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News Analysis



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MARCH 2025

1. IMPORTANT TOPICS OF THE MONTH

1.1 Ancient Indian Knowledge System

Why in news?

Recently Union Minister for Culture and Tourism in a written reply in Lok Sabha, presented the governments focus on preserving intellectual heritage of Ancient Indian Knowledge Centres.

What are the ancient knowledge systems of India?

- **Ancient systems of knowledge in India** – It basically consist of understanding the mysteries of the universe, human interactions with environment, philosophy of life, development of art etc.
- **Ancient literatures** – Shruti and Smriti literature, Sutra literature, Jataka tales, Panchtantras, Kathasaritsagara, Thirukural, Athichudi and Vachanas are examples of Indian literary traditions.
- **Indian Philosophical thoughts** – Āstika, Nāstika, Sāṅkhya, Yoga, Nyāya, Vaiśeṣika, Mīmāṃsā, Vedānta, Cārvāka, Buddhism and Jainism.

Ancient knowledge systems

- **Mathematics** - Gaṇita anuyoga, Saṅkhyāna (literally, 'the science of numbers,' meaning arithmetic and astronomy), gaṇana saṅkhyāna
- **Ayurveda** - A holistic health system encompassing all the aspects of well-being — from physical, physiological and psychological to environmental and ecological health.
- **Alchemical traditions** - Rasāyana Śāstra, Rasatantra, Rasakriyā or Rasavidyā
- **Yoga** - It encompasses the different fields of our existence such as physical, psychological, social and spiritual.
- **Ancient knowledge centres** – They are learning institutions developed to provide institutional frameworks for scholarly activities.
- Prominent universities of Buddhist system were Takshashila, Nalanda, Vikramshila, Odantapuri and Vallabhi.
- Despite their decline due to invasions, their legacy influenced global education.

Ancient Knowledge Centers

Taxila (Takshashila)

- Situated in present-day Pakistan.
- Believed to have been founded by Kuru prince Duryodhana
- Flourished between the 6th BCE and the 5th century CE.
- It is regarded as one of the earliest universities in the world,
- Notable figures such as the strategist Chanakya (Kautilya), the physician Charaka, and the grammarian Pāṇini were associated with Taxila.

Nalanda University

- Situated in Bihar
- Founded by Kumaragupta I of the Gupta dynasty.
- Flourished between the 5th to the 12th century CE.

- The Chinese traveler Xuanzang documented his studies at Nalanda in the 7th century.

Vikramashila University

- Situated in Bihar.
- Founded by the Pala emperor Dharmapala
- Flourished between 8th to 12th century
- It specialized in Vajrayana traditions.

Odantapuri

- Buddhist learning centre situated in Bihar.
- Founded by the Pala ruler Gopala I.
- Flourished between 8th to 12th century
- Considered the second oldest of India's Mahaviharas.

Vallabhi

- Located in Bhavnagar, Gujarat.
- Founded by Maitraka kings and patronized Hinayana Buddhism.
- Flourished from 600 AD to 1200 AD.
- Famous for Buddhist philosophy, economics, agriculture, Theology, Medicine and Nithya Shastra (Law)

How did ancient India's knowledge survive destruction?

- **Oral tradition and guru-shishya parampara** – Knowledge was transmitted orally from teachers to students to ensure its continuity even without or destruction of formal institutions.
- **Migration of scholars** – When institutions like Nalanda and Vikramashila were attacked, scholars fled to different regions, taking their knowledge with them.
- Many migrated to South India, Tibet, China, and Southeast Asia, ensuring that their teachings were preserved and spread.
- **Religious institutions and monasteries** – Buddhist and Hindu monasteries, along with temples, functioned as secondary knowledge centers of learning, which preserved ancient texts.
- Monks and scholars continued their work in secret or in other safe locations.
 - For instance, Tibetan Buddhist monasteries preserved Indian texts and traditions when Buddhism declined in India.
- **Foreign translations and records** – While invaders destroyed libraries, travellers like Xuanzang and Al-Biruni documented and translated Indian knowledge into Chinese and Arabic languages.
- **Underground libraries** – Some scholars hid manuscripts in remote locations or underground repositories.
- **Resurgence of learning** – New centers of knowledge like Varanasi and Kanchipuram emerged, and continued intellectual traditions.
- **Integration into other cultures** – Indian mathematical, scientific, and philosophical knowledge was absorbed by Islamic and European scholars.
- Concepts like the decimal system and Ayurveda found their way into global civilizations, ensuring their survival despite institutional destruction.
- Thus, while ancient knowledge centers were physically attacked, their intellectual and cultural legacy endured through resilience, adaptation, and the widespread dissemination of knowledge.

What are the Initiatives taken by IGNC to restore ancient Indian knowledge systems and centers?

- **Vedic Heritage Portal** - Launched in 2023, It aims at preserving and disseminating the rich heritage of the Vedas.

- It features transcriptions of ancient texts such as the Vedas, Upanishads, Vedangas, Upavedas, and details of Vedic rituals in both audio-visual formats.
- **Project 'Mausam'** - It is a multidisciplinary initiative to revive and strengthen ancient historical maritime cultural and economic ties among countries along the Indian Ocean.
- **Academic programs and research** – IGCCA offers postgraduate diploma courses and conducts research on India's traditional knowledge systems, to understand and revive ancient practices.
- **Indian knowledge systems (IKS) initiative** – IGCCA supports the IKS division of Ministry of Education.
- IKS focuses on integrating traditional Indian knowledge into contemporary education by incorporating subjects like Vedic mathematics, Ayurveda, yoga, and ancient Indian sciences into university curricula.

*The **Indira Gandhi National Centre for the Arts (IGNCA)** was established in 1987 under the Department of Culture, as a centre for research, academic pursuit and dissemination in the field of the arts.*

IGNCA's divisions on India's cultural heritage

- **Kalanidhi** - Serves as a repository of research and reference materials in humanities and the arts, amassing a vast collection of textual, visual, and auditory data to support scholarly research.
- **Kalakosa** - Engages in research and publication, investigating intellectual traditions across multiple disciplines, thereby enriching the understanding of ancient knowledge systems.
- **Janapada Sampada** - Dedicated to lifestyle studies, this division conducts systematic research on tribal and folk arts, facilitating live presentations and fostering a deeper appreciation of indigenous knowledge.
- **Kaladarsana** - Transforms research findings into visible forms through exhibitions, making ancient knowledge accessible to the public and encouraging further scholarly inquiry.
- **Cultural Informatics Laboratory** - Applies technology tools for cultural preservation and propagation, including the development of 'Kalāsampada', a digital repository encompassing rare archival collections.

1.2 India's Burden of Rising Obesity

Why in News?

Recently Prime Minister, in 'Mann Ki Baat' radio programme highlighted the alarming increase in obesity in the country.

What is the status of obesity in India?

- **Indian obesity** - The National Family Health Survey round 5 (NFHS-5, 2019-21) suggests that nearly one in every four men or women is obese.
- **Gender variation** - At the national level, Obesity has increased from 21% to 24% among women and 19% to 23% among men.
- **Childhood obesity** - The percentage of children under 5 who were overweight rose from 2.1% to 3.4% from 2015-16 to 2019-21, as per NFHS data.
- **Regional variation** - The proportion of those who are overweight and obese ranges from 8% to 50% across States, in both men and women, and in rural and urban settings.
- **Recent increase** - Overweight and obesity in adults and children have doubled in the last 15 years and tripled in the last three decades.
- **Forecast** - World Obesity Atlas 2022 estimates that India will have a child obesity prevalence of 10.81% amongst 5 to 9-year-olds and 6.23% amongst 10 to 19-year-olds by 2030.

ICMR Estimation on Indian obesity amongst adults over 20 years of age

- One in every third (35 crore) has abdominal obesity.
- One in every fourth person (25 crore) has generalised obesity.
- One in every fifth person (21 crore) has high levels of blood cholesterol.

What are the causes for the high prevalence of obesity in India?

- **Societal normalization** - The general societal attitude in India normalises obesity or being overweight.

- **Inadequate balanced diet** - 'State of Food Security and Nutrition in the World' report (2024), estimated that nearly 40% of Indians fall short of an adequate-nutrient diet.
- **High cost of health diet** - Eating healthy is becoming more expensive than eating junk food and that around 55% (78 crore) of India's population could not afford a healthy diet.
- **High fat, salt, sugar (HFSS)** - In the last two decades, easy and low-cost availability of high fat, salt, sugar (HFSS) and the ultra-processed food (UPF) has compounded the challenge.
- **Sedentary lifestyle** - A recent World Health Organization (WHO) report says that 50% of Indians fail to meet recommended physical activity levels driven by urbanization.
- **Lack of awareness** - Many people are not fully aware of the health risks associated with obesity and the importance of maintaining a healthy lifestyle

What are the impacts of obesity?

- **Health impact** – Obesity is often called the 'mother of all diseases' and affects the overall personal health.
- **Chronic disease** - WHO and the medical profession across the world have recognised that obesity is both a risk factor/lifestyle challenge and a complex and chronic disease.
- **NCD's risk** - Being overweight in childhood and adolescence, the WHO says, affects children's and adolescents' immediate health and is associated with greater risk and earlier onset of various NCDs.
- **Diabetes risk** - The 'common soil hypothesis' highlights obesity as a cause and risk factor for diabetes (one in every fourth Indian adult, or 25 crore Indians, is either diabetic or prediabetic).
- **Mortality** - Overweight and obesity are associated with an estimated 3.4 million deaths annually in the world.
- **Affects childhood development** - Obesity can also have adverse psychosocial consequences affecting school performance and quality of life, compounded by stigma, discrimination and bullying.
- **Economic cost** - The global obesity observatory estimates that the annual economic cost of obesity and being overweight in India in 2019 was \$28.95 billion (Rs.1, 800 per capita), or 1.02% of India's GDP.
- These costs are linked to health-care expenditures and lost productivity, among others.
- **Increasing burden** - Without sufficient interventions, it is estimated that the economic burden is likely to increase to Rs.4, 700 per capita by 2030 (or 1.57% of GDP).

What are the government measures in tackling obesity?

- India's Economic Survey 2024-25 takes note of obesity as an emerging health challenge, recommending higher taxation on UPF.
- **Public campaigns** – Programs like 'Khelo India', 'Fit India Movement' or 'Eat Right India' campaigns, promote physical activity and healthy lifestyle.
- **NCD control** – National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD) focuses on preventing and controlling NCDs, including obesity.
- **Adolescent health** - Rashtriya Kishor Swasthya Karyakram (RKSK) addresses adolescent health by providing nutrition awareness and services to prevent NCDs like obesity.
- **Nutrition promotion** - POSHAN Abhiyaan Tackles malnutrition by addressing both undernutrition and overnutrition, including obesity.
- **Trans Fat regulation** - FSSAI limits trans fatty acids in oils and fats to $\leq 2\%$ by weight to reduce unhealthy fat consumption.

What are the challenges?

- **No dedicated program** - There are not enough programmatic initiatives to tackle obesity.
- **Underplayed responsibility** – Most initiatives place far too much of a responsibility on the individual, and the responsibility of most other stakeholders is underplayed.
- **Insufficient Screening** - Despite the growing prevalence of obesity, there is a lack of comprehensive public health measures such as screening, treatment, and awareness programs.
- **BMI Limitations** - Traditional measures like BMI often fail to capture obesity-related risks accurately, especially in Asian populations.
- **Financial Constraints** - Limited financial resources and budget allocations restrict the ability to provide necessary equipment and facilities for obesity prevention initiatives

What lies ahead?

- **Public awareness creation** - Start a societal dialogue, and a structured science communication to highlight that obesity is a disease with rising burden.
- **Management** - Obesity needs prevention, care and management, just like any other health condition.
- **Healthy ecosystem** - There needs to be better urban planning and urban infrastructure development with place for bicycle lanes, free access to parks and other public spaces and open gymnasiums.
- **Taxation** - Levy high tax rate for HFSS and UPF products and provide subsidies for healthier food items including fruits and vegetables and ensure their availability.
- **Health check-ups** - The 'weight, height and waist circumference' measurement has to be an integral part of all health visits and preventive health check-ups.
- **Drugs and medicines** - Developing and widely disseminating clinical practice guidelines about the ideal candidates for anti-obesity medicines, which need to be used as per medical indication.
- **Occupational health** - Every office and workplace needs to raise awareness about 'unhealthy weight' in the workforce and make weighing scales easily available.
- **Incorporate nutrition education** - Curriculum should include lessons on balanced diets, the importance of various nutrients, and how to make healthier food choices.
- **Engage dietitians and nutritionists** - Following Japan's example, schools should consider hiring dietitians to plan nutritious meals, provide dietary advice, and conduct workshops for students and staff.
- **Healthy school canteens** - Canteens should offer a variety of healthy food options, with a focus on fresh, local produce. Junk food should be limited or replaced with healthier alternatives.
- **Coordinated interventions** - Obesity prevention requires multiple ministry engagements (health, finance, education, agriculture, urban planning and development) to work together.
- **Wholistic approach** - India's nutrition intervention programme needs to be reimagined as 'Suposhan Abhiyan' with a focus on not just feeding but also 'mindful under-feeding' and 'rightful micronutrient supplementation'.

Basal metabolic rate (BMI) does not indicate how much of the weight is fat and where the fat is distributed in the body.

A very generic but useful parameter to know one's ideal weight is the height in centimetre minus 100 for males and minus 105 for females.

1.3 Women Empowerment

Why in News?

International Women's Day is celebrated around the world on 8th March.

What is the theme of International Women's Day 2025?

- **International Women's Day** - It is celebrated around the world on 8th March to recognize their achievements across national, ethnic, linguistic, cultural, economic or political boundaries.

Officially recognized by the United Nations in 1977, International Women's Day first emerged from the activities of labour movements at the turn of the twentieth century in North America and across Europe.

- **Theme** - "For ALL Women and Girls: Rights. Equality. Empowerment."
- This year's theme calls for action to unlock equal rights, power and opportunities for all and an inclusive future where no one is left behind.
- **Significance of 2025** - It marks the 30th anniversary of the Beijing Declaration and Platform for Action which is the most progressive and widely endorsed blueprint for women's and girls' rights worldwide.

The Beijing Declaration was a resolution adopted by the UN at the end of the Fourth World Conference on Women on 15 September 1995.

What are the constitutional provisions for women empowerment?

Constitutional Provisions for Women Empowerment

Preamble

<ul style="list-style-type: none"> • Equality - It provides for equal status and of opportunity for all.
Fundamental Rights
<ul style="list-style-type: none"> • Article 14 - Equality before the law • Article 15 – It prohibits discrimination based on sex. • Article 16 - Equality of opportunity in matters of public employment
Directive Principles of State Policies
<ul style="list-style-type: none"> • Article 39 - Equal pay for equal work for men and women • Article 42 - To make provision for maternity relief
Fundamental Duties
<ul style="list-style-type: none"> • Article 51A - Renounce practices derogatory to the dignity of women.
Panchayat Raj and Municipality
<ul style="list-style-type: none"> • Article 243D&T – 1/3rd of seats in local bodies are reserved for women aimed at political empowerment.

What are the international treaties India signed for women empowerment?

