in the East, the Indian Ocean on the South and the Arabian Sea** on the West.
- There are **nine States** viz. Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha and West Bengal and **four Union Territories** viz. Daman & Diu, Lakshadweep, Puducherry and Andaman & Nicobar Islands are situated on the coast.
- More than **600 million people**, equal to around **10% of the world's population.**
- About **14.2% of the population** in India lives in coastal districts.
- Around **95% of India's trade by volume** and **68% by value** is conducted through these waters, with priority being accorded to port-led development plans in recent years.

Vulnerabilities of coastline and its security

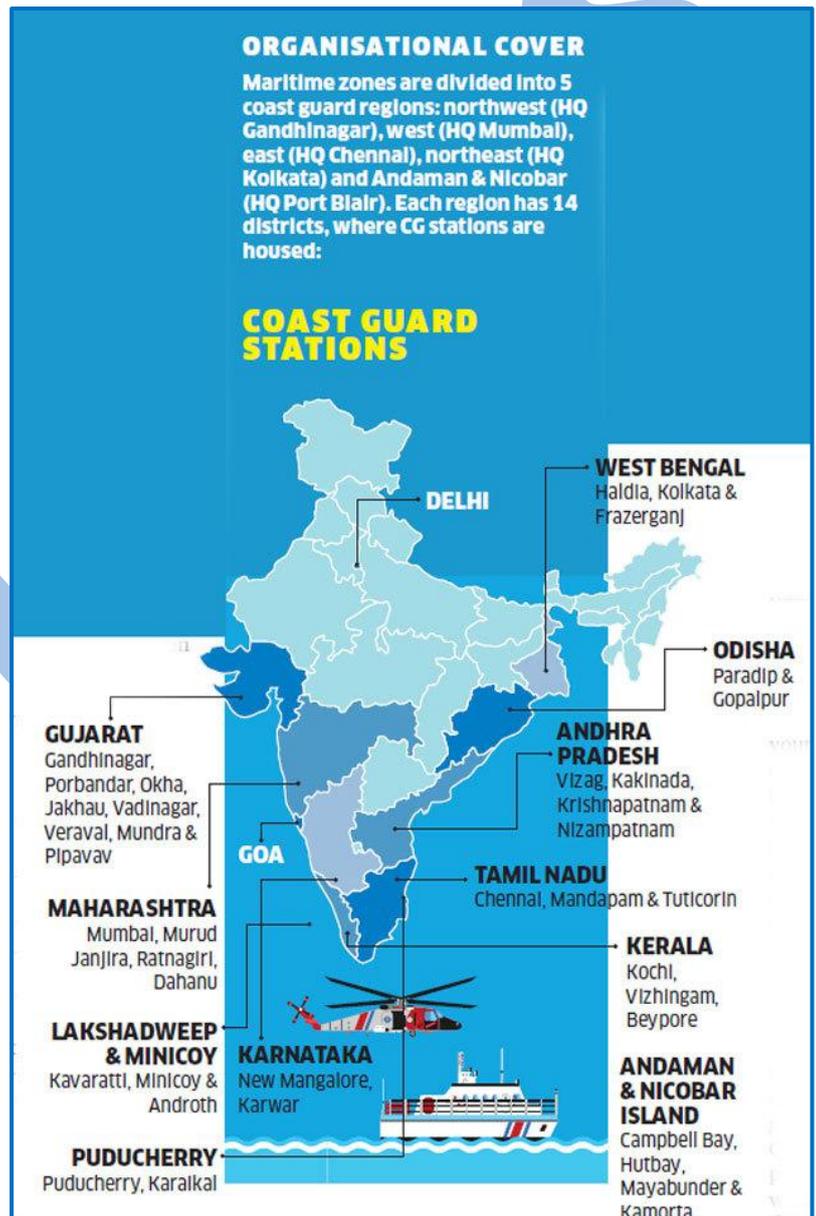
- After the **Mumbai attacks in 2008**, there has been a paradigm shift in the maritime security apparatus that increased emphasis on surveillance, intelligence gathering and information sharing amongst the various stakeholders to ensure an effective response to any emerging situation.
- Thus, several agencies, which include the **Indian Coast Guard, Indian Navy, Coastal Security Police, Customs, Fisheries, Port Authorities, Intelligence Agencies, and other Central and State Departments**, are the stakeholders in ocean governance.
- The multi-agency concept mandates cooperation, coordination, and institutionalized domain control of the respective agency to achieve foolproof security by optimum utilization of limited resources.

Measures

1. **Sagar Kavach:** To ensure a high degree of preparedness for responding to an immediate threat and to streamline the response to more significant threat perception, Coastal Security Exercise 'Sagar Kavach' is conducted bi-annually for each coastal state.
2. **Infrastructure and assets for Coast Guard:** Additionally, the Government of India initiated a focus on the infrastructure and assets of the Indian Coast Guard and all concerned agencies to enhance their capabilities for surveillance and patrol at sea.
3. **Coastal Police Stations:** More than 200 Coastal Police Stations along with patrol boats have been established in the **coastal States, including Island territories, for surveillance of shallow waters.**
4. **Use of technology:** Measures such as coastal mapping, strengthening of security at non-major ports, setting up of State Maritime Boards by **coastal States, and biometric identity cards for fishermen** have also been implemented.

Way ahead

- The Indian Coast Guard ships and aircraft provide essential deterrence and ensure the security of maritime zones of India, thereby protecting the **national maritime interests.**
- The critical issues as challenges for coastal security and, in turn, **safety for vessels ranging from small country craft to Ultra Large Crude carriers** are primarily embedded in the legal regime of **United Nations Conventions for Laws of the Seas (UNCLOS)** and its adoption under various other applicable national acts and the rules thereof.





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- Non-conventional Energy Sources

APTI PLUS

* The table of content is segregated as per its relevance with Mains Syllabus of CSE Examination.

* The article mention under GS paper in table of content might be important for many other topics in GS Papers as well.

* The details relevance of each article/Topics with respect to GS syllabus has been mention at the starting of each article.

**01****S&T: TOWARDS WOMEN EMPOWERMENT****GS Syllabus Covered**

GS-I: Role of women and women's organization, population and associated issues, poverty and developmental issues, urbanization, their problems and their remedies.

GS-II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

Introduction

- **Science and technology** are the **most powerful enterprise** that drives a nation's development, but ironically women in this area are underrepresented globally, and India has been no exception.
- The Prime Minister has emphasized that **women's power is significant for the growth of India**.
- On 28 February 2020, India celebrated **National Science Day** with 'Women in Science' as the focal theme.
- Globally, **governments and organizations** are focusing on promoting gender equality and women empowerment to untap the potential of women as precious human capital.

Women in Science and Technology in India (1950-2000s)

1. **Scientific Policy Resolution, 1958:** The first **Science and Technology Policy** in India acknowledged women's role in **science and technology**.
 - It aimed to ensure that the **creative talent of men and women** is encouraged and finds full scope in scientific activity.
2. **Dr MS Swaminathan's contribution:** The first focused move on women empowerment in science and technology was done by Dr MS Swaminathan, who initiated a chapter on '**Science and Technology for Women**' in the **Sixth Five Year Plan (1980-85)** which was included in the plan document on 'Women and development

UN Conference on Women

- The first steps date back to the **UN Conference on Women in Mexico** to mark 1975 as International Women's year followed by the **4th U.N. World Conference on Women held in Beijing in 1995**.
- The objectives of the conference highlighted full gender equality and integrating women in developmental activities by **creating opportunities for full participation at diverse workplaces**.

The 21st Century for Women in S&T

- Former Prime Minister Atal Bihari Vajpayee declared the year 2001 as the year of empowerment of women.
- In the **new millennium, the Indian Science and Technology leadership** focused on women-enabling policies and initiated the implementation of programmes to increase the participation of **women in STEM (Science, Technology, Engineering and Mathematics) disciplines**.
- The **Science and Technology Policy 2003** emphasised promoting the **empowerment of women** in all science and technology activities and ensuring their full and equal participation.

INSA Report (2004): A breakthrough for Women in Science

- In 2002, Prof. MVS Valiathan, the President of the Indian Nation Science Academy (INSA) constituted a committee to examine the status of women in science in India.
- The recommendations of the **INSA report on 'Careers of Women in Science'** prompted the Scientific Advisory Committee of the Prime Minister (PM -SAC) to constitute a **National Task Force for Women in Science in December 2005** under the **Department of Science and Technology (DST)**.

Initiatives are taken by the Government**National Task Force for Women in Science**

- The task force conducted **ten nationwide meetings with women scientists** to identify reasons for the lower retention of **women in S&T and propose** related solutions with gender-enabling measures.
- The task force made several recommendations, these include:

- Recruitment of deserving women scientists in institutions
- Selection/hiring committees to include women scientists
- Committee members to avoid asking questions with inherent gender bias
- Age relaxation for exceptional female scientists Refresher training
- Mentorship programs and schemes for career advancement
- Re-entry to enable women who had been on a break due to family reasons was rolled out

KIRAN (Knowledge Involvement in Research Advancement through Nurturing)

- It is a division reconceptualised at DST in 2014 to cover all the women-exclusive schemes to bring gender parity in S&T and provide a **framework for gender mainstreaming**.
- It supports **Women Scientist Scheme (WOS), originally launched in 2002-2003, Curie Program (2008-09)** and the more recently launched 'Mobility scheme'.

Women Scientist Scheme (WOS)

- WOS-A provides opportunities to women researchers who have taken a break in a career primarily due to family **responsibilities, relocation, etc for pursuing research** in basic or applied sciences in frontier areas of science and engineering.
- WOS-B provides grant support to women scientists for developing S&T solutions for solving grassroots-level issues and promoting social benefit.

CURIE Programme (2008-09)

- One of the major goals that were identified by the **National Taskforce was to increase the number of women in S&T** by providing them access to cutting-edge S&T infrastructure and promoting scientific skills training.

Mobility Scheme

- The mobility scheme offers a **contractual research award towards conducting independent research in any location**.
- This enables women to undertake research during the early phases of their careers while fulfilling key domestic responsibilities.