- **UDHR** - Universal Declaration of Human Rights (1948) states that all humans are “born free and equal in dignity and rights”.
- **ICCPR** - International Covenant on Civil and Political Rights (1966) ensure the equal right of men and women to the enjoyment of all civil and political rights.
- **CEDAW** - Convention on the Elimination of All Forms of Discrimination Against Women (1979) is often described as an international bill of rights for women.
- **Beijing Declaration and Platform for Action (1995)** – It was adopted to promulgate a set of principles concerning the equality of men and women.
- **United Nations Convention Against Corruption (2003)** – It encourages States parties to 'promote meaningful participation of women and girls in anti-corruption activities.
- **Agenda 2030 for Sustainable Development** - SDG 5 aims at achieving gender equality and empower all women and girls
- **What are the government schemes for women educational upliftment?**
- **Education** - India has undertaken several initiatives to ensure that girls have equal access to quality education from primary schooling to higher education.
- **Gender parity in education** - It has improved significantly, with female enrolment surpassing male enrolment in recent years.

Educational Initiatives for Women

- **Right to Free and Compulsory Education Act, 2009** - It ensures schools are within reach for all children.
- **Beti Bachao Beti Padhao (BBBP)** – It focuses on improving the child sex ratio and promoting girls' education.
- **Samagra Shiksha Abhiyan** – It supports school infrastructure and girl-friendly facilities.
- **National Education Policy (NEP) 2020** – It prioritizes gender equity and inclusion in education.
- **Eklavya Model Residential Schools** – It promotes quality education for tribal girls.

STEM Initiatives

- **Vigyan Jyoti (2020)** promotes STEM education for girls in underrepresented areas.
- **Overseas Fellowship Scheme** supports women scientists in global research opportunities.
- National Digital Library, SWAYAM, and SWAYAM PRABHA ensure access to online learning.

Achievements

- **Female Gross Enrollment Ratio (GER)** has overtaken Male GER since 2017-18.
- **Female enrolment in higher education:** 2.07 crore (2021-22), which is nearly 50% of the total number 4.33 crore.
- **The female to 100 male faculty ratio** has also improved to 77 in 2021-22 from 63 in 2014-15.
- **Women in STEM:** 42.57% (41.9 lakh) of total STEM enrolment.
- Over 10 lakh girl students benefitted under various scholarships for STEM fields.

What are the skill development initiatives for women?

- **Skill India Mission** – Under the mission, Ministry of Skill Development and Entrepreneurship (MSDE) delivers skill, re-skill and up-skill training to all the sections of the society including women.
- **Pradhan Mantri Kaushal Vikas Yojana (PMKVY)** - To increase the participation of women under PMKVY, conveyance cost and expenditure towards boarding & lodging facilities are provided.
- **Women Industrial Training Institutes** - There are 19 National Skill Training Institutes (NSTI) and more than 300 ITIs exclusively for women.
- Government of India approved 30% reservation of seats for women candidates in all ITIs (Govt. & Private) in all courses.
- **What are the initiative for women health and nutrition promotion?**
- **Access to healthcare services** – It is crucial for improving the well-being of women and reducing gender-based health disparities.
- The government has introduced several policies to ensure maternal and child health, nutrition, and medical support for women across all sections of society.

Health and Nutrition initiatives for women

- **Pradhan Mantri Matru Vandana Yojana (PMMVY):** Provides cash incentives to pregnant and lactating mothers, with Rs. 17,362 crore disbursed to 3.81 crore women, as of January 2025.
- **Jal Jeevan Mission** provided potable tap water to 15.4 crore households, reducing health risks.
- **Swachh Bharat Mission** led to the construction of 11.8 crore toilets, improving sanitation and hygiene.
- **Poshan Abhiyaan:** Strengthens maternal and child nutrition programs
- **Ujjwala Yojana** - Over 10.3 crore clean cooking gas connections distributed under the scheme.

Achievements

- Maternal Mortality Rate (MMR) reduced from 130 (2014-16) to 97 (2018-20) per lakh live births.
- Under-5 Mortality Rate (U5MR) decreased from 43 (2015) to 32 (2020).
- Life expectancy for women increased to 71.4 years (2016-20), expected to reach 74.7 years by 2031-36.

What are the initiatives for economic empowerment?

- **Female workforce** - Women's participation in the workforce is a key driver of economic growth.
- The government has launched multiple initiatives to promote financial independence, entrepreneurship, and employment opportunities for women.

Women Initiatives of Financial Inclusion

- **PM Jan Dhan Yojana:** Over 30.46 crore accounts (55% belonging to women) opened.
- **Stand-Up India Scheme:** 84% of loans under Rs. 10 lakh to Rs. 1 crore sanctioned to women entrepreneurs.
- **MUDRA Scheme:** 69% of microloans given to women-led enterprises.
- **Self-Help Groups under NRLM:** 10 crore (100 million) women connected to 9 million SHGs.

- **Bank Sakhis Model:** 6,094 women banking correspondents processed transactions worth \$40 million in 2020.

Employment and Entrepreneurship Initiatives

- **Mahila Coir Yojana** - It is an exclusive training programme aimed at the skill development of women artisans engaged in the coir industry.
- **Mahila Samridhhi Yojana** - It is a Micro Finance scheme for women with a rebate in interest.
- **Women Entrepreneurship Platform (WEP)** – It hosts information and services relevant to women entrepreneurs.
- **Stand-Up India (SUI)** – It facilitates financing SC/ST and/or Women Entrepreneurs through Small Industries Development Bank of India (SIDBI).
- 10% of funds in the Small Industries Development Bank of India reserved for women-led startups.
- **Women in Armed Forces** - Entry into NDA, combat roles, and Sainik Schools.
- **Civil Aviation** - India has over 15% women pilots, higher than the global average of 5%.
- **Working Women's Hostels (Sakhi Niwas)** - 523 hostels benefiting 26,306 women.

- **What are the Digital and Technological initiatives?**
- **Digital skills** - In the digital era, access to technology and digital literacy are crucial for women's socio-economic progress.
- The government has been proactive in ensuring women are part of the digital revolution through various initiatives.

Digital India Initiatives

- **PMGDISHA** (Prime Minister's Digital Saksharta Abhiyan): 60 million rural citizens trained in digital literacy.
- **Common Service Centres (CSCs):** 67,000 women entrepreneurs running digital service centers.
- **Ayushman Bharat Digital Mission (ABDM):** Bridging healthcare accessibility through digital solutions.
- **SANKALP Hubs** for Women Empowerment: Functioning in 742 districts across 35 States/UTs
- **Digital banking** and Aadhaar-linked services ensure financial security for women.
- **Government e-marketplaces** encourage female entrepreneurship and online businesses.

- **What are the initiatives for safety and protection?**
- **Ensuring women's safety** – It is a top priority for the Indian government.
- Several legislative measures, dedicated funds, and fast-track courts have been established to curb crimes against women and provide legal and institutional support.

Key Legal Frameworks

- **Criminal Law (Amendment) Act, 2018:** Enhanced penalties for crimes against women.
- **Protection of Women from Domestic Violence Act, 2005.**
- **Sexual Harassment of Women at Workplace Act, 2013.**
- **POCSO Act, 2012:** Strengthened laws against child abuse.
- **Ban on Triple Talaq (2019):** Criminalizing instant divorce practices.
- **Dowry Prohibition Act, 1961:** Penalizes dowry-related offenses.
- **Prohibition of Child Marriage Act, 2006:** Protects minors from forced marriages.

Nirbhaya Fund Projects (Rs. 11,298 crore allocated)

- **One Stop Centres (OSCs):** 802 centers functional, assisting over 1 million women.

- **Emergency Response Support System (ERSS - 112):** 38.34 crore calls handled.
- **Fast Track Special Courts (FTSCs):** 750 operational courts, 408 exclusively for POCSO cases.
- **Cyber Crime Helpline (1930)** and cyber forensic labs for digital safety.
- **Safe City Projects:** Implemented in 8 cities to enhance women's safety.
- 14,658 Women Help Desks in Police Stations, 13,743 headed by women.

Institutional and Legislative Reforms

- **Bharatiya Nyaya Sanhita (BNS), 2023:** Strengthens provisions for gender justice.
- Enhanced punishment for sexual offenses and trafficking.
- Witness protection and digital evidence admissibility improved.
- **Women's representation in CAPFs:** 33% reservation in select forces.
- **Nari Adalat:** Piloted in 50 Gram Panchayats each in Assam and J&K, now expanding.

What lied ahead?

- India has made remarkable progress in women's empowerment through comprehensive policies, targeted schemes, and legal frameworks.
- From economic participation to safety, digital inclusion to education, the government's initiatives have led to significant improvements in women's lives.
- On this International Women's Day, it is crucial to reaffirm the commitment to building an inclusive, gender-equal society where women play a central role in shaping the nation's future.
- Sustained efforts in policy-making, community engagement, and digital inclusion will ensure that women continue to drive India's growth story in the years to come.

1.4 India's AI Revolution

Why in News?

Recently, China's open-source AI model DeepSeek has created a shockwave in global tech and economic system.

- **What are the key developments in India's AI computing infrastructure?**
- **India's AI infrastructure** - India is rapidly building a strong AI computing and semiconductor infrastructure to support its growing digital economy.
- **India AI Mission** - IndiaAI Mission was launched in 2024, with Rs. 10,300 crore allocation over five years to strengthen AI capabilities.
- **High-end common computing facility** - Under the AI mission, this facility equipped with 18,693 Graphics Processing Units (GPUs), is developed
- It will be one of the most extensive AI compute infrastructures globally and is nearly nine times that of the open-source AI model DeepSeek and about two-thirds of what ChatGPT operates on.

Key Developments

- **Scaling AI Compute Infrastructure** - The initial phase of the mission has already made 10,000 GPUs available, with the remaining units to be added soon.
- **Opening Access to High-Performance Computing** - India has also pioneered the launch of an open GPU marketplace, making high-performance computing accessible to startups, researchers, and students.
- **Robust GPU Supply Chain** - The government has selected 10 companies to supply the GPUs, ensuring a robust and diversified supply chain.
- **Indigenous GPU Capabilities** - To further strengthen domestic capabilities, India aims to develop its own GPU within the next three to five years, reducing reliance on imported technology.

- **Affordable Compute Access** - A new common compute facility is planned to be launched, allowing researchers and startups to access GPU power at a highly subsidised rate of Rs. 100 per hour, compared to the global cost of \$2.5 to \$3 per hour.
- **Strengthening Semiconductor Manufacturing** - In parallel, India is advancing semiconductor manufacturing, with five semiconductor plants under construction.

How is open data advancing AI?

- **IndiaAI Datasets Platform** - The platform will enable Indian startups and researchers to access a unified repository of high-quality, anonymised datasets, reducing barriers to AI innovation.
- **Boosting AI Model Accuracy** - By providing large-scale, non-personal datasets, the initiative will help reduce biases and improve the reliability of AI applications across domains such as agriculture, weather forecasting, and traffic management.
- **Centres of Excellence** - The government has established three AI Centres of Excellence (CoE) in Healthcare, Agriculture, and Sustainable Cities in New Delhi.
- **Skilling for AI-Driven Industries** - Plans are in place for five National Centres of Excellence for Skilling, to equip youth with industry-relevant expertise.

What are India's indigenous AI Models and language technologies?

- **India's Foundational Large Language Models** - IndiaAI has launched an initiative to develop indigenous foundational AI models, including LLMs and Small Language Models (SLMs).
- **Digital India BHASHINI** - An AI-led language translation platform designed to enable easy access to the internet and digital services in Indian languages, including voice-based access.
- **BharatGen** - The world's first government-funded multimodal LLM initiative, BharatGen was launched in 2024 in Delhi to enhance public service delivery and citizen engagement.
- **Sarvam-1 AI Model** - It is a large language model optimised for Indian languages with 2 billion parameters and supports ten major Indian languages.
- It is designed for applications such as language translation, text summarisation, and content generation.
- **Chitrlekha** - An open-source video transcreation platform developed by AI4Bharat to generate and edit audio transcripts in various Indic languages.
- **Hanooman's Everest 1.0** - A multilingual AI system developed by SML, Everest 1.0 supports 35 Indian languages, with plans to expand to 90.

How does AI improve Digital Public Infrastructure (DPI)?

- **India's DPI** - It has redefined digital innovation by combining public funding with private sector-led innovation.
- Platforms like Aadhaar, UPI, and DigiLocker serve as the foundation, while private entities build application-specific solutions on top of them.
- **Integrating AI and DPI** - DPI model is now being enhanced with AI, integrating intelligent solutions into financial and governance platforms.
- **Applications** - For Mahakumbh 2025, AI-driven DPI solutions played a crucial role in managing the world's largest human gathering.
 - **Railway crowd management** - AI-powered tools monitored real-time railway passenger movement to optimise crowd dispersal in Prayagraj.
 - **Kumbh Sah'AI'yak** - It is aBhashini-powered Kumbh chatbot enabled voice-based lost-and-found services, real-time translation, and multilingual assistance.

What is the status of AI Talent & Workforce Development?

- **Development of Global Capability Center** - India is adding one GCC every week, reinforcing its status as a preferred destination for global R&D and technological development.
- **National Education Policy (NEP) 2020** - University curriculum is revamped to include AI, 5G, and semiconductor design, aligning with the National Education Policy (NEP) 2020.

- **AI Education** - Under the IndiaAI Future Skills initiative, AI education is being expanded across undergraduate, postgraduate, and Ph.D. programs.
- **AI Talent Pipeline** - To enhance accessibility, Data and AI Labs are being established in Tier 2 and Tier 3 cities, with a model IndiaAI Data Lab already set up at NIELIT Delhi.
- **India AI developers** - India has emerged as the fastest-growing developer population globally and is home to 16% of the world's AI talent.
- **AI Talent Hubs** - The AI-skilled workforce has seen a 14-fold increase from 2016 to 2023, making India one of the top five fastest-growing AI talent hubs, alongside Singapore, Finland, Ireland, and Canada.

According to the **Stanford AI Index 2024**, India ranks first globally in AI skill penetration with a score of 2.8, ahead of the US (2.2) and Germany (1.9).

India ranks second in public generative AI projects on **GitHub**.

What is the status of India's AI adoption and industry growth?

- **India's AI Growth** - The India Skills Report 2024 by Wheebox forecasts that India's AI industry will reach USD 28.8 billion by 2025, with a CAGR of 45%.
- **Businesses Prioritising AI Investments** - 80% of Indian companies consider AI a core strategic priority, surpassing the global average of 75%.
- **GenAI Startup Funding** - According to NASSCOM report, Indian GenAI startup funding surged over six times quarter-on-quarter, reaching USD 51 million in Q2FY2025.
- **AI Transforming Workplaces** - Seven in 10 Indian employees used AI at work in 2024, up from five in 10 a year earlier, showcasing AI's rapid integration into workplaces.
- **AI Empowering Small & Medium Businesses (SMBs)** - AI-driven technologies, such as autonomous agents, are helping SMBs scale efficiently, personalise customer experiences, and optimise operations.
- **Rapid Expansion of India's AI Economy** - As per the BCG-NASSCOM Report 2024, India's AI market is projected to grow at a CAGR of 25-35%, reinforcing its potential for innovation and job creation.
- While AI automates routine tasks, it is simultaneously generating new opportunities in data science, machine learning, and AI-driven applications.
- **AI Startup Support Ecosystem** - India hosts 520+ tech incubators and accelerators, ranking third globally in active programs.

According to Salesforce, 78% of Indian SMBs using AI reported revenue growth, while 93% stated AI has contributed to increased revenues.

How India is regulating AI?

- **Pragmatic AI Regulation** – India balances innovation and accountability by steering clear of overregulation that could stifle growth and unchecked market-driven governance that may create monopolies.
- **AI-driven safeguards** - Instead of relying solely on legislation, India is investing top universities and IITs to develop solutions for deep fakes, privacy risks, and cybersecurity threats.
- **Techno-legal approach** – It ensures AI remains a force for inclusive growth, fostering an ecosystem where innovation thrives while ethical concerns are proactively addressed.