Application of S&T for Women's Welfare

- 'S&T for Women' is a special scheme rolled out by DST in 1981-1982 to primarily engage women scientists to **foster research and development of technology** with the potential to improve the quality of life of rural women.
- Since its inception, more than 2000 projects have been sponsored and around **500 technologies have been transferred in various areas for the upliftment and empowerment of rural women**.
- Under this scheme, rural women are not only provided access to technology solutions but are given the training to **adopt innovative methods to improve their working conditions**.
- Women scientists are supported to focus on developing technologies for the development of rural women in hill, coastal and arid regions.

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02

TECHNOLOGY AND INNOVATION IN HEALTHCARE

GS Syllabus Covered

GS- II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS-II: Issues relating to the development and management of Social Sector/Services relating to Health, Education, Human Resources.

Introduction

- Technology has made life easier for people **living in rural and remote areas**.
- The Indian healthcare system has witnessed a **paradigm shift in ensuring quality healthcare delivery to citizens in the last decade**.

Technological Progress and Digitalization of Healthcare

- Care is slowly moving away from **healthcare facilities, focusing primarily on patient (home) facilities, and technology is driving this transition**.
- Tele-consultation has multiplied during the COVID pandemic, as there is a renewed acceptance among **doctors, patients, insurers, and others in the wellness ecosystem**.
- In 2020, the Ministry of Health and Family Welfare (MoHFW), NITI Aayog, and the Board of Governors (BoG) Medical Council of India (MCI) issued the **Telemedicine Practice Guidelines**, enabling **medical practitioners to provide healthcare using telemedicine**.

The emergence of Digital Healthcare in India

- Interoperability is the ability of systems to be able to communicate with each other and make use of the **information obtained through each other without any restrictions**.
- The Ministry of Health & Family Welfare (MoHFW) notified the **Electronic Health Records (EHR) standards for India in September 2013**.
- Revised EHR Standards for India were notified in December 2016.
- In India, considering the COVID pandemic, the **National Digital Health Mission (now known as Ayushman Bharat Digital Mission - ABDM)** was launched in 2020, which is the implementation of the National Digital Health Blueprint.
- It seeks to create a single repository of **medical records of all citizens**.

Scope of Remote Healthcare in India

- Today, one of the main barriers to patient care is medical prescription and delivery, and this can also be done remotely.
- One of the significant challenges faced by rural communities is the **lack of healthcare expertise**.
- The existing health model has endless potential for technology to deliver massive improvements, especially in the **rural health sector**.
- The purpose of incorporating technology into healthcare in rural areas is not to replace doctors but to improve healthcare and **enable more efficient and accurate diagnoses where specialised knowledge is not always available in the field**.

The Rise of Remote Healthcare

- Another area in which technology plays a **vital role is remote care**.





- Due to severe shortages of intensive care staff in hospitals during the pandemic, many providers have **built remote or smart ICUs**.
- This facility allowed them to serve more patients simultaneously.
- Small towns and rural areas still lack such facilities, but this technology holds the answer to bridge this existing gap during future health crises.
- The **Internet of Medical Things (IoMT)** is changing the nation's healthcare system for the better. IoMT is the collection of medical devices and applications that connect to healthcare IT systems through online computer networks.
- IoMT devices that are **Bluetooth enabled can transmit all essential clinical data** to the consulting physician in real-time.
- This setup closely mimics face-to-face consultation and helps the treating physician make appropriate clinical decisions down the line of treatment.

Conclusion

- An effective healthcare system of a nation is determined by its ability to deliver **high-quality and efficient care that is affordable and accessible for all**.
- Access to quality healthcare is a problem in the country, especially in the hinterland.
- However, **government-led innovations** are taking place within rural communities.
- Existing and new resources must be deployed strategically, recognising the need to improve both the quality of individual-level care and the health of the rural populace.
- Adopting an **integrated approach for addressing both the public's health** needs and investing in robust information and communications technology infrastructure is the way forward.

03

SCIENCE AND TECHNOLOGY IN AGRICULTURE

GS Syllabus Covered

GS- II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS-III: Issues related to direct and indirect farm subsidies and minimum support prices; Public Distribution System objectives, functioning, limitations, revamping; issues of buffer stocks and food security; Technology

Introduction

- The agriculture industry has radically transformed over the **past 50 years**.
- Advances in machinery have expanded the scale, speed, and **productivity of farm equipment, leading to more efficient cultivation of more land**.
- **Seed, irrigation, and fertilizers** also have vastly improved, helping farmers increase yields.

Agriculture and allied sector

- The agriculture and allied sectors play a critical role in **rural livelihood, employment, and national food security**.
- The sector provides the largest source of livelihood in the country.
- The proportion of the Indian population depending directly or indirectly on agriculture for employment opportunities is more than that of any other sector.
- It is estimated that around 55 - 60 per cent of its rural households depend primarily on agriculture for their livelihood.

Farmer population

- According to the agriculture census (2015-16), there are 14.5 crore farmers' families in the country.
- Around 82 per cent of farmers belong to small and marginal categories, who own less than one acre of land each.
- The sector, which is the largest employer of the workforce, accounted for a sizable 18.8 per cent (2021- 22) in **Gross Value Added (GVA) of the country registering a growth of 3.6 per cent in 2020-21 and 3.9 per cent in 2021-22**.