India AI Regulation Frameworks

- **National Strategy for Artificial Intelligence 2018** -It aims to establish a strong basis for future regulation of AI in India.
- **Principles for Responsible AI 2021** – It serves as India's roadmap for the creation of an ethical, responsible AI ecosystem across sectors.
- **Operationalizing Principles for Responsible AI 2021** – It emphasizes the need for regulatory and policy interventions, capacity building and incentivizing ethics by design with regards to AI.
- **Digital Personal Data Protection Act 2023** – It regulates the processing of personal data of Indians.
- **Draft Digital India Bill 2023** - It aims to replace India's existing Information Technology Act of 2000 and provide comprehensive oversight of the digital landscape.
- **Draft AI Indian Standard** – The Bureau of Indian Standards (BIS) has a committee on AI that is proposing draft Indian Standards equivalent to ISO Standards.

What lies ahead?

- India's rapid advancements in artificial intelligence, underpinned by strategic government initiatives, have positioned the country as a global AI powerhouse.
- By expanding AI compute infrastructure, fostering indigenous AI models, enhancing digital public infrastructure, and investing in talent development, India is creating an inclusive and innovation-driven ecosystem.
- Emphasis on open data, affordable access to high-performance computing, and AI-driven solutions tailored to local needs ensures that the benefits of AI reach businesses, researchers, and citizens alike.
- As AI adoption accelerates across industries, India's proactive approach is not only strengthening its digital economy but also paving the way for self-reliance in critical technologies.
- With a clear vision for the future, India is set to become a leader in AI innovation, shaping the global AI landscape in the years to come.

1.5 JAN VISHWAS BILL 2.0

Why is in News?

In response to the India Business Corruption Survey, 2024 showing 66% of businesses paying bribes, Budget 2025 unveiled Jan Vishwas 2.0, designed to alleviate regulatory compliance challenges."

What is Jan Vishwas 2.0?

- **Aim** – To further decriminalize around 100 provisions in various laws to enhance the *ease of doing business* in India.
- It builds upon the *Jan Vishwas (Amendment of Provisions) Act, 2023*, which had already decriminalized **180 provisions** across **42 laws**.

India Business Corruption Survey, 2024

- The India Business Corruption Survey 2024 is a comprehensive study assessing the prevalence and impact of corruption on businesses across India.
- Conducted by the online platform LocalCircles.
- The survey provides critical insights into bribery, red-tapism and compliance challenges faced by businesses.
- **Key Findings of the Survey:**
 - *66% of businesses admitted to paying bribes*, highlighting the systemic nature of corruption.
 - *54% stated they were coerced into bribery* to expedite government approvals, secure permits, or meet compliance requirements.
 - The worst-affected sectors include labour, GST, income tax, pollution control, provident funds, property registration, drug, and health departments.
 - A majority of respondents view corruption as a major deterrent to foreign direct investment (FDI).

What is the need for the bill?

- **Decriminalize more provisions** – While Jan Vishwas Act 2023 decriminalized 180 provisions with imprisonment clauses, Jan Vishwas 2.0 aims to decriminalize approximately 100 more provisions.
- However, over 20,000 provisions with imprisonment clauses still remain untouched.
- **Trust-Based Governance** – The initiative reflects a move towards "trust-based governance," where the emphasis is on *fostering a system of compliance through trust rather than fear of punishment*.
- It is designed to reduce the regulatory burden on businesses.
- **Reduce corruption and bribery** – The document cites that 66% of businesses admit to paying bribes, with 54% being coerced to do so to navigate government processes.
- The bill aims *to reduce opportunities for corrupt practices*.
- **Simplify regulatory compliance** – Indian businesses face *extremely complex compliance challenges* with 9,420 compliance updates in the past year alone (about 36 daily changes).

- This creates inefficiency and opportunities for corruption.
- **To increase foreign investment** – The document mentions that 4 out of 5 respondents in an EY-FICCI survey believe corruption deters foreign direct investment (FDI).
- Improving compliance frameworks would make India more attractive for global investors.
- **Maintain economic competitiveness** – The document warns that India risks losing investment and talent to countries with more business-friendly environments, like the United States, which is advancing its own governance reforms.

What are the Key Features of Jan Vishwas 2.0?

- **Sectors covered** – Taxation laws (GST, Income Tax), Labour laws, Company and corporate laws, Environmental compliance laws, Intellectual Property laws (Copyright, Trademark, Patents and Geographical Indications).
- **High-Level Committee for Regulatory Reforms** – A dedicated High-Level Committee will be set up to review non-financial sector regulations.
- The committee's key responsibilities include:
 - Identify laws that create compliance burdens.
 - Recommend further decriminalization.
 - Suggest measures to enhance ease of doing business.
 - Compliance Simplification & Predictability
- The government recognizes that frequent compliance updates create confusion and foster corruption.
- Inspired by **FSSAI's new regulation** (which allows only one update per year for food label changes), a predictable regulatory framework will be introduced for other business sectors.
- **One Nation, One Business Identity** – Jan Vishwas 2.0 proposes a 'One Nation, One Business' Identity System, which will:
 - Unify all business IDs into a single digital identifier.
 - Reduce paperwork, duplications, and bureaucratic delays.
 - Improve regulatory transparency and reduce corruption.
- As India has 23 different business identifiers, it can help to navigate them.
- The 23 different business identifiers include:
 - Permanent Account Number (PAN)
 - Goods and Services Tax Identification Number (GSTIN)
 - Corporate Identification Number (CIN)
 - Professional tax numbers, Factory licenses, etc.
- **Digital-First Approach to Compliance** – Establishing a factory in India requires submitting hundreds of self-attested and notarised documents across more than 40 government departments.
- This process needs to be transformed as this this archaic system breeds corruption and inefficiency.
- Proposal to introduce 'Digi Locker' for Businesses, a tamper-proof, authenticated repository that could result in:
 - All compliance-related documents to be stored digitally.
 - Government agencies to verify records instantly without requiring notarized hard copies.
 - Entrepreneurs have no longer need to submit hundreds of self-attested documents.
 - Approval timelines for business licenses, factory setups, and permits could be cut from months to days.

What are its impacts?

- Boost India's Ease of Doing Business Ranking.
- Reduce Corruption & Bureaucratic Delays.
- Encourage Domestic & Foreign Investments.

- Empowering Indian entrepreneurs to "innovate, expand, and create jobs without fear or unnecessary regulatory friction."
- Helps India remain competitive in the global race for investment and entrepreneurial talent.

What are its Challenges?

- **Limited scope** – While Jan Vishwas 2.0 aims to decriminalize around 100 provisions, the document points out that over 20,000 provisions with imprisonment clauses would still remain untouched.
- This suggests the bill may be insufficient in scale.
- **Slow implementation** – The government initiated compliance reforms two years ago, but progress has been "sluggish."
- This raises concerns about timely implementation of Jan Vishwas 2.0.
- **Systemic corruption** – Deep-rooted corruption issues that may not be fully addressed by decriminalization alone.
- Officials "often wield compliance provisions as tools to extract bribes" and "unofficial payments are still required" even when compliances are met.
- **Regulatory chaos** – With 9,420 compliance updates in the past year (36 daily changes), there's concern that decriminalizing some provisions won't solve the fundamental issue of excessive and frequently changing regulations.
- **Competing reforms globally** – Other countries like the US are making their business environments more efficient, creating pressure for India's reforms to be sufficiently bold and comprehensive to remain competitive.
- **State-level implementation challenges** – Labour codes remain in limbo awaiting implementation, suggesting potential challenges in execution across Union and state levels.
- **Clarity and Transparency** – Ambiguity in certain provisions could lead to arbitrary interpretations by officials, potentially recreating the problems the bill aims to solve.
- **Impact on Worker Rights** – Concerns exist that decriminalizing labor law violations could weaken worker protections, potentially leading to exploitation.
- Careful consideration is needed to ensure that worker rights are not compromised.
- **Less Focus on the informal Sector** – The bill primarily targets the formal sector, leaving the vast informal sector largely untouched.
- This raises concerns about equitable treatment and the potential for increased disparities.

What lies ahead?

- The India Business Corruption Survey 2024 shows that bribery is a big problem.
- Jan Vishwas 2.0 aims to fix this by simplifying laws and reducing red tape.
- However, more steps are needed for real change that include:
 - It can implement a comprehensive decriminalization of the more than 20,000 remaining imprisonment clauses beyond Jan Vishwas 2.0.
 - It can create a unified "One Nation, One Business" identity system to replace the current 23+ separate identifiers.
 - Adopting a digital-first approach with a secure "digi locker" system for document verification.
 - It can establish predictable regulatory changes by limiting updates to once per year across all bodies.
 - It can operationalize the four modern labor codes that remain in limbo.
 - It can reduce subjective power of inspectors who currently operate without accountability.
 - Allocating the budget for digital integration of business compliance systems.

1.6 Role of Parliament in Budgetary Process

Why in News?

The 2025 Union budget of India was presented by Finance Minister Nirmala Sitharaman on 1 February 2025 for the financial year 2025-2026.

What is the role of Parliament in budgetary process?

- **Budget** – The budget is the annual financial statement of the estimated receipts and expenditure of the Government of India in a financial year, which begins on 1 April and ends on 31 March of the following year.
- **Significance of budget** - It is more than just a financial statement, as it reflects a nation's priorities, economic vision and governance philosophy.
- **Role of Parliament** - The Parliament plays a vital role in India's budgetary process, ensuring transparency, accountability, and democratic control over public finances.

Article 112 - The President shall in respect of every financial year cause to be laid before both the Houses of Parliament a statement of the estimated receipts and expenditure of the Government of India for that year.

Stages of Discussion on the Budget	
In Lok Sabha	In Rajya Sabha
(i) General Discussion on the Budget	(i) General Discussion on the Budget
(ii) Vote on Account	(ii) Consideration of Demands for Grants by the Departmentally-Related Standing Committees
(iii) Consideration of Demands for Grants by the Departmentally-Related Standing Committees	(iii) Discussion on the working of the Ministries
(iv) Discussion and Voting on Demands for Grants	(iv) Consideration and return of the Appropriation Bill to the Lok Sabha
(v) Consideration and passing of the Appropriation Bill	(v) Consideration and return of the Finance Bill to the Lok Sabha
(vi) Consideration and passing of the Finance Bill	

- **Presentation of the budget** - The Union Budget is prepared by the Ministry of Finance and presented by the finance minister in Parliament.
- **General discussion** - After the budget presentation, a general discussion takes place in both houses of Parliament (Lok Sabha and Rajya Sabha), where members debate the overall budgetary policies, priorities, and allocations.
 - No voting occurs at this stage.
- **Departmental committees** - Detailed scrutiny of the budget is done by the Departmentally Related Standing Committees.
- These committees examine the demands for grants of various ministries & present their reports to the Lok Sabha.

There are **24 standing committees** to secure more accountability of the Executive (i.e., the Council of Ministers) to the Parliament, particularly financial accountability. Each standing committee consists of 31 members (21 from Lok Sabha and 10 from Rajya Sabha). A minister is not eligible to be nominated as a member of any of the standing committees.

- **Voting on demands for grants** - The Lok Sabha takes up voting on demands for grants ministry-wise.
- During this stage, members can discuss and seek explanations on specific demands, but only the Lok Sabha has the power to approve or reject them.
- **Passing cut motions** - Loksabha can move various cut motions (Policy cut motion, Economy cut motion, Token cut motion) to reduce/decline any demand for grant.
- **Appropriation bill** - After the demands are approved, the Appropriation Bill is introduced.
- This bill authorizes the government to withdraw funds from the Consolidated Fund of India to meet its expenditures.
- **Finance bill** – It includes tax proposals and revenue-raising measures, is introduced and debated.
- Once passed, it becomes the Finance Act, providing the legal framework for the government to collect revenue.
- **Rajya Sabha's role** - While the Rajya Sabha does not have the power to vote on the budget, it can discuss the budget and suggest changes.
- **Implementation and oversight** - Once the budget is enacted, the Parliament monitors its implementation through committees like the Public Accounts Committee (PAC) and the Estimates Committee.

Public Accounts Committee (PAC)

- **Composition** - The committee consists of 22 members (15 from the Lok Sabha and 7 from the Rajya Sabha).
- **Method of election** - The members are elected by the Parliament every year from amongst its members according to the principle of proportional representation by means of the single transferable vote.
- Thus, all parties get due representation in it.
- **Term** - The term of office of the members is one year.
- A minister cannot be elected as a member of the committee.
- **Function** – To examine the annual audit reports of the Comptroller and Auditor General of India (CAG), which are laid before the Parliament by the President.
- Examine the appropriation accounts and the finance accounts of the Union government and any other accounts laid before the Lok Sabha.

Estimates Committee

- **Composition** – It consists of 30 members all from Lok Sabha.
- Method of election is same as PAC but only within Lok Sabha.
- **Function** - To examine the estimates included in the budget and suggest 'economies' in public expenditure.

What are the challenges in parliamentary control over budget?

- **Dominance of executive** – Budget preparation process is executive-driven process leaving limited scope for the parliament in the preparation process.
- **Inadequate discussions** - Budget debates are brief and lack depth, leading to ineffective scrutiny.
- **Limited power of Parliament** - Parliamentarians have no power to amend or significantly influence budget proposals.
- This results in a passive approval process, reducing accountability.
- **Limited role of Rajya Sabha** - Rajya Sabha, despite its democratic credentials, has no substantive role in Budget discussions.
- While a finance minister can be a Rajya Sabha member, they lack the ability to vote on their (own) Budget proposals in the Lok Sabha.
- **Lack of institutional mechanism** - India lacks an institutional mechanism that provides legislators with independent and non-partisan Budget analysis.
- **Single party domination in Lok Sabha** – When a single party enjoys the absolute majority in the Lok Sabha, it often limits meaningful debate and scrutiny of budgetary proposals.
- **Weak opposition** – The ruling party can push its agenda through with minimal resistance, potentially undermining the role of opposition parties in questioning or amending budgetary provisions.
- **Limited time for budget review** - The parliamentary schedule often allows limited time for MPs to thoroughly review and debate the budget.
- This hinders detailed scrutiny of demands for grants and proposals.

Parliamentary budget office of other countries: United States -The Congressional Budget Office (CBO), Canada -The Office of the Parliamentary Budget Officer, United Kingdom- The Office for Budget Responsibility (OBR)

What are the significances of pre-Budget discussions?

- **Democratization of budget process** - Pre-Budget debates allows elected representatives to voice public concerns, suggest equitable resource allocation, and engage in policy deliberations.
- **Participatory process** – Pre-budget discussions would facilitate greater public involvement, fostering transparency and trust in financial governance.
- **Efficient and effective budget** - A dedicated five to seven-day discussion period would allow legislators to assess the nation's fiscal health, outline Budget priorities, and present a broad economic framework for the government's consideration.

- **Better coordination** – Pre-budget discussions would also encourage better coordination among subject committees, enhancing their ability to provide informed input.
- **Concern** - Some economists argue that empowering legislatures may lead to populist spending and weakened financial prudence.
- A balanced approach, where the executive retains financial discretion but remains answerable to Parliament, is the hallmark of a healthy democracy.

What are the significances of Parliamentary Budget Office (PBO)?

- **Improves parliamentary capability** - A crucial aspect of Budget reform is in strengthening Parliament's analytical and research capabilities.
- **Expertise process** - Establishing a Parliamentary Budget Office (PBO) would bridge the expertise gap as there would be data-driven insights and expert economic forecasts.
- **Streamlined process** - Modelled on institutions such as the U.S. Congressional Budget Office and similar bodies in Australia, Canada and the United Kingdom, a well-structured PBO in India would play a vital role in analysing government spending, revenue projections, and fiscal policies.
- **Comprehensive economic analysis** - PBO would conduct independent economic forecasts, assess the fiscal impact of proposed policies, and evaluate medium-term and long-term budgetary trends.
- **Empowers parliamentarians** - PBO would offer policy briefs to parliamentarians, enhancing informed decision-making.
- **Complements executive process** - Rather than encroaching upon the executive's role, it would complement it by ensuring legislative scrutiny is backed by objective research.
- **Better parliamentary accountability** - Such an institution would significantly enhance Parliament's capacity to hold the government accountable and foster evidence-based policy discussions.

A Parliamentary Budget Office (PBO) is an independent and impartial body linked directly to Parliament, providing technical and objective analysis of budgets and public finance to support parliamentarians in their oversight role.

What lies ahead?

- By integrating pre-Budget discussions and establishing a PBO, Parliament can transition from being a passive recipient of financial proposals to an active budget-influencing institution.
- A robust parliamentary engagement in budgeting would ultimately lead to more equitable economic policies, greater transparency, and a financial governance framework that genuinely serves the people's interests.

1.7 Regulation of Digital Giants in India

Why in news?

A recent order by the Competition Commission of India (CCI) against Meta platforms reinforces the needs and challenges associated in regulating digital giants.

Why data regulation is important?

- **Digitised economy** – In the 21st century, the economy has become digital and *data is the new oil*.
- **Virtually limitless utility** – Unlike oil, data has virtually limitless utility as it can be *collected, analyzed and reused indefinitely*.
- **Dominance in digital markets** – Data plays a foundational role in creating and sustaining dominance due to its unique characteristics and the competitive advantages it provides.
 - Data is both the source and the enabler of dominance in digital markets.
- **Influences consumer behaviour** – Data is used to refine algorithms, offer *hyper-targeted advertising, and create personalized user experiences*, thereby locking consumers into their ecosystems.
 - **For example**, platforms like Meta leverage vast data pools from billions of users for influencing consumers.

The Economic Survey 2024–25 highlighted India's rapid digital transformation, and role of artificial intelligence (AI) in shaping the nation's economic landscape.

- **Data–Driven network effects** – More users generate more data while using platforms, thus enhancing the platform’s value and deterring competitors.

What are the various orders of CCI for regulating digital giants?

Competition Commission of India (CCI)

- It is the *chief national competition regulator* in India.
- **Historical background** – *Based on the Raghavan Committee recommendations* the Monopolies and Restrictive Trade Practices Act, 1969 (MRTP Act) was repealed and replaced by the Competition Act, 2002.
- **Established in** – 2003, by Ministry of Corporate Affairs
- **Aim** – To establish a competitive environment in the Indian economy by engaging with all stakeholders, the government, and international jurisdiction
- **Composition** – Chairperson and *not more than 6 Members*.
- All appointments are made by the Central Government.
- **Appellate mechanism** – Competition Appellate Tribunal was established in 2009 to hear and decide appeals against the orders of the CCI.
- It was *replaced with the National Company Law Appellate Tribunal (NCLAT)* in 2017.

- **Issues with Meta** – It found the *privacy policy update* of Meta’s subsidiary, WhatsApp, in 2021 was an abuse of dominant position.
- It *forced users to accept a data-sharing agreement* on a “take-it-or-leave-it” basis and thereby it gained *access to user data across its platforms*, including Facebook and Instagram.
- **Orders against Meta** – CCI issued a landmark order imposing a *fine of ₹213.14 crore* and *forcing several behavioural remedies*.
- It also includes a 5-year ban on sharing user data collected on WhatsApp with other Meta companies such as Facebook and Instagram, for advertising purposes.
 - But NCLAT granted a stay on the 5-year ban and the penalty, subject to Meta depositing 50% of the total penalty.
- **Issues with Google** – It was accused for abusing its dominant position across several markets including
 - Licensable operating systems for smart mobile devices
 - App stores for Android devices
 - Non-OS-specific mobile web browsers
 - Online video hosting platforms
 - General web search services in India.
- It was found to have abused its dominant position by *mandating the pre-installation of its apps on Android devices*.
- **Orders against Google** – In 2022, it was fined ₹1,337.76 crore.
- The penalty imposed on Google was *upheld by NCLAT in 2023*.

Meta Platforms, formerly Facebook, is a tech conglomerate that owns Facebook, Instagram, WhatsApp, and other services.

What are the challenges in regulating digital giants in India?

- **Lack of provision against monopoly** – India’s competition law, namely, the Competition Act, 2002, currently lacks explicit provisions to address data-centric monopolies.
- **Negligent focus on data-based dominance** – While *traditional frameworks focus on price-based dominance*, digital markets often witness dominance arising from data aggregation.
- **Lack of inter-agency coordination** – Absence of explicit coordination mechanisms *between the CCI and the Data Protection Board of India* limits the effectiveness of addressing overlapping concerns.

What are the regulations taken on digital giants globally?

- **U.S. Antitrust litigation** – Meta is accused of creating barriers for competitors by acquiring Instagram and WhatsApp platforms, reducing competition.

- Google was found guilty *for violating the Sherman Act* due to exclusive agreements in search and advertising markets.
- **Australia's regulations** – Measures were taken to address the dominance of digital platforms like Meta and Google.
- **Facebook–Germany Case** – Meta is accused for combining user data from different sources without explicit consent thereby violating EU competition law & GDPR.
- **European Union (EU) regulations** – Meta is currently under scrutiny in the EU for its ad supported subscription model.
- Google has already been fined over 8 billion Euro in the EU for anti-competitive practices across 3 major cases.

Sherman Act (1890) is the 1st federal law to prohibit monopolistic business practices and antitrust practices in the U.S.

How India can regulate digital giants?

- The parallels between the global regulatory actions against Meta and Google emphasise the importance of addressing data exploitation, vertical integration, and anti-competitive practices through a multidisciplinary approach.
- **Passing of Digital Competition Bill** – While India had proposed a draft bill in 2024, it is still under deliberations on certain provisions like ex-ante provisions.
- It is aimed to prevent anti-competitive practices by tech giants like Google, Facebook, and Amazon.
- **Making amendments to the Competition Act** – It can introduce “data monopolization” as a parameter for assessing market dominance.
- **Incorporating global best practices** – It can address the concerns, such as mandating interoperability and data-sharing agreements or separation of integrated services.
- **Harmonising various regulations** – Steps can be taken to increase coordination mechanisms between the CCI and the Data Protection Board of India.
- India could draw inspiration from the EU’s integration of competition law with the Digital Markets Act (DMA) and GDPR.
- This could create frameworks that tackle data exploitation and anti-competitive practices comprehensively.
- **Making regulatory frameworks dynamic** – It can anticipate emerging challenges posed by rapidly advancing technologies and the ever-expanding influence of tech giants.

Ex-ante provisions refer to future events that are based on forecasted predictions rather than concrete results.

G.S PAPER I

2. HISTORY

2.1 Devadasi System in Mysore

Why in news?

Recently, historian Janaki Nair's talk at the Bangalore International Centre outlined the rise of Devadasi system in Mysore and its abolition by the early 20th century.

How did the Devadasi system originate and evolve over time?

- Devadasis are also called as or “**dancing girls**”.
- **Origin** – It traces its origins to the close of 8th century.
- **Historical reference** – According to an inscription dated 800 AD, a virgin girl, 8 mattars of land, 1,000 cows and a swing was dedicated for the deity, to a local temple in Mayile village.
- Other records also indicate the presence of devadasis in Jain, Shaivite and Vaishnavite temples across the region.
- **Royal patronage** – It flourished in Mysore province under the patronage of Wadiyars.

- **Established system** – By end of 10th century, young girls dedicated to temples were made to perform different services like
 - Dancing, singing, drum beating, carrying sacred aaratis and participating in temple processions.
- **Training to dedicated girls** – They underwent rigorous training in *nritya (dance) and geeta (vocal music)*.
 - Krishnaraja Wadiyar III employed Chinnayya Pillai of the Thanjavur Quartet to train the dancers.
- **Maintenance of devadasis** – Portions of land or significant sums of money were set apart for the women and their expenses.
 - One epigraph mentions about a grant of money for various items including '*looking glass of the dancing girls*' and "the grant was to continue as long as sun and moon exist."

Chola-era Rajarajesvara Temple in Thanjavur in Tamil Nadu records the names of the 400 devadasis of the temple and their remuneration in the form land grants.

Thanjavur Quartet were 4 brothers Chinnayya, Ponnayya, Sivananda, and Vadivelu, who lived during the early 19th century and contributed to the development of Bharatanatyam and Carnatic music.

What were the social status of devadasis?

- **Wider presence** – During the reign of Wadiyars, Devadasis resided and performed in temples *in cities and towns* including Mysore, Bangalore, Mulbagal, Kadoor, T. Narsipur and so on.
- **Social support** – Upon from royal patronage, they were also supported by merchants, landlords and art connoisseurs.
- **New social class** – They had their *own laws of inheritance, rules* of etiquettes and even panchayats.
 - Girls belonged to *various castes* such as Kurubas, Bedas, Gangadikara Vokkaligas, Telugu Banajigas and Lingayats.
- **Matrilinial tradition** – The Devadasi system allowed the adoption of girls through females.
- They followed **a matrilineal inheritance system** (property passed through women).
- **Stature in weddings** – During several weddings, apart from the groom, the devadasi (considered *nitya sumangalis* and hence auspicious) *tied a second tali around the bride's neck*.
- Many of the Devadasis rose in prominence and enjoyed significant wealth and social standing.

Reasons for Social Importance of Devadasis

- **Expertise in fine arts** – Music, dance and literature.
- **Learning and catholicity** – They had greater exposure than the ordinary women in society.
- **Acceptance of polygamy** – A dancing girl who was not very rigid about having contact with a single man only was not looked down upon.
- **Higher economic status** – They owned land and received grants, securing financial independence and influence.
- Grants given to Devadasis reached a peak in the 12th century.
- **Permanent position** – Their posts were permanent and hereditary and upon the death, all temple activities were halted and ensured dignified burial.

What led to the decline of the Devadasi system?

- The Devadasis started seeing a decline in their social status by *around the 18th century*.
- **Factors for decline** – *Exploitation of women within* the system became more rampant.
- **Influence of Western morality** – It enlightened the larger conscience of the Indian society and equated the system to prostitution thereby protesting against it.
- **Anti-nautch movement** – It became prominent during 19th and 20th century that aimed to abolish the practice of dedicating girls to the system gained significant momentum.
- **Sanitizing the sadir** – A process where women of the dominant castes learn and perform dance in *more secular kinds of locations*.

Sadir or Dasiyattam, the dance form performed by Devadasis was erotic in nature.

- **Administrative changes** – Muzrai Commissioner A. Srinivasacharlu played a major role in abolition in Mysuru.
 - *The **Muzrai Department** manages matters related to religious and charitable institutions in Mysore province.*
- By 1898, he announced that no new Devadasis would be appointed after their predecessors passed away.
- He discontinued the appointment of Devadasis in Muzrai temples across Mysore, Kadur, Tumkur, Kolar, and other regions.
- **Progressive reforms**
 - **Infant Marriage Regulation (1894)** – Banned marriages for girls below 8 years and limited the age gap to 30 years.
 - **Hindu Women's Property Rights (1933)** – Granted Hindu women rights to inherit property.
- **Abolition** – Mysore became one of the 1st regions in India to abolish the Devadasi system in 1908-09 much earlier than Madras Devadasi Abolition Act in 1947.

3. GEOGRAPHY

3.1 Local Climate Projection and Effective Climate Policy

Why in News?

Recently, the School of Climate Change and Sustainability at Azim Premji University) has started creating district-level climate projections for every region in India.

What are the significances of local level climate projections?

- **Climatic diversity of India** - From the snow-capped Himalayas to the drought-prone Deccan Plateau, from the floodplains of the Ganga to the cyclone-ravaged coasts of Odisha, no two districts experience climate change in the same way
- **Better disaster preparedness** - If local governments had seamless access to granular, district-level climate projections, they could better prepare for the future.
- **Monsoon vagaries** - Every monsoon season brings uncertainty in terms of floods in some states or droughts in others.
- **Decision making** - Without granular data, decision-making is like navigating a storm with a broken compass.
- Farmers struggle to make planting decisions, urban planners lack reliable data to develop long-term strategies for extreme weather.
- **Proactive resilience-building** - District-level climate projections facilitates the shifting from reactive disaster management to proactive resilience-building.
- **Climate data democracy** - To ensure that every community, regardless of its resources, has equal access to scientific climate insights that affect their future.
- Climate data democratisation is essential for effective climate action for a resilient future.

What are the challenges in transferring climate science into policy?

- **Limited access to data** - A major reason for this disconnect is the limited access to accurate climate data in a usable form.
- **Complex data** - Processing complex climate data into easily usable form at a high level of granularity is difficult and hence there is a general hurdle for the policymakers to interpret the projections and apply them effectively.
- **Inadequate capacity** - Even when climate data is available, local officials may not know how to use it due to a lack of training.
- **Inadequate tools** - Without the right tools and insights, even the best climate projections fail to inform decision-making.
- **Low awareness** - Many policymakers still see climate change as a distant problem, not an urgent one.
- As a result, short-term political and economic priorities overshadow long-term planning.

- **Lack of coordination** - Government departments often work in isolation, making it hard to use climate data in decision-making.
- Urban planners rarely consult climate scientists, leading to infrastructure projects that ignore future risks.
- Bridging this gap is essential to transforming scientific knowledge into actionable, impactful policies.

How to bridge the gap between Climate Science and Climate Policy?