Digital Technologies

- The Committee on Doubling Farmers' Income in its report 2018 has noted the **role of digital technology, which can play a transformational role in modernising and organising how rural India performs its agricultural activities.**
- **Digital technologies** are finding increasing use in the agricultural value system, and farmers are increasingly becoming more informed.

Government Initiatives

- The government has taken various initiatives to give a push to digital agriculture in the country.
- The Government has finalized the core concept of the **India Digital Ecosystem of Agriculture (IDEA) framework** which would lay down the architecture for the federated farmers' database.
- The IDEA would serve as a foundation to build **innovative agri-focused solutions leveraging emerging technologies to contribute effectively to creating a better Ecosystem for Agriculture in India.**

1. e-NAM: Online Marketplace

- The **National Agriculture Market (e-NAM)** is a pan-India electronic trading portal which networks the existing **Agricultural Produce Market Committee (APMC) mandis to create a unified national market for agricultural commodities.**
- Digital services are provided to traders, farmers, Farmers Producer Organisations (FPOs), and Mandis through various modules of the e-NAM platform such as the FPO trading module, and warehouse-based trading module.
- Under the scheme, **three reforms are mandatory for States/ Union Territories (UTs) in their respective APMC Acts** for integrating their mandis with the e-NAM platform:
 - Provision for e-trading
 - Single point levy of market fee
 - Unified single trading license for the State
- States without APMC Act need to provide legally enforceable guidelines and institutional mechanisms for implementing e-NAM.

PIB | 75 Azadi Ka Amrit Mahotsav

e-NAM

National Agriculture Market

One Nation One Market For Farmers

- Online platform for direct buying and selling of agricultural commodities
- Connects Agricultural Produce Market Committees into single network
- Single market for agricultural producers at national level

2. PM KISAN Digital Payment

- Under the **PM KISAN scheme, Rs. 6,000 annually** in three instalments is directly transferred into the bank accounts of the eligible farmers under the **Direct Benefit Transfer mode.**
- Farmers can do their self-registration through the farmer's corner in the portal.
- The **PM-KISAN mobile app** was launched to broaden the reach of the scheme where farmers can view the status of their application, update or carry out corrections of their name based on their Aadhaar card and check the history of credits to their bank accounts.

3. AGMARKNET portal

- **Integrated Scheme for Agricultural Marketing schemes (AGMARKNET)** to promote the creation of agricultural marketing infrastructure.



- AGMARKNET portal which is a G2C e-governance portal that caters to the needs of various stakeholders such as farmers, industry, policymakers, and academic institutions by providing agricultural marketing-related information from a single window.
- It facilitates web-based information flow, of the daily arrivals and prices of commodities in the agricultural produce markets spread across the country.

4. National Mission on Horticulture

- It promotes holistic development of the horticulture sector (including bamboo and coconut), HORTNET project is a web-enabled workflow-based system for providing financial assistance.

5. Agriculture Infrastructure Fund

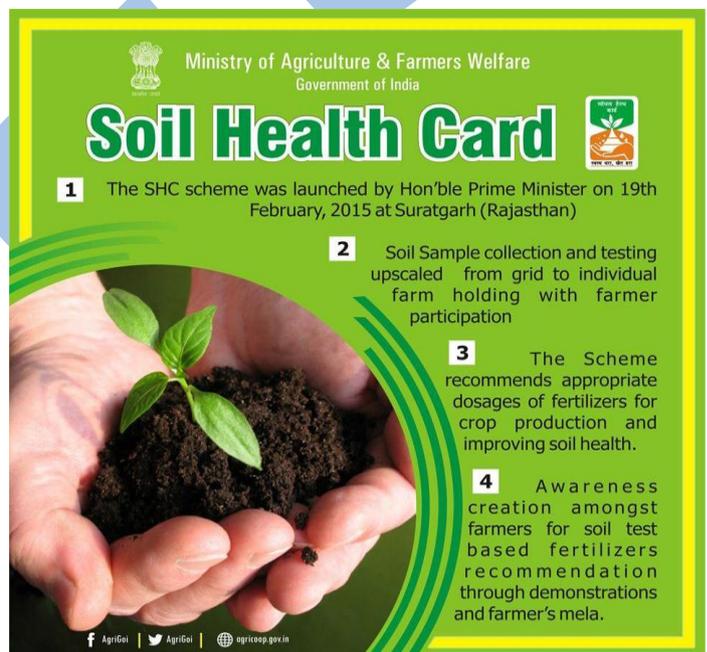
- To mobilise a medium -long-term debt finance facility for investment in viable projects for post-harvest management Infrastructure and community farming assets through incentives and financial support to improve agriculture infrastructure in the country.
- The fund also allows convergence with other schemes so that benefits from other Centre/State government schemes can also be availed along with AIF.
- This subvention is available for a maximum period of 7 years.

6. National Project on Soil Health and Fertility

- The Government has recommended soil test-based balanced and integrated nutrient management through conjunctive use of both inorganic and organic sources such as manure, biofertilizers green manuring, in-situ crop residue recycling etc. of plant nutrients with the 4Rs approach-right quantity, right time, right mode and right type of fertiliser for judicious use of chemical fertilisers and to reduce the use of chemical fertilisers.
- Integrated Nutrient Management has been promoted through the implementation of the Soil Health Cards scheme since 2015.