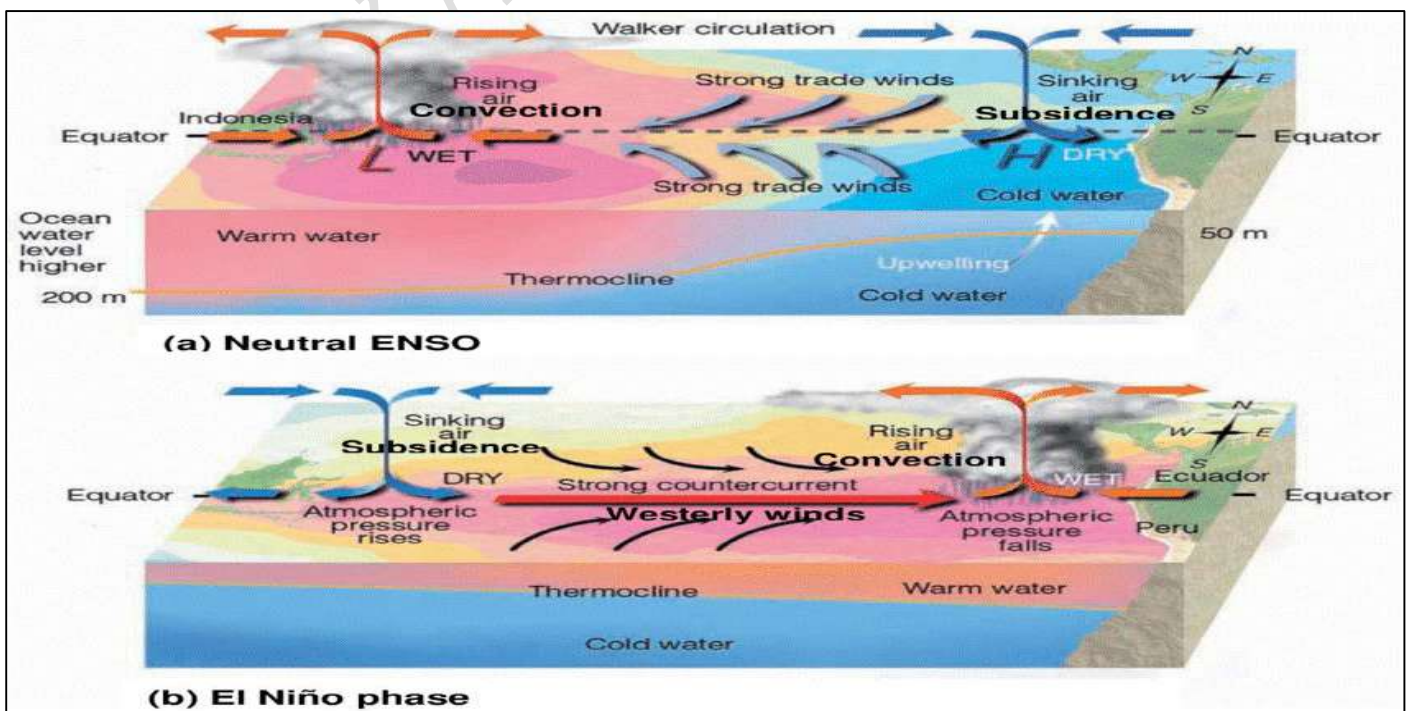
- Science alone is insufficient unless it is effectively applied to benefit society, including the fight against climate change.
- If climate projection data is not effectively utilised, climate modelling efforts become meaningless and fail to benefit society.
- **Four levers of change** - The government and policymakers, the journalists and media houses, teachers and students, and the activists and the civil society organisations to collaborate to make science effective in benefitting society.
- **Data access** - Making district-level climate data accessible to journalists, educators, and community leaders can help people understand the real impact and push for change.
- **Local climate assessment** - Climate risk assessments can be conducted at every district using localized projections, allowing state governments to incorporate climate adaptation into their annual budgets.
- **Capacity building** - Workshops, training programs, and climate fellowships can be designed to equip officials with the ability to interpret and apply climate data effectively.
- **Public-Private Partnerships** - Strengthening public-private partnerships is another crucial component of building climate resilience.
- The private sector—particularly insurance companies, real estate developers, and agribusinesses—has a vested interest in understanding climate risks, as these projections can help them de-risk investments and build long-term resilience.
- Governments can facilitate collaboration with these industries, encouraging investments in climate adaptation measures that benefit both businesses and communities.

3.2 Challenges in ENSO/Monsoon Forecast

Why in News?

The evolution of sea surface temperature (SST) patterns in the tropical Pacific Ocean from 2024 has raised concerns in predicting global weather.

What is El Niño-Southern Oscillation?



- **El Nino-Southern Oscillation (ENSO)** – ENSO is an ocean -atmospheric phenomena characterized by fluctuating temperatures in the central and eastern equatorial Pacific Ocean.
- **El Nino** – It is the **warm phase** of ENSO in the *central and eastern Pacific* with weak trade winds.
- **La Nina** – It is the **cool phase** of ENSO in the *eastern Pacific*, strengthening trade winds.
- **Indian Ocean Dipole (IOD)** – It is a climate pattern characterized by alternating warm and cold sea surface temperatures in the western and eastern Indian Ocean, impacting rainfall patterns and monsoon intensity.
- It can influence Indian monsoon, where a positive IOD can counteract the negative effects of El Nino.
- **ENSO Transition Mode (ETM)** – It is a climate mode that modulates the seasonal transition of El Niño-Southern Oscillation (ENSO) from boreal winter to summer, particularly in the Southern Hemisphere.

Effect of ENSO on India's Monsoon

- **La Nina** - Cold SSTs in the eastern/central Pacific strengthen easterly trade winds, boosting the monsoon (June-September). This often means more rain for India good for farmers.
- **El Nino** - Warm SSTs weaken the monsoon winds, often leading to less rain or drought.
- **Neutral** - When neither La Nina nor El Nino dominates, the monsoon can be average, but other factors (like the Indian Ocean) play a bigger role.

What are the challenges in predicting ENSO and Monsoon?

- **Inconsistency** - only 60% of deficit and surplus years have historically been accounted for by El Niño and La Niña events.
- **SST anomalies** – Traditionally, La Nina is marked by cold SST in the eastern Pacific, while El Nino features warm SST in eastern and central Pacific.
 - Anomaly - However, in 2024 the year predicted for La nina, the cold SST anomalies began shifting **westward**, with warm SST anomalies in the far east by early summer 2024.
- This unusual distribution contrasts with historical ENSO patterns, making predictions unreliable.
- **Wind pattern anomalies** – ENSO states are also driven by wind patterns, particularly the strength and direction of trade winds.
 - Anomaly - Strong easterly anomalies blew in the central-western tropical Pacific even as there were westerly anomalies in the far eastern tropical Pacific.
- **Dateline El Nino (Central Pacific El Nino)** – It is a type of El Niño event characterized by the strongest sea surface temperature warming in the central equatorial Pacific, near the International Dateline.
- In the last few decades, the reverse pattern – with warm SST anomalies around the dateline and cold SST anomalies around the Galapagos – has been more common and affecting ENSO cycle.
- **El Niño “flavours”** – El Niño events are categorized into "flavors" based on the location of the strongest sea surface warming in the tropical Pacific Ocean, with the two main types being Eastern Pacific (EP) and Central Pacific (CP) or Modoki El Niño.
- These flavours also affect the development of usual ENSO cycle.
- **Failed La Nina Transition** – ENSO cycle usually transitions among El Nino – Neutral – La Nina phases.
 - Sometimes, these transitions failed to make effect.
 - Forecasts in early 2024 projected a strong La Nina to emerge by mid-year.
 - The ETM-induced wind anomalies might have *prevented the smooth shift* from El Nino to La Nina.
- **Impact of Indian Ocean Dipole** – Despite a strong El Nino in 2023, the Indian monsoon remained normal, *possibly due to a positive Indian Ocean Dipole (IOD)*.
- The pre-monsoon cyclone activity, influenced by ENSO shifts, is also modifying monsoon onset and distribution.
- **Jet Stream Meandering** – The relationship between ENSO and the monsoon itself has changed in recent decades.

Easterlies winds blow from east to west and *Westerlies* blow from west to east.

Jet stream is a fast-moving air current high up in the atmosphere that generally blow from west to east.

- The jet stream usually *helps guide weather systems*, but as it shifts and meanders in new ways, it is causing changes in temperature and weather patterns, especially in the middle latitudes.
- As a result, it is harder to predict the timing and behaviour of the monsoon.
- **Influence of global warming** – The record-high global temperatures of 2023 and 2024 may be affecting ENSO cycles.
- Typically, cooling in the eastern Pacific during La Nina allows the ocean to absorb heat, but persistent warm anomalies suggest the ocean is struggling to regulate heat uptake.
- Without a well-defined ENSO phase, climate patterns become harder to predict, impacting global weather systems, including the Indian monsoon.

What lies ahead?

- Better models are needed to predict unusual patterns like the 2025 confused ENSO state and improve monsoon forecasts.
- More real-time data from oceans and winds can help us understand shifting SSTs and refine 2025 predictions.

3.3 Wallace line

Why in News?

New studies on Wallace line explain how species across the Wallace line were related.

What is Wallace line?

- **Shift in the composition of organisms** - In the 19th century, Alfred Wallace noticed a shift in the composition of organisms as he moved from Asia to Australia, New Guinea, and other islands nearby.
- **Wallace line** – It is an imaginary divider used to mark the difference between species found in Australia and Papua New Guinea and Southeast Asia.
- **Location** - The line extends from the Indian Ocean through the Lombok Strait (between the islands of Bali and Lombok), northward through the Makassar Strait (between Borneo and Celebes), and eastward, south of Mindanao, into the Philippine Sea.
- **Species Distribution** - To the west of the line, species are predominantly of Asiatic origin, while to the east, there is a mix of Asian and Australian species.
- **Modern biogeography** – Wallace line laid the foundations for modern biogeography in studying distribution and how they got there.

Alfred Russel Wallace was an English naturalist, explorer, geographer, anthropologist, biologist who independently conceived the theory of evolution through natural selection. Kangaroos and cockatoos in Australia and tigers and orangutans with Asia.



Wallace wrote in 1876 that the animals here showed "affinities" to Africa, India, Java, the Maluku Islands, New Guinea, and the Philippines.

What is the significance of Sulawesi Island?

- **Sulawesi** – It is one of the largest islands in the Indonesian archipelago, situated east of Borneo, west of the Maluku Islands.



- **Biological uniqueness** – Sulawesi Island is home to both Asian and Australian species.
 - **Asian species** - It is home to species found nowhere else on the planet, including tarsiers (family Tarsiidae), the lowland anoa (*Bubalus depressicornis*), and the mountain anoa (*Bubalus quarlesi*).
 - **Australian marsupials** - Dwarf cuscus (*Strigocuscus celebensis*).

What are the reasons for the species variation along both sides of the line?

- **Complex geology** – The Wallace line is part of the Malay archipelago, a geologically complex region with more than 25,000 islands.
- **Asian mainland connect** - Wallace figured that Sulawesi's animal distribution could be explained if some of these islands had been joined with the Asian mainland in the past.
- **Movement of continents** - As the islands broke off and drifted apart, the ancestral species on each island would have become isolated and evolved independently.
- **Origin of Australia** - Millions of years ago, Australia broke off and drifted away from Antarctica.
- An ocean emerged in the growing gap and the water currents in its depths cooled the planet.
- **Australian drift** - Australia drifted north into Asia, creating the volcanic islands of Indonesia.
- **Climate variation** - variations in monsoons, aridity, and sea levels between these islands spurred island species to adapt to their new conditions and diversify, until as recently as four million years ago.
- **Asian species movement** - Species from Asia can migrate through the rainforest-rich northern route, as the ecosystems are similar to their origins.
- Asian fauna used these islands as stepping stones to Australia.
- **Constriction of Australian fauna** - Australian species, having evolved in cooler climates, struggled to make their way across the islands to Asia.
- Australian species can only move into Asia along the southern route, around Timor and nearby islands.

Despite global cooling, Malay's tropical islands stayed warmer and wetter than Australia.

4. SOCIAL ISSUES

4.1 Anatomy of Riots

Why in News?

After the Delhi Assembly election results were announced, a fake controversial social media post sparked tensions in Udayagiri, in Mysuru.

What are the causes of riot?

- **Provocative social media posts** – Organised or random provocative contents of hate speeches on social media incites violence.
- **Extreme communal polarisation** – Division of society along religious or ethnic lines through social segregation and religious fundamentalism.
- **Exploitation of communal feelings** - Riots are precipitated as a device to consolidate the support of ethnic, religious, or other culturally marked groups by emphasizing the need for solidarity in face of the rival communal group.
- **Majoritarianism** - When minority community frequently comes under attack both online and offline, religious polarisation has intensified, and pent-up frustration is spilled on to the streets.
- **Backwardness** – Socio economic backwardness of a region or community is potential ground for conflicts and riots.
- **Highly polarised polity** - Competitive assertion of identities in a highly polarised polity offers varied forms of patronage to non-state actors.
- **Communalisation of state** - Penetration of communal ideologies in various domains of state and state indifference or complicity.

- **Vicious cycle** – All above factors feed each other in a vicious cycle online and in the real world.

Paul Brass's Institutionalized riot systems

- Institutionalized riot systems (IRS) is a term invented by Professor Paul Brass in 2004 in his book *The Production of Hindu-Muslim Violence in Contemporary India* with regards to Indian politics.
- This term describes the dramatic production of riots, which Brass has divided into three phases.
 - Preparation, activation and explanation.
- In the endemic riot prone regions, these three phases are continuous activities.

Preparation/ Rehearsal

- This phase is a continuous activity.
- The most important people in this phase are "fire tenders", who keep Hindu-Muslim tensions alive through various inflammatory and inciting acts.

Activation/Enactment

- This phase is a phase of violence.
- The activation takes place under particular circumstances, most notably in a context of intense political mobilization or electoral competition.
- In this phase another group of people come forward, who lead and address mobs of potential rioters and give a signal to indicate if and when violence should start.
- These leaders are called "conversion specialists".
- They usually lead the mob of criminals from poor background, who were recruited and rewarded for practicing the violence.

Explanation/Interpretation

- It follows after the violence in a broader struggle to control the explanation or interpretation of the causes of the violence.
- In this phase, many other elements in society become involved, including journalists, politicians, social scientists, and public opinion generally.
- Violence is presented as spontaneous, religious, mass-based, unpredictable and impossible to prevent.
- Social scientists start the process of blame displacement to save those who are most responsible for the production of violence, and instead diffuses blame widely.
- This contributes to the perpetuation of violent productions in future, as well as the order that sustains them.

What are the measures to manage riots?

- **Legal Framework** - Sections 141 to 190 of Indian Penal Code (IPC) provides for preventive and punitive actions against unlawful assemblies
- **Section 144 of the IPC** - This section can be imposed to restrict public gatherings and prevent the spread of violence.
- **Disaster management** – Riots and communal violence are included as part of state disaster management plans in Rajasthan and Meghalaya.
- **Social media monitoring cells** – These cells have been formed by district administration to monitor the social media posts and potential person media accounts.
- **Establishment of Peace Committees** - In riot-hit areas, peace committees comprising respected individuals from different communities are formed to mediate and restore peace
- **Proactive actions** - Police have filed numerous suo motu cases whenever they come across such "inflammatory and derogatory" content.
- **Development** – Regional and community development is essential in addressing the communal riots.

- **Press Briefings** - Frequent media briefings help prevent misinformation and keep the public informed about developments.
- **Fact check units** – Various government and news media have created fact checking platforms to enable people verify news.

What are the challenges in addressing riot situation?

- **Viral contents prevention** - Identifying such potentially provocative content before it goes viral is a major challenge.
- **Resource limitation** - Limited software that the district cells have is not compatible with regional languages, does not read what is written on images and scans only posts.
- **Vast volumes of content** – Social media is indefinitely vast with different open platforms such as Facebook and X and billions of users to check for objectionable content.
- **Monitoring private channels** – Privacy settings in WhatsApp and Telegram makes the monitoring of circulation of provocative contents close to impossible.
- **Overreach** - Social media monitoring by the police has also led to overreach, with many cases being booked against people for criticising the ruling party.
- **Technological evolution** – Rise of artificial intelligence and deep fakes makes it difficult to separate the reality and fake audio, images, video.

What lied ahead?

- Community outreach and trust between the local police, leadership, and the community can prevent escalation of situations.
- Use of advanced technologies like Artificial intelligence, Big data to monitor social media platforms to prevent the circulation of provocative contents.
- Coordination between different departments and levels of government is crucial for effective response and recovery.
- Media education and awareness creation among people about the potential misuse of advanced technologies.

4.2 Addressing the plight of deserted women in India

Why in News?

The plight of deserted women in India has gained attention due to their exclusion from legal and welfare frameworks, highlighting the need for targeted policy interventions.

Who are deserted women?

- **Marriage** – It is the cornerstone of societal structure and is traditionally viewed as a fundamental institution, not only forming the bedrock of family life but also defining social roles and statuses.
- **Desertion** – It is the abandonment of a spouse without justifiable cause.
- **Deserted woman** – A woman whose husband has denied marital co-existence.

What are the challenges faced by deserted women?