7. Kisan Suvidha App

- Development of Kisan Suvidha mobile application to facilitate dissemination of information to farmers covering a range of issues: weather forecast, extreme weather alert, the market price of commodities, information about dealers of fertiliser, seeds, pesticides, seeds etc, plant protection for 12 major crops, agro advisories, soil health card, soil testing labs, cold stores and godowns, veterinary laboratories and diagnostic centres, crop insurance and government schemes.



8. Usage of Drones in Agriculture

- To promote the use of drones in agriculture, the Department of Agriculture and Farmers Welfare has released the Standard Operating Procedures for use of drones in pesticide and nutrient application, which provide concise instructions for effective and safe operations of drones.

Way Ahead

- The government's thrust on new digital technologies innovations and focus on research and development in the agricultural sector, has helped not only boost farmers' income but also ensure that the country remains self-sufficient in most agricultural commodities.

04 CONSERVATION OF NATURAL RESOURCES

GS Syllabus Covered

GS- II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS-III: Conservation, environmental pollution and degradation, environmental impact assessment.

Introduction

- Conservation of natural resources is all about preserving and taking care of these resources that come directly or indirectly from nature.
- The term “environment” was introduced in the Constitution of India for the first time in the year 1976 and the State's responsibility for environmental protection was laid down under **Article 48-A**.

Objective National Environment Policy 2006

- National Environment Policy 2006 of India formulated by the Ministry of Environment, Forest and Climate Change for the protection and conservation of the environment identifies the following seven objectives:
 1. **Conservation of Critical Environmental Resources:** To protect and conserve critical ecological systems and resources, and invaluable **natural and man-made heritage**, which are essential for life support, livelihoods, economic growth, and a broad conception of human well-being.
 2. **Intra-generational Equity-Livelihood Security for the Poor:** To ensure equitable access to environmental resources and quality for all sections of society, and, to ensure that poor communities, which are most dependent on environmental resources for their livelihoods, are assured secure access to these resources.
 3. **Inter-generational Equity:** To ensure judicious use of environmental resources to meet the needs and aspirations of the present and future generations.
 4. **Integration of Environmental Concerns in Economic and Social Development:** To integrate environmental concerns into policies, plans, programmes, and projects for economic and social development.
 5. **Efficiency in Environmental Resource Use:** To ensure efficient use of environmental resources in the sense of reduction in their use per unit of economic output, to minimize adverse environmental impact.
 6. **Environmental Governance:** To apply the principles of **good governance (transparency, rationality, accountability, reduction in time and costs, participation, and regulatory independence)** to the **management and regulation of the use of environmental resources**.
 7. **Enhancement of Resources for Environmental Conservation:** To ensure higher resource flows, comprising finance, technology, management skills, traditional knowledge, and social capital, for environmental conservation through **mutually beneficial multi-stakeholder partnerships between local communities, public agencies, the academic and research community, investors, and multilateral and bilateral development partners**.

Technological Interventions of Ministry of Environment, Forest and Climate Change (MoEF&CC)

PARIVESH:

- It is a single-window integrated environmental management system which has been developed by the **Ministry of Environment, Forest, and Climate Change through NIC**.
- It has an automated process starting from submitting of application, preparation of the agenda, and preparation of minutes to granting of clearances.





- It facilitates sound and informed decision-making, real-time information about the status of the application with alerts at each of the stages through SMSs and emails, and standardisation of processing real-time time monitoring/compliances.

Decision Support System (DSS):

- This is a web GIS application developed to provide qualitative and quantitative information concerning forest areas.
- It uses different spatial layers for providing information like **state and district boundaries, tiger reserves, tiger corridors, forest type maps, biological richness, hydrological layer, etc.** available at www.fsigeoportal.gov.in/dss.

Climate Change Knowledge Portal:

- India's Climate Change Knowledge Portal is a single-point information resource which captures sector-wise adaptation and mitigation actions that are being taken by the various ministries in one place including updated information on their implementation.
- The knowledge portal will help in disseminating knowledge among citizens about all the major steps the Government is taking at both national and international levels to address climate change issues.

National Mission on Himalayan Studies:

- MoEF&CC attaches the highest priority to protecting the unique but highly fragile Himalayan ecosystem.
- This portal covers the aspects of the **National Mission on Himalayan Studies which is a Central Sector Grant-in-aid Scheme** through a holistic understanding of the system's components and their linkages, in addressing the key issues relating to the conservation and sustainable management of natural resources in the Indian Himalayan Region.

Wetlands of India portal:

- This portal is an **initiative to provide a single-point access system that synthesizes information dissemination regarding wetland sites of the country**, projects, initiatives, and training. Wetlands are shallow waterbodies, transitional between terrestrial and aquatic systems, with high biodiversity and productivity.

Conclusion

- Today when climatic conditions are changing, there is a need to inculcate effective education along with the use of technology for environmental protection, which will play an important role in sensitising the people about environmental issues.
- This will also facilitate people to adopt green social responsibility for the protection of the environment.

05

SMART WATER FUTURE

GS Syllabus Covered

GS- III: Achievements of Indians in science & technology; indigenization of technology and developing new technology.

GS-III: Conservation, environmental pollution and degradation, environmental impact assessment.

Introduction

- Water is an essential but scarce resource and therefore consuming and managing every drop of water is vital.
- Some **1.1 billion people worldwide lack access to water**.
- By 2025, two-thirds of the **world's population may face water shortages**.
- By 2030, the country's water demand is projected to be twice the available supply and if business as usual continues, it may imply severe water scarcity for hundreds of millions of people.

Waste water management

- The issue of wastewater management is significant for India and it needs to be addressed urgently.
- The per-person disease burden due to unsafe water and sanitation was **40 times higher in India than in China and 12 times higher than in Sri Lanka in 2016.**
- With a country generating 140 billion Cubic Metre (BCM) of wastewater annually, mismanagement of wastewater which also **contaminates groundwater, lack of liquid waste management, poor sanitation conditions, and poor hygiene habits have contributed to a major portion of the population suffering from water-borne diseases.**

Water and economic growth

- Water is a necessary and irreplaceable **resource for economic growth.**
- As per the UN report on water and jobs, it has been estimated that half of the world's workforce i.e., about 1.5 billion people are dependent and employed in one of the eight water and natural resources dependent industries.
- If India does not take water scarcity seriously, then by 2030, it can lose **6 per cent of its GDP due to water-related disasters.**
- Therefore, it is the right time to work on the water management part for our sustained future.



Smart Water Future

- Smart Water broadly means the management and distribution of water whilst maintaining its quality.
- To ensure the sustainable supply of water in a smart format, there is a need to focus on two key points:
 - a) Reduction in non-revenue water
 - b) Encouraging wastewater recycling and reuse
- Indian utilities face huge distribution losses because of the non-revenue water.
- It has been estimated that about **40-70 per cent of water distributed**, is lost on account of leakages, unauthorized connections; billing and collection inefficiencies (World Bank, 2012).
- Reducing non-revenue water losses has considerable benefits including **efficient management of water resources and revenue generation for water utilities.**

Basic leakage management

- Four basic leakage management activities can be undertaken by water utilities to reduce distribution losses, namely:
 - i. **pressure management**
 - ii. **active leakage control**
 - iii. **speed and quality of repairs and pipe asset management**
 - iv. **maintenance and renewal**
- These steps holistically feature conventional yet necessary steps to manage leakage while reducing physical losses.

Smart solutions for water future

- Apart from reducing non-revenue water and encouraging wastewater recycling and reuse, there are several smart solutions which India can undertake to move towards a smart water future. Some of these are:
 1. **Implementation of Internet of Things (IoT) technology:** This technology will require the data of the water to be transmitted over a longer distance, wirelessly, and uninterrupted to a central dashboard to analyze and monitor the water system.



2. **Sensors, remote- sensing, geographic information systems (GIS) technologies,** and visualization tools are some key elements to managing water resources at the service area, watershed, and regional scales.
3. **Remote sensing/imaging technologies** such as satellites and drones, can be used separately or together, to provide data for mapping water resources, measuring water fluxes, and utility asset management.
4. **New and existing sensors,** both fixed and mobile can be used to provide near real-time data on water quality, flows, pressures, and water levels, among other parameters.
5. Smart meters can be used to record customer water usage that will provide a clear picture of water consumption and convey data to both **consumers and utilities, allowing for improved water management.**
6. **Artificial Intelligence** in water can allow for the strategic and cost-effective operation of utilities, including better planning and execution of projects, **better tracking and understanding of resource loss in real-time, more efficient collection and distribution networks, and maximum revenue capture and customer satisfaction.**
7. **Augmented Reality and Virtual Reality (AR and VR) technologies** provide their own, unique contributions to digital water. AR and VR technology has the potential to support decision-making in the field by providing holographic representation of pipes, cables, and other assets, and offering immersive, scenario-based training for employees.
8. Blockchain applications have the potential for direct, secure transactions between resource providers and consumers, peers, utility, and other players in the water sector.
9. Use of Satellite/ drones/ GIS/AI in reservoir operation, flood forecasting, and inundation mapping can help to mitigate floods and save thousands of lives.

Good Practices

- India is already on the way ahead in adopting various water sector-related technologies. For example- World Bank-funded Karnataka Urban Water Sector Improvement Project (KUWASIP) has reduced non-revenue water (NRW) from 50 per cent to 7 per cent and increased the hours of supply from 2 hours every few days to 24 hours of water supply.
 1. **Jamshedpur Utilities and Services Company (JUSCO),** Jamshedpur has introduced NRW management, and since then the level of NRW decreased from 36 per cent to 10 per cent with continuous water supply from 7 hours per day.
 2. The **Andhra Pradesh government** has launched the Andhra Pradesh Water Resources Information and Management System (APWRIMS) which is a Smart Water Solution platform targeting the overarching objective of sustainable water management in Andhra Pradesh.
 3. Similarly, **Odisha is the first State in the country** that has implemented an **Early Warning Dissemination System (EWDS)** which aims to establish a foolproof communication system to address the existing gap in disseminating disaster warnings from the State, District and Block levels to communities.
 4. Recently, students from **IIT Madras have developed an AI-enabled drone that can help authorities provide vital information** on people trapped in disaster-hit areas.