- **Lack of a clear definition** – It leads to fundamental lacunae in India's gender-sensitive policymaking.
- **Judicial limbo** - Abandoned without the legal certainty of divorce, deserted women exist in a judicial and social limbo perpetuating their socio-economic and psychological marginalisation.
- **Paradoxical situation** - Divorced women have legal entitlements, and widows receive social and official acknowledgment and assistance.
- Deserted women, however, are caught in a paradoxical situation, ineligible for the benefits afforded to either group.
- **Systemic negligence** - While India's Draft National Policy for Women (2016) acknowledges the vulnerabilities of various categories of women, including divorced, separated, and widowed, it fails to adequately address the specific plight of deserted women.
- **Absence of data** - Despite the wealth of data on India's female population, the absence of reliable figures on deserted women renders policy responses speculative and ineffective.

- **Patriarchal society** - The onus of maintaining marital relationship falls heavily on women, making them particularly vulnerable to the fallout of marital discord.
- **Social isolation** - The stigma of being deserted, coupled with familial and community rejection, leads to social isolation and hinders their reintegration into society.
- In rural areas, where patriarchal norms are deeply entrenched, these challenges are compounded by factors such as caste, religion, and geographic location.
- **Economic challenges** - They struggle to achieve financial stability and financial independence, due to lack of access to property rights and credit, further deepening their financial insecurity.
- **Limited employment opportunities** - Limited skills and education, rigid social norms force them into poorly paid or irregular jobs.
- **Psychological challenge** - The impact of desertion is devastating and these women endure severe emotional trauma, characterised by low self-esteem, anxiety, and depression.

What are the measures available to support deserted women?

- **Swadhar Greh Scheme** - It provides temporary shelter, food, and medical care for women in distress, including deserted women.
- **One Stop Centre Scheme (Sakhi Centers)** - It provides medical, psychological, and legal assistance to women facing distress.
- **Working Women's Hostel** - It Provides subsidized accommodation to women, including deserted women, to help them find employment and financial independence.
- **Mahatma Gandhi National Rural Employment Guarantee (MGNREGA)** - It guarantees 100 days of wage employment per year for rural workers, including deserted women.
- Single women, including deserted women, get priority job allocation under the scheme.
- **Women Helpline 181 (WHL)** - It provides 24 hours emergency and non-emergency response to women affected by violence, both in public and private spaces.
- **Mahila Shakti Kendra** - It aims to empower rural women through community participation and to create an environment in which they realize their full potential.
- **Nari Arthik Sashaktikaran Yojana** - It supports Scheduled Castes, Single Women/Widows to take up income generating activities.
- **National Rural Livelihood Mission (NRLM)** - It encourages women, including deserted women to form Self-Help Groups (SHGs) for financial independence.
- **State government schemes** - "Destitute/Deserted Wives Pension Scheme" scheme by Tamil Nadu and "Pension for Women in Distress" under "Integrated Social Security Scheme (IGSSS)" by Jammu and Kashmir provides social security to deserted women.

What are the challenges in implementing the welfare programs for deserted women?

- **Absence of formal recognition** - While some States have categorized deserted women, a lack of uniformity at the Central level hinders their formal recognition as eligible beneficiaries.
- **Inadequate targeted welfare programs** - The lack of targeted State welfare measures further exacerbates the plight of deserted women.
- **Stringent criteria for social welfare benefits** - Requirements such as residency criteria, create barriers for women who have migrated in search of sustenance.
- **Budgetary constraints** - Even well-intentioned schemes such as the Swadhar Greh Scheme often fail to deliver tangible benefits owing to budgetary constraints and implementation challenges.
- **Lack of Awareness** - Many deserted women do not know about their legal rights and available schemes.

What lies ahead?

- The plight of deserted women underscores the need for a more inclusive approach to women's empowerment.
- Discrepancies faced by deserted women necessitates a re-evaluation of gendered hierarchies and a more nuanced approach to gender-sensitive policymaking.
- A multi-pronged strategy encompassing legal reform, policy innovation, and grassroots advocacy is essential.

- Integrating deserted women into State welfare measures and expanding empowerment initiatives through self-help groups (SHGs) are crucial steps.
- Deserted women can be recognized as a separate category in all welfare and empowerment schemes such as NSAP pension, PM Awas yojana, employment, entrepreneurship and credit.
- Improving legal literacy through dedicated legal support centers is equally essential.
- Community support networks and free counseling are needed to address their psychological needs.
- Expanded access to healthcare and insurance coverage will provide a safety net against economic- and social instability.
- A formal national institution dedicated to the care of deserted women would ensure uniform policy implementation and recognition of their specific needs.
- Legal reforms are necessary to expedite processes and remove administrative barriers.

G. S. PAPER II

5. INDIAN POLITY

5.1 Appointment of Vice chancellors

Why in news?

There have been reservations expressed from various quarters on the Draft University Grants Commission Regulations, 2025 regarding the appointment of Vice chancellors of universities.

What are the UGC recommendations on appointment of vice chancellors?

- **Vice Chancellor** - A vice chancellor (VC) is the chief executive and academic head of a university.
- **Qualifications** - A distinguished person possessing high academic qualifications and demonstrated administrative and leadership capabilities with a minimum of 10 years of experience as
 - As a professor in an HEI (or)
 - At a senior level in reputed research or academic administrative organizations (or)
 - At a senior level in industry, public administration, public policy (and/or)
 - Public sector undertakings, with a proven track record of significant academic or scholarly contributions
- **Selection process** – It shall be through an all India newspaper advertisement and public notification.
- Applications can also be sought through nomination or a talent search process by a Search cum Selection Committee.
- **Search cum Selection Committee** - The Chancellor/Visitor shall constitute the Search cum Selection Committee comprising three experts.
- **Members of Search-cum-Selection Committee** – They shall be eminent persons with a proven track record of excellence (either Directors/Vice Chancellors or former Directors/Vice Chancellors of HEIs).
- They shall not be connected in any manner with the University concerned or its colleges.
 - **Chairperson** - A nominee of the Visitor/Chancellor shall be the Chairperson of the Search cum Selection Committee.
 - **Members** - A nominee of the Chairman, University Grants Commission.
 - A nominee of the apex body of the university such as Syndicate/ Senate/Executive Council / Board of Management.
- **Mandatory** - The composition of the Search cum Selection Committee shall be mandatory for the selection of Vice-Chancellors of all Universities established or incorporated by or under a Central Act, Provincial Act or State Act.
- **Service conditions** - It shall be prescribed in the Statutes of the respective University in conformity with these Regulations.
- **Term** - The Vice-Chancellor shall hold office for a term of 5 years from the date of entering the office.

- **Consequences of Violation** - If a Vice-Chancellor is not appointed as per these regulations, such an appointment shall be null and void.

What are the Observations made in the UGC's recommendations?

- **Judicial restriction** – In Dr. Premachandran Keezhoth and Anr. vs The Chancellor Kannur University and Ors. (2023), the Court has enunciated that members of the State executive shall not be members of the search-cum-selection committee
- **Dilution of academic integrity** – Expansion of eligibility of VC to experts from public policy, government, diplomacy, and industry may dilute academic integrity.
- **Overcentralisation** - Search cum Selection Committee is dominated by the representatives of Union government directly/indirectly.

Why states have representations in VC selection?

- **State universities** – They are largely a product of statute of the State Legislatures and that a majority of their funds and efforts have been provided by the State executive.
- **Affects regional development** – Mandates of state universities involves regional development and provincial priorities in research and advancement.
- **Affects university & States cooperation** - Universities have to necessarily feed the State innovation ecosystem and work in tandem with the government scientific and development establishment.
- **Impact on enrolment** - The central universities enrol far too low to meet requirements while private universities inaccessible due to high cost.

What lies ahead?

- The representative of the university executive can be a consensus candidate who is informally approved by the State executive which is amply represented in the university executive.
- Allow the State executive to nominate one member to the search-cum-selection committee in addition to the member representing the University executive.

5.2 Indian Bureaucracy

Why in news?

Recent article on the conflict between democracy and fair administration highlights the issues on bureaucracy Integrity in India.

What is bureaucracy?

- **Bureaucracy** – It refers to a system of administration characterised by complex rules, hierarchical structures, and formal procedures.
- **Definition** – Max Weber defined it as the *only legal-rational authority* to exercise the state's legitimate power.
- **Role in administration** – It is the core of any public administration.
- It helps to realize the dream of true democracy and *bridge the gap between the people and their representatives*.
- **In India** – Though *colonial in origin*, it was deeply Indian in ethos and spirit.
- Its importance becomes even more pronounced in India, the world's largest functioning democracy with the largest population.
- Independent India's bureaucracy is an institution to which the common citizen looks up.

What constitutes Indian Bureaucracy?

- It consists of officers working under the Central and All India Civil Services and the State Civil Services.
- **Top bureaucrats** – Among the Central and All India Services, the highest-ranking officers form the most elite group under the Central Government of India.
 - Indian Administrative Service (IAS),
 - Indian Police Service (IPS)
 - Indian Revenue Service (IRS), and others.
- Each of these services plays a specific role in India's public administration.

- Among them, the IAS occupies a unique role, as its officers are preferred for senior positions in government at both the state and central levels.
- **State-level Bureaucracy** – Officers of the State Civil Services are selected by individual states.
- They work entirely under the state government and different services like
 - State Administrative Service (SAS)
 - State Police Service
 - State Revenue Service.
- Among them, the SAS, much like the IAS, occupies key positions within the state-level administration.

*Bureaucrats are referred to as the **steel frame of India** by Sardar Patel, bureaucrats are responsible for implementing government policies and making decisions.*

What are the strengths and weakness of bureaucracy in India?

Strengths of Indian bureaucracy

- **Provide continuity in governance and administration** – It ensures that policies and programs initiated by one government are carried forward by the next.
- **Deliver efficient governance** – It provides a *professional and experienced cadre* of administrators who are well-trained in various aspects of governance, such as policy formulation, implementation, and evaluation.
- **Check on the power of elected officials** – It ensures that decisions are made *based on merit* and not political considerations.
- **Ethical bureaucracy** – Ethical leaders are considered honest, caring, and principled individuals who make *balanced and fair decisions*.
- Such ethical and conscious leadership can promote integrity within institutions.
- **Prioritise public welfare** - In the Covid times when everyone feared death, these brave officers *set aside their personal lives*, responsibilities and fears to serve the nation, with some even laying down their lives.

Weakness of Indian Bureaucracy

- **Lack of accountability & transparency** – *Opacity in governance* and lack of accountability leads to culture of impunity where civil servants can get away with poor performance or even corruption without fear of consequences.
- **Sluggish administration** – It include *delays in justice and bureaucratic red tape*, with high-profile cases dragging on for years due to inefficiencies.
- **Abuse of power** – Incidents such as *extrajudicial killings, custodial deaths*, and police inaction in politically sensitive cases raise serious concerns about fairness in administration.
- **Erosion of trust** – *Corruption, bureaucratic apathy* during disasters, and undue political influence over decision-making further erode trust.
- There are also concerns about *favouritism and cronyism*.
- **Bureaucratic culture of hierarchy & seniority** – They can *stifle innovation* and discourage younger civil servants from taking risks.

What lies ahead?

- **Strengthening public trust** – It can be done by increased transparency and accountability in governance.
- **Reforming police** – Reforms can be taken to transform policing into a service-oriented institution.
- **Making People-centric services** – For instance, the khaki should symbolize unimpeachable integrity in thoughts, words, and deeds.
- **Embody ethical leadership** – Encouraging bureaucrats to develop ethical behaviour as a defining personality trait and to have an ethical consideration in public life.

Every great institution is the lengthened shadow of a single man. His character determines the character of the organization. Only then can fair administration and democracy go hand in hand - Ralph Waldo Emerson.

5.3 Judicial Accountability

Why in News?

Recently a Delhi High Court Justice was repatriated to the parent court after several sacks of high value currency notes were allegedly found in his property.

What are the significances of judicial accountability?

- **Judicial accountability** – It refers to the responsibility and obligation to uphold the rule of law, fairness, and justice.
- It emphasizes transparency, ethical behavior, and adherence to established legal principles.
- **Ensures impartiality**- Judges remain impartial and fair in their decisions.
- **Builds public trust** - To maintain public trust and confidence in the judiciary.
- **Promotes institutional responsibility** - By rendering the judiciary responsive to the needs of the public.

The first case of impeachment is that of Justice V. Ramaswami of the Supreme Court (1991–1993). Though the enquiry committee found him guilty of misbehaviour, he could not be removed as the impeachment motion was defeated in the Lok Sabha.

What are the perceived challenges in holding judiciary accountable?

- **Ineffective removal process** - The removal of judges requires a high threshold of parliamentary support, making it a rarely used and impractical tool.
- No judge has been impeached till date, though some impeachment actions are taken.

Removal of Judges

- Article 124 (for the removal of a Supreme Court judge) and Article 218 (for the removal of a high court judge) of the constitution provides for the removal of judges.
 - They can be removed by an order of the President passed after an address by each House of Parliament supported by a majority of the total membership of that House and by a majority of not less than two-third of the members of the House present.
 - **Ground of removal** - Proved misbehavior or incapacity.
 - **Removal procedure** - The Judges Enquiry Act (1968) regulates the procedure relating to the removal of a judge of the Supreme Court by the process of impeachment:
 - A removal motion signed by 100 members (in the case of Lok Sabha) or 50 members (in the case of Rajya Sabha) is to be given to the Speaker/ Chairman.
 - The Speaker/Chairman may admit the motion or refuse to admit it.
 - If it is admitted, then the Speaker/ Chairman is to constitute a three-member committee to investigate into the charges.
 - The committee should consist of
 - The chief justice or a judge of the Supreme Court
 - A chief justice of a high court
 - A distinguished jurist.
 - If the committee finds the judge to be guilty of misbehavior or suffering from an incapacity, the House can take up the consideration of the motion.
 - After the motion is passed by each House of Parliament by special majority, an address is presented to the president for removal of the judge.
 - Finally, the president passes an order removing the judge.
- **Political influence in removal process** – In the Ramaswamy case, impeachment issued by the apex court failed due to the lack of majority vote from the Houses of the Parliament.

- **Judicial immunity** – In the Justice R. Veeraswamy case, it was declared that judges of SC or HC cannot be subjected to investigation in any criminal offence of corruption, or a FIR be registered against them without the prior permission of the CJI.
- **Not covered by Lokpal** – Recently Supreme Court stayed a Lokpal Order that brought judges of High Courts under its jurisdiction.
- Special Bench of the Supreme Court is examining the Lokpal's jurisdiction over sitting High Court judges.
- **Lack of transparency** - Internal mechanisms like the in-house procedure for addressing judicial misconduct are often confidential, leaving the public unaware of outcomes.
- **Contempt of court laws** - Strict contempt laws discourage open discussions about judicial misconduct, limiting public scrutiny.
- **Absence of an independent oversight body** - Unlike other government institutions, the judiciary largely regulates itself, leading to potential conflicts of interest.
- **Delays in proceedings** - Cases of judicial misconduct often drag on for years, reducing their deterrent effect.
- **Lack of transparency in collegium system** – Lack of transparency and proper criteria for selecting judges remains a huge issue in the collegium appointments process.
- **Overburdened collegium** - Every year, hundred judges of the High Court and the Supreme Court are to be selected and in any proper selection process, at least a 1,000 candidates have to be examined for their relative merits and demerits.
- Since the sitting judges of collegium are very busy with their judicial work and have little time to devote to this task.

What lies ahead?