GS Syllabus Covered

GS- II: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

GS-III: Conservation, environmental pollution and degradation, environmental impact assessment.

Background

- Energy occupies a pivotal position to facilitate the dream of a sustainably developed India.
- India is gradually transitioning from **conventional sources to non-conventional sources of energy, for its needs.**
- This is particularly significant as being one of the **fastest-growing countries in the world and the fifth-largest economy.**
- India holds a strategically important position in the global arena and **India's efforts in climate change will pave a direction for the future generation.**

Energy sources and global warming

- The Sources of energy play a dominant role in determining the pace of global warming.
- Conventional energy sources such as the burning of **fossil fuels including coal are the largest contributor to global climate change.**
- Fossil fuels account for about **75 per cent of the total global greenhouse emissions** and about 90 per cent of the total **carbon dioxide emissions.**

Research on the global climate change

- In the past few decades, there has been extensive research on the global climate change phenomenon and how the usage of conventional sources of energy particularly fossil fuels may be reduced.
- This research also led to the formation of the **United Nations Framework Convention on Climate Change (UNFCCC)**, an international environmental treaty, in 1992 to combat excessive greenhouse emissions.

Important Global measures

1. **Kyoto Protocol:** One of the first major measures undertaken under UNFCCC was the Kyoto Protocol which was signed in 1997.
 - The Kyoto Protocol made the industrialized countries and economies commit and reduce the emission of Green House Gases as per their agreed individual targets.
2. **Paris Agreement:** After the Kyoto Protocol, the Paris Agreement was also signed wherein around 196 countries signed a global framework to avoid dangerous climate change by limiting global warming to well below **2°C and pursuing efforts to limit it to 1.5°C.**
 - Despite all these efforts, the carbon-dioxide emissions are alarming and call for a shift towards non-conventional sources of energy.

India's energy transition

- India is gradually transitioning from conventional sources to non-conventional sources of energy, for its needs.
- Non-conventional energy sources refer to those renewable sources of energy that are obtained from nature and are replenished at a rate faster than their consumption unlike conventional energy sources like coal, natural gas etc.
- The popular sources of non-conventional energy sources in India are as follows:
 1. **Solar Energy**
 - Solar energy refers to the energy received from the sun in the form of light and heat.
 - It can be harnessed by converting solar energy into electric energy in solar plants.
 - India, being a **tropical country and its geographical location** makes it a conducive source of energy.
 - Further, the solar energy sector in India has evolved as one of the key sunrise sectors with lots of potentials.

- The country's need for solar energy has resulted in a Production Linked Incentive scheme for the **manufacturing of solar Photo-Voltaic (PV) modules with an outlay of Rs. 24,000 crores.**

- The scheme supports the setting up of integrated manufacturing units of **high-efficiency solar PV modules by extending support through Production Linked Incentive (PLI).**

2. Wind Energy

- The **kinetic energy** of wind in motion is used to generate wind energy.
- The expansion of the wind industry in the country has created a strong ecosystem with efficient project handling and operation facilities and a manufacturing base of about 10,000 MW per annum.
- As of March 2021, India with a total installed capacity of **39.25 GW has the fourth-highest wind installed capacity in the world.**
- India with its long coastline of around **7,500 km has immense potential in harnessing offshore wind energy.**
- The recent assessment by the government has indicated a gross wind power potential of 302 GW in the country at 100 meters and 695.50 GW at 120 meters above ground level.

3. Tidal Energy

- The energy produced from the surge of the ocean i.e., from the rise and fall of waves is called **tidal energy.**
- Tidal energy is yet to take full fledge form for commercial purposes and is still in the research and development phase.
- Relatively high cost and limited availability of sites with sufficiently high tidal ranges or flow velocities pose constraints on its total availability.

4. Geothermal Energy

- The energy generated from the heat derived from the subsurface of the earth is called geothermal energy.
- The gradual decline of radioactive particles in the earth's core generates geothermal energy.

5. Hydropower

- Hydropower, or hydroelectric power or hydel power, is one of the **oldest and largest sources of renewable energy.**
- It generates electricity by harnessing the flow of water.

6. Biomass

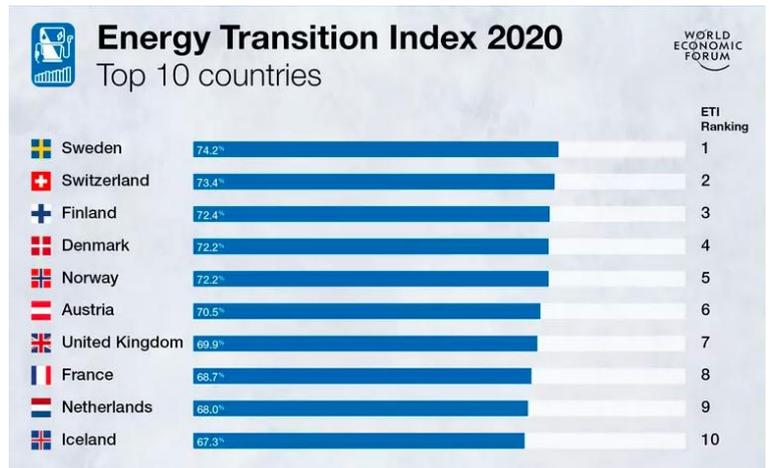
- Biomass is an organic material and contains stored energy obtained from the sun.
- Burning of biomass results in the release of chemical energy in biomass in the form of heat.
- According to the Ministry of New and Renewable Energy (MNRE), about **32 per cent of the total primary energy use in India is still derived from biomass and more than 70 per cent of the country's population depends on bio-mass fuel to cater to their regular energy needs.**

7. Fuel Cell

- This refers to the source of energy which uses hydrogen and oxygen to generate electric power. Through chemical reactions with oxygen, fuel cells convert hydrogen obtained from diverse sources, into electricity.
- Water is the only product of this process, making it a clean and sustainable energy source.