- A full-time judicial appointments commission, comprising retired judges and other eminent public men, who are totally independent of the government can be appointed for selecting judges in a transparent manner.
- A high-powered and full-time judicial complaints commission comprising five men/women who are independent of the government as well the judiciary can be established.
- This complaints commission can receive complaints against judges of the higher judiciary from people.
- If they feel that there is a prima facie case, they can have the matter investigated or hold the trial of the judge through another committee, much like the judges inquiry committee.
- This would address the problem of judicial misconduct and corruption to a substantial degree.
- Higher judiciary can be brought under the Lokpal jurisdiction.

6. GOVERNMENT POLICIES AND INTERVENTIONS

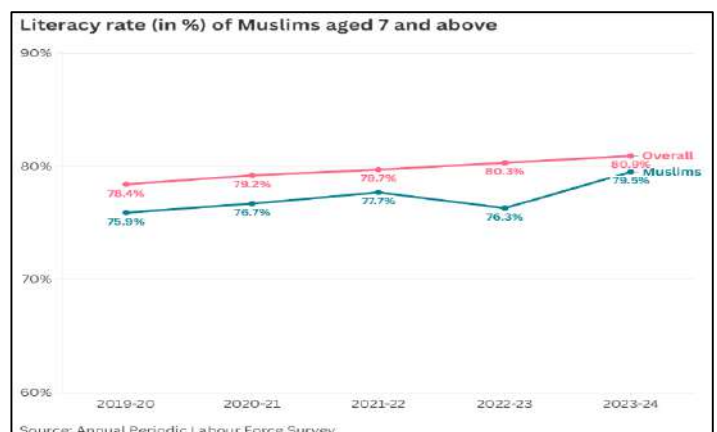
6.1 Educational Schemes of Waqf and Madrassa

Why in news?

Recently, the Centre had revealed that the budgetary allocations for madrasa and Waqf educational schemes had been lashed almost to nil.

What is the educational status of Muslims?

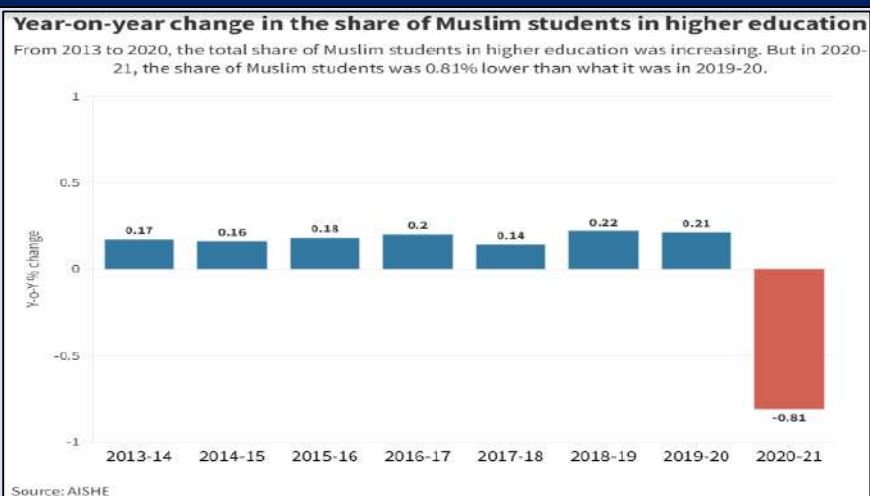
- **Lower literacy rates of Muslims** – It stands at 79.5% which is below the national average 80.9%, as per recent Minority Affairs Ministry report.
- **Decline in Muslim Higher Education Enrolment** – All India Survey on Higher Education (AISHE) 2020-21 reported an **8% decline** in Muslim enrolment compared to 2019-20.



- The drop was greater than that of Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC).

'State of Muslim Education in India' Report

- Reduction in female enrolment during 2020-21.
- High dropout rates in states like Assam and West Bengal.
- On an average 18.64% Muslim students drop out at the secondary level, compared to the national average of 12.6%.
- Enrolment declines from Class 6 onwards, reaching the lowest in Classes 11 and 12.



What are the Waqf educational schemes?

Waqf Board

- It is a *statutory body*.
- **Role** - They manage waqf properties, which are endowments for religious or charitable purposes in Islam.
- They oversee assets like mosques, madrasas, graveyards, and welfare institutions.

- The Ministry of Minority Affairs oversees 2 key waqf schemes.
- **Quami Waqf Board Taraqqiati Scheme (QWBTS)** – It aims to develop and modernize waqf properties.
- **Shahari Waqf Sampatti Vikas Yojana (SWSVY)** – It aims to support urban waqf properties for community welfare and educational purposes.
- **Implementing agency** – Both the above two schemes are implemented by Central Waqf Council (CWC).

Central Waqf Council is a statutory body under the Ministry of Minority Affairs was set up in 1964 to advise the Central Government on matters concerning the working of the Waqf Boards.

What is the Scheme for Providing Education to Madrasahs and Minorities (SPEMM)?

- **Launched in** – 2014-15.
- **Nodal agency** – Ministry of Minority Affairs.
- **Objectives** – To restructure existing education schemes for Muslims and to include more minority communities.
- To provide **modern education** in madrasahs by
 - Improving teacher training
 - Strengthen madrasah boards
 - Enhance infrastructure in minority institutions
 - Raise awareness about education programs.
- **Eligibility** – Madrasahs affiliated with recognized school education boards and mapped on the Geographical Information System (GIS) were eligible for financial assistance.
- **Financial assistance** – For teachers and madrasah boards for administration.

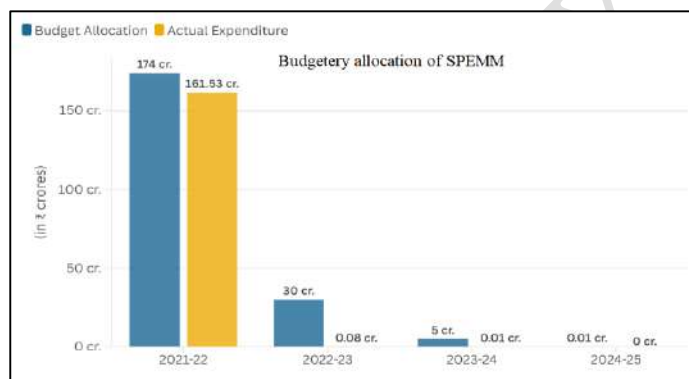
Madrasahs have been centers of Islamic education, dating back to the 8th-9th century during the Abbasid Caliphate.

• **Funding mechanism**

Regions	Centre	State
North-Eastern states & Himalayan states	90%	10%
Union Territories without legislature	100%	-
Other states	60%	40%

What are the concerns associated with Muslims education?

- **Decline in education funding** – The *allocation and expenditure for QWBTS and SWSVY have steadily decreased* between 2021 and 2025, with little to no spending in recent years.
- **Nil Funding for SPEMM** – While it started at Rs. 194 crore in 2014-15 and dropped to *zero in 2024-25*.
- **Closing of Madrassas** – In 2021, the Assam government repealed 2 madrassa-related Acts (1995, 2018), *closing all government and government-funded private madrassas*.



- They were later converted into general schools in 2023.
- **Issues in Madrassa education** – The National Commission for Protection of Child Rights (NCPCR) told the Supreme Court that madrassas are unsuitable for proper education with following concerns
 - Islamic supremacy in textbooks.
 - Violating the right against *forced participation in religious instruction or worship* of non-Muslim students in madrassas.
 - *Lack of curriculum standards* and teacher eligibility issues.
 - *Opaque funding* and land law violations.
 - Failure to provide a holistic educational environment.
- **Waqf (Amendment) Bill, 2024** – If the Waqf (Amendment) Bill, 2024 is passed in present form, it will
 - Increase Central regulation over waqf properties.
 - Allow non-Muslim members in waqf boards.
- Since waqf boards manage most madrassas, this move will reduce the influence of Islamic trusts and *bring madrassas under greater government control*.

What lies ahead?

- Steps can be taken to identify and enrol out-of-school children in age-appropriate classes.
- Coverage of financial aid to Muslim students can be increased.
- Provision of scholarships, grants for the community can be increased.

6.2 Two-Exam Scheme

Why is in News?

The CBSE has proposed a "Draft Scheme for Two Examinations, Class X from 2026," allowing students to take board exams twice a year to reduce stress and improve scores.

What is the two-examination scheme of CBSE?

- **Two exam scheme** - The Central Board of Secondary Education (CBSE) has proposed a “Draft Scheme for Two Examinations, Class X from 2026”.
- **Two exam sessions** - It allows students to take board exams twice a year i.e February/March & May (best score considered).

- **Alignment with NEP** - The initiative aims to align with the National Education Policy (NEP) 2020 of
 - Reduce stress among students.
 - Provide an additional opportunity to improve scores.
 - Promote a holistic assessment model.
 - To test core capacities/competencies rather than months of coaching and memorization.

National Education Policy (NEP) 2020

NEP 2020 aims to transform India's education system, replacing the 1986 policy, with a holistic, flexible, and skill-based approach.

School Education:

- 5+3+3+4 structure replaces 10+2 system.
- Focus on Early Childhood Care and Education (ECCE).
- Competency-based board exams with reduced emphasis on rote learning.
- Mother tongue/regional language as medium of instruction (up to Grade 5).
- Multiple entry-exit options for flexibility.

Higher Education:

- Four-year UG programs with exit options.
- MPhil discontinued for streamlined higher studies.
- Multidisciplinary Education & Research Universities (MERUs) introduced.
- Academic Bank of Credits (ABC) for credit transfer.

Skill & Vocational Training:

- Vocational education from Class 6 onwards.
- Internships & coding integrated into school curriculum.

Exams & Assessment:

- Shift to conceptual & competency-based learning.
- Board exams twice a year for stress reduction.

Digital & Inclusive Education:

- Expansion of e-learning (DIKSHA, online platforms).
- Special focus on disadvantaged groups (SEDGs) for equitable access.

What are the issues with the two-exam scheme?

- While the reform appears student-friendly, it raises concerns related to:
 - Operational challenges in conducting and evaluating large-scale exams.
 - Financial burden on students, particularly from marginalized backgrounds.
 - Pedagogical concerns, including potential reinforcement of rote learning.
- **Logistical issues** - 26.6 lakh students expected for Class 10 exams in 2026 and 1.72 crore answer scripts to be evaluated across two sessions, requiring a vast pool of evaluators.
- **Increased students stress** - Instead of reducing stress, students may face intensive preparation for two exams, increasing pressure.
- **Overlap of board exams** - The overlap of Class 10 and 12 examinations adds another layer of administrative complexity, stretching school resources and placing an additional burden on the teachers responsible for evaluation.
- **Short remediation window** - Students scoring poorly in February will have only two months to prepare for the May attempt.

- Without structured remedial support, many may resort to rote memorization instead of true conceptual improvement with contradicts the goal of NEP 2020.
- **Financial burden on economically weaker students** - Policy mandates a non-refundable examination fee covering both attempts, even for students opting for a single attempt.
- Increased costs may create barriers for marginalized students, contradicting NEP 2020's goal of equitable education.
- **Coaching culture** - Emphasis on multiple examinations may still lead to 'coaching-driven preparation' rather than genuine conceptual learning.
- **Affects academic cycle** - Second exam results expected by **June-end**, compressing the **admission cycle** for Class 11.
- Most schools start their **academic year in April/May**, creating **delays and uncertainty** for students awaiting second exam results.
- These factors are sighted as reason by some educationist that the proposed system may be more cumbersome.

What lies ahead?

- **Ensuring competency-based assessments** - Moving beyond logistical changes and focus can be given on **conceptual learning** and redesigning question papers to **test competencies, not memorization**.
- **Structured remedial support** - Introducing **remedial programs** between exams to help students improve.
- **Revising examination fee structure** - Making the policy more **equitable** for economically weaker students.

6.3 National Technical Textiles Mission

Why in News?

It has been 5 years since the launch of the National Technical Textiles Mission.

What are technical textiles?

- These are fabrics made for specific functions and performance, focusing on function over appearance.
- **Specialized properties** - They are engineered to possess unique characteristics like breathability, water resistance, UV protection, flame retardance, chemical resistance, and moisture management.
- **High-performance materials** - Technical textiles often utilize specialized materials like Nomex, Kevlar, Spandex, and Twaron, which exhibit enhanced properties like tenacity, insulation, and thermal resistance.
- **Types** - They are divided into different categories, each serving a different purpose.
- **Applications** - These textiles are designed to meet the needs of various industries like cars, construction, farming, healthcare, and safety.

USAGE OF TECHNICAL TEXTILES IN 12 SEGMENTS (BASED ON APPLICATION)	
MEDITECH Diapers, Sanitary Napkins, Disposables, Contact Lens, Artificial Implants	MOBILTECH Airbags, Helmets, Nylon Tyre Cords, Airline Disposables
OEKOTECH Recycling, Waste Disposal, Environmental Protection	PACKTECH Wrapping Fabrics, Polyolefin Woven Sacks, Leno Bags, Jute Sacks
PROTECH Bullet Proof Jackets, Fire Retardant Apparels, High Visibility Clothing	SPORTECH Sports Net, Artificial Turf, Parachute Fabrics, Tents, Swimwear
AGROTECH Shadenets, Fishing Nets, Mulch Mats, Ant Hail Nets	BUILDTECH Cotton Canvas, Tarpaulins, Floor and Wall Coverings, Conspires
CLOTHTECH Zip Fasteners, Garments, Umbrella, Cloth, Shoelaces	GEOTECH Geogrids, Geonets, Geocomposites
HOMECH Mattress and Pillow Fillings, Stuffed Toys, Blinds, Carpets	GEOTECH Conveyer Belts, Vehicle Seat Belts, Bolting Cloth

Status of India's Textile Industry

- **India's textile industry** – It is important to the economy and makes some of the most innovative fabrics globally.
- **Export** - India is the 6th largest exporter of textiles globally, with a 3.9% share in world textile exports.
- **GDP contribution** - It contributes nearly 2% to the country's GDP.
- **Potential of textile sector** - The sector is set to grow to US\$350 billion by 2030 and create 3.5 crore jobs further strengthening India's position in the global market.

- They are used in products that help protect people, improve machinery, and solve practical problems, such as in car parts, building materials, medical equipment, and safety gear.

What is the National Technical Textiles Mission?

- **National Technical Textiles Mission (NTTM)** – It was launched in 2020 by the Ministry of Textiles to boost technical textiles in India for a period from 2020-21 to 2025-26.
- **Aim** - To make India a global leader in Technical Textiles with a budget of Rs. 1,480 crore till 2025-26 and to train 50,000 individuals in technical textiles.
- **Focus areas** - Research, market growth, exports and skill development.

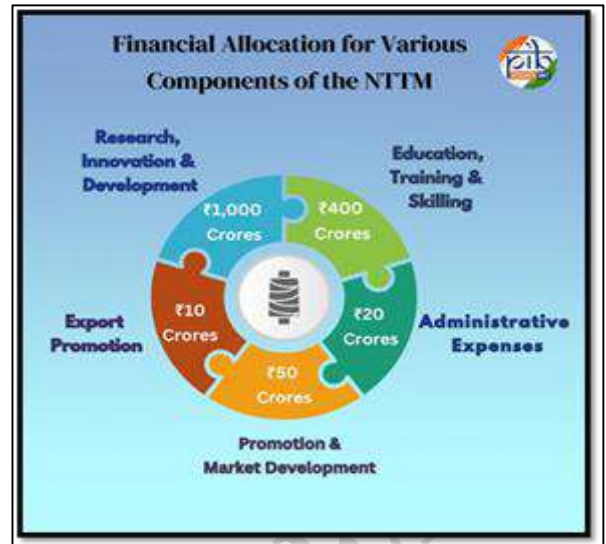
Four key components of National Technical Textiles Mission (NTTM)	
Component I Research, Innovation and Development	Supports R&D in technical textiles, inviting proposals to develop new materials and processes.
Component II Promotion and Market Development	Aims to increase technical textile adoption in India through market promotion and international collaborations.
Component III Export Promotion	Focuses on boosting exports of technical textiles with a dedicated export council.
Component IV Education, Training, and Skill Development	Promotes technical textiles education, skill training, and internships in top institutes and industries.