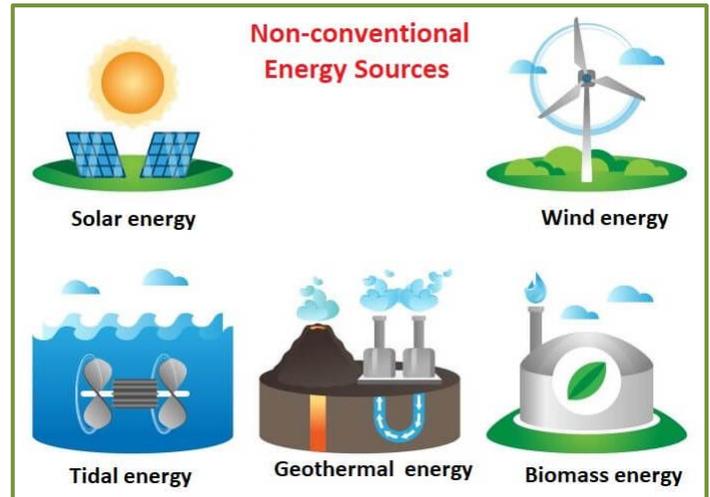
Significance of Non-conventional Sources of Energy

- Transitioning to non-conventional sources of clean energy ensures the attainment of three Es that often finds mention in energy policies: **energy security, economic development, and environmental sustainability.**
- Apart from addressing the issue of climate change and global warming, the transition to renewable sources of energy will reduce air pollution and will further contribute to better public health outcomes.
- The shift towards non-conventional sources of energy can bring down the cost of energy supply.
- The realisation of India's Atmanirbhar Abhiyaan also depends on the enhanced accessibility and affordability of green/clean energy sources.
- Further, the transition to non-conventional sources of energy results in more employment and entrepreneurship opportunities in the domain of renewable energy.



Governmental Interventions to Foster Renewable Energy Sources

- India is committed to achieving 500 GW of non-fossil fuel-based energy capacity by 2030.
- The governmental efforts are aligned with making substantial progress in achieving Sustainable Development Goal 7, which calls for “affordable, reliable, sustainable and modern energy for all” by 2030.
- Some of the recent governmental interventions for facilitating the transition to renewable sources of energy are as follows:
 - Permitting Foreign Direct Investment (FDI)** up to 100 per cent under the automatic route for renewable energy projects, including offshore wind energy projects.
 - Setting up of ultra-mega renewable energy Parks** to provide land and transmission to renewable energy developers on a plug-and-play basis.
 - Waiving of Inter-State Transmission System (ISTS)** charges for inter-state sale of solar and wind power for projects to be commissioned by 30th June 2025.
 - Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM-KUSUM):** PM KUSUM aims for de-dieselisation of the farm sector along with providing energy security and increased income to farmers.
 - It has 3 components (i) the creation of 10,000 MW of Decentralised Ground mounted grid-connected solar power plants, (ii) the solarisation of 15 lakh grid-connected agriculture pumps and (iii) the installation of 20 lakh agriculture pumps powered by solar energy.
 - National Hydrogen Mission:** The mission aims in making India, a green hydrogen hub, aiding India to fulfil its target of production of five million tonnes of green hydrogen by 2030 along with allied development of renewable energy capacity.



Challenges in Transition to Non-Conventional Energy Sources

- Ensuring an enabling infrastructure and conducive ecosystem for facilitating a smooth **transition to renewable energy is a matter of concern.**
- This also includes the challenge of expanding power infrastructure to permit increased use of diverse energy sources and ensuring system flexibility.
- Massive investment is inevitable for facilitating a smooth **transition to non-conventional energy sources.**
- Ensuring viable financing mechanisms to raise long-term funds at a low-interest rate to facilitate this transition is thus a formidable challenge.
- The poor financial strength of some of the distribution companies and their resulting inability to make timely payments to renewable energy developers is also a formidable hindrance.



Way Ahead

- Facilitation of transition to **non-conventional energy sources holds the key to India’s developmental aspirations.**
- To facilitate a smooth and sustainable transition to non-conventional sources of energy, the mobilisation of green finance needs to be adopted at a faster pace.
- It is also important to further escalate research and development spending on the domain of clean energy sources, to come up with sophisticated enabling technologies.
- Transition to non-conventional sources of energy is a crucial enabler for sustainable development and climate resilience paving its way towards the **creation of a more equitable, inclusive, and sustainable society.**