NTTM Key Highlights	
Research Areas Supported:	Carbon fiber, aramid fiber, nylon fiber, composites, geotextiles, agro-textiles, medical textiles, mobile textiles, sports textiles, and biodegradable textiles.
Quality Control Orders (QCOs):	68 QCOs issued across various segments (20 Geotech, 12 Protective Textiles, 20 Agro Textiles, 6 Medical Textiles, 9 Ropes & Cordages, 1 Indutech textiles).
Export Promotion:	The Synthetic & Rayon Textiles Export Promotion Council (SRTEPC) (now MATEXIL) assigned to promote technical textiles exports.
BIS Standards:	Over 600 standards developed for technical textiles, including 200+ since NTTM's launch.
Academic Support:	38 proposals approved worth ₹191 crore for lab upgrades and faculty training in technical textiles.

How is NTTM strengthening the textile industry with other initiatives?

- The National Technical Textiles Mission (NTTM) is driving the transformation of India's textile sector with a range of initiatives focused on innovation, skill development and promoting indigenous production.
- **Grant for Internship Support for Technical Textiles (GIST 2.0)** - Launched under NTTM, GIST 2.0 bridges the gap between industry and academia by offering hands-on learning opportunities in technical textiles.

- It fosters local innovation, supports the Make in India initiative and helps empower young talent to drive growth in the textile sector.
- **Grant for Research & Entrepreneurship across Aspiring Innovators in Technical Textiles (GREAT) Scheme** - Launched in August 2023, the program provides funding to help translate prototypes into technologies and products for commercialization.
- **Skill Development Programs** - To meet the growing demand in the technical textiles sector, NTTM aims to train 50,000 individuals, including undergraduate students, unskilled workers, and professionals.
- **Technotex 2024** - Held as part of Bharat Tex 2024, showcased the strength of India's technical textiles sector, offering a platform to explore global investment opportunities.



Conclusion

- India's journey to becoming a global leader in technical textiles is well underway.
- Initiatives like GIST 2.0, along with cutting-edge technology and research, are paving the way for this vision.
- With continued effort and innovation, India is set to lead the global technical textiles market, driving both economic growth and global competitiveness.

7. HEALTH

7.1 Compassionate health care

Why in the news?

The World Health Organization (WHO) released a report titled "Compassion and Primary Health Care" on February 7, 2025.

What are the importances of Compassionate Healthcare?

- **Compassionate healthcare** - It involves *empathetic communication, emotional support, and patient-centered care.*

- **Significance** - It not only benefits patients but also enhances the work environment for healthcare professionals.
- Compassion in healthcare is essential for improving patient outcomes, reducing stress, and enhancing the overall quality of medical services.
- **Better patient outcomes** - Compassionate healthcare reduces stress and anxiety in patients, leading to faster recovery.
- **Faster recovery** - Research conducted by Stanford University's The Center for Compassion and Altruism Research and Education (CCARE) has found out that patients treated by compassionate health-care providers recover quickly and the duration of their hospital stays is way less.
- **Reduce patients stress** – As per study by the Johns Hopkins Hospital, when doctors spend an additional 40 seconds with each patient and express solidarity, it significantly reduced anxiety in patients and positively influenced their recovery.
- **Strengthens doctor-patient relationships** - It ensures higher patient satisfaction, which is crucial for building positive healthcare experiences.
- **Reduces burnout among medical professionals** - When health-care professionals practice compassion, they experience reduced stress, improved job satisfaction, and build stronger relationships with their patients.
- **Encourages holistic healing** - Compassionate healthcare does not just focus on physical recovery but also on emotional and psychological well-being.
- **Addresses public health challenges** - Compassion in medical services can improve accessibility and inclusivity for marginalized groups.

What are the differences among sympathy, empathy and compassion in medical healthcare?

Sympathy	Empathy	Compassion
It is a pity-based momentary response	Empathy is when people immerse themselves in others' problems and they get overwhelmed in the process.	Compassion is about mindful problem-solving
Health-care workers who operate with empathy can experience anxiety, exhaustion, and sometimes depression when they internalise the anguish of their patients.	Along with demanding work hours, the stress can lead to empathy fatigue and further degrade the quality of care to patients.	Compassionate healthcare professionals will feel the patients' pain as their own but, at the same time, maintain a detachment that will not let them get overwhelmed.

What are the challenges in providing compassionate care in India?

- **Low doctor-patient ratio** – Though the doctor-population ratio in the country stands at 1:834 which is better than the WHO standard of 1:1000, doctor to patient ratio is less.
- **Inadequate resources** - The country currently has 0.79 government hospital beds per 1,000 population – far below the two beds per 1,000 population recommended by the National Health Policy 2017
- **Lack of soft skills training** – Medical education focuses more on technical skills than empathy.
- **Financial barriers** – Many patients struggle to afford quality healthcare.
- **Administrative burden** – Doctors spend more time on paperwork than patient care.

The Indian Public Health Standards (IPHS) 2022 recommend one bed per 1,000 population as a baseline.

What lies ahead?

- Health care is not just about treating illnesses but also promoting the overall well-being of individuals.
- Compassion facilitates adopting a more sustainable approach to health care that will allow professionals to offer excellent medical treatment, be content and peaceful with the recoveries of their patients, and protect their professional and personal lives.
- We need to create awareness on the imperative need of compassionate health care.
- Compassionate health care shall become the driving principle for industry leaders, hospitals, thought leaders, and health-care think-tanks.

- Health-care providers can be equipped on what compassionate care is all about and how they can incorporate it effortlessly.
- Investment is needed in quality training of doctors, nurses and paramedical staff, and experiential learning.
- Medical colleges and training institutes should incorporate courses on compassionate communication, ethics, and patient engagement.

7.2 Essentiality of Public Health Care

Why in the news?

In the Budget 2025, while the allocation for Ayushman Bharat Pradhan Mantri Jan Arogya Yojana has increased, the National Health Mission received a declining share.

What are the significances of insurance driven health care?

- **Affordable Access to Healthcare** - By pooling resources through contributions or taxes, public health insurance reduces the financial burden of medical expenses, making healthcare services more affordable for individuals and families.
- **Health Equity** - It ensures that everyone, regardless of income or socio-economic status, has access to necessary medical services, helping to bridge healthcare disparities.
- **Economic Stability** - It protects individuals and families from catastrophic healthcare costs that could lead to debt or poverty, thereby enhancing financial security.
- **Improved Public Health Outcomes** - With more people having access to healthcare, public health insurance contributes to better health outcomes, reducing the spread of diseases and improving overall life expectancy.

What are the challenges with insurance-driven healthcare?

- **Inflated medical costs** - Private insurers often *prioritize profits* over patient care, leading to unnecessary medical procedures and cost inflation.
 - In the U.S., insurance-driven pricing has led to skyrocketing health-care costs, widening inequalities, and limiting access for uninsured individuals.
- **High Out-Of-Pocket Expenditure (OOPE)** - In an insurance-driven healthcare model, patients often bear significant *out-of-pocket expenses* due to *exclusions, deductibles, and co-payments*.
- Many essential services, such as *outpatient consultations, diagnostics*, and long-term treatments, are not covered comprehensively.
- **Limited coverage and exclusion**- Despite government schemes like *Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana* (AB-PMJAY), a large segment of the population, particularly informal sector workers and rural people, remains uninsured.
- **Claim rejections** - Even those covered under insurance face issues due to *limited network hospitals* and claim rejections.
- **Complex insurance system** - Different insurance providers follow varying policies, creating a *fragmented system* with inconsistent benefits.
- Government insurance schemes, though widespread, face *operational inefficiencies* and *delays* in reimbursements.
- **Rising premium costs** - As healthcare costs increase, *insurance premiums* also rise, making private insurance unaffordable for many families.
- **Neglect of preventive care** -Insurance models predominantly focus on *hospital-based treatments* rather than *preventive* healthcare and primary care.
- This leads to *excessive medicalization* of health issues instead of addressing root causes through public health measures.
- **Privatization of health** - Health is a state subject, and dominance of insurance driven private health system, limits state control on public health care.

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) is an insurance-based programme to reduce OOPE by covering hospitalisation, surgeries, and procedures at the secondary and tertiary level.

According to the *National Health Accounts (NHA 2021-22)*, *OOPE* constitutes around 39.4% of total health expenditures in India.

- **Weakens public health infrastructure** - Despite improving financial protection, it discourages primary health-care use, weakens public health infrastructure, and strengthens market-driven private health care.
- **No pandemic support** – Insurance based model will not help during public health crisis times like COVID-19 period, where strong public health care infrastructure can only save.

What are the significances of public health care system?

- **Universal Health Coverage (UHC)** - Primary Health Care (PHC) is the very foundation of achieving universal health coverage and health for all.
- **Efficient health system** - A robust PHC system reduces the burden on secondary and tertiary care, and ensures cost-effective health care.
- **Accessibility** - PHC ensures that healthcare services are accessible to all, especially underserved and rural populations.
- **Equitable health care** - It reduces disparities in health outcomes by providing equal access to essential care.
- **Preventive care** -Emphasis on preventive measures like vaccinations, health screenings, and lifestyle counseling helps avert diseases before they become severe.
- **Cost efficiency** - By addressing health issues early, PHC minimizes the need for expensive treatments and hospitalizations.
- It is more cost-effective for governments and individuals compared to specialized care.
- **Holistic care** – PHC integrates various aspects of healthcare—maternal and child health, mental health, and chronic disease management—offering holistic care.
- **Managing health pandemic** - A robust PHC system enhances a country's ability to respond to public health emergencies, like pandemics or disease outbreaks.

*The **Bhore Committee 1943**, officially known as the Health Survey and Development Committee, recommended strong primary health care, with a pyramid-shaped health system tapering to secondary and tertiary care.*

What are the challenges with public health delivery system?

- **Insufficient funding** - Limited financial resources often lead to inadequate infrastructure, medical supplies, and staffing, making it hard to meet the population's needs.
- **Overburdened facilities** - Public health services frequently serve large populations, leading to overcrowded hospitals and long wait times for patients.
- **Shortage of healthcare Professionals** - Many public health systems face a lack of doctors, nurses, and other medical staff, which impacts the quality and availability of care.
- **Quality of care** - Due to resource constraints, the quality of care in public health systems may not always match that of private healthcare providers.
- **Bureaucratic inefficiencies** - Administrative delays, mismanagement, and red tape can slow down service delivery and discourage innovation within the system.

What lies ahead?

- Comprehensive public health benefit packages, cost-control mechanisms, and programmes to reduce OoPE are essential for achieving UHC.
- Strong public health investments, and regulated private insurance to ensure prioritising primary care and community-based services along with secondary and tertiary care will help achieve UHC.
- Safeguards can be created to prevent private insurance from driving up health-care costs, ensuring India's commitment to 'Health for All' remains more than just a slogan.
- Policies shall address the health-care needs of informal workers, the unemployed, migrants, and vulnerable populations, especially with rising climate-related health risks.

7.3 Tackling the problem of Malnutrition

Why in news?

The article discusses India's nutrition challenges and government initiatives like **Saksham Anganwadi** and **Poshan 2.0** in Budget 2025.

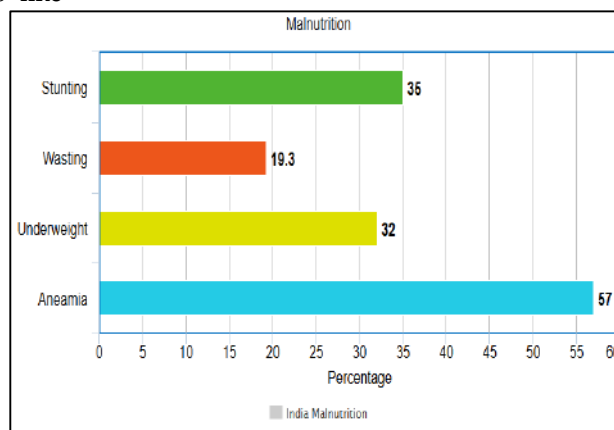
What is the status of malnutrition in India?

- **Malnutrition in Women and Children** - India has one of the world's highest share of malnourished children and anaemic women.

What are challenges in addressing malnutrition in India?

- **Complex factor** - Nutrition in India is shaped by our culture, caste, gender and many diversities present.
- **Exclusion** – Inadequate focus on other target groups like women out of reproductive age, men and senior citizens.
- **Lifestyle disorders** - Diseases like diabetes, hypertension, non-communicable diseases and nutrition deficiency are highly linked with nutrition.
- **Poverty and Inequality** - Many families lack the financial resources to afford a diverse and nutritious diet.
- Rural areas, tribal communities, and urban slums often suffer from higher rates of malnutrition due to systemic inequalities.
- **Lack of Awareness** - Limited knowledge about proper nutrition, especially among mothers and caregivers, leads to poor dietary practices.

***Stunted growth** refers to children who are too short for their age, **wasted** refers to the children who are too thin for their height, and **underweight** children have low weight for their age, indicating both stunting and wasting.*



- **Healthcare Access** - Inadequate healthcare services in rural and underserved areas hinder early identification and treatment of malnutrition.
- **Agricultural and Food Systems** - India relies heavily on staple crops like rice and wheat, which are calorie-rich but not always nutrient-rich.
- **Gender Disparities** - Women and girls often eat last and least in households, leading to chronic undernutrition.

What are the government measures in addressing malnutrition?

- **National Food Security Act, 2013** – It ensures food security by providing subsidized food grains to 75% of the rural population and 50% of the urban population.
- **Integrated Child Development Services (ICDS)** – It provides supplementary nutrition, immunization, pre-school education, health checkups, and health referrals for children under 6 and pregnant and lactating mothers.
- **Mid-Day Meal Scheme** – It offers free, nutritious meals to school children to enhance their nutritional intake and encourage school attendance.
- **POSHAN Abhiyaan** – National Nutrition Mission was launched in 2018 to achieve improvement in nutritional status of Children under 6 years, Adolescent Girls, Pregnant Women and Lactating Mothers.
- **Pradhan Mantri Matru Vandana Yojana (PMMVY)** - Offers cash incentives to pregnant and lactating women for their first live birth, helping them access better healthcare and nutrition.
- **Anemia Mukh Bharat (AMB)** - Focuses on combating anemia, particularly among children, adolescents, and women, through iron and folic acid supplementation and deworming.
- **Swachh Bharat Mission** - Aims to improve sanitation and eliminate open defecation, which indirectly helps prevent malnutrition by reducing infections and diseases.
- **Saksham Anganwadi and Poshan 2.0** – It is an Integrated Nutrition Support Programme to address malnutrition through a strategic shift in nutrition content and delivery.

What lies ahead?

- Nutrition needs to be identified as a public health issue that impacts all people among different social stratification.
- Clear identification of nutrition needs beyond the reproductive and child health.
- A set of solutions suited especially according to our local food systems.
- Identification of locally-embedded facilities to deliver nutritional services.

- Systematically expand the nutrition-focused activities to other segments of the population and involve health and wellness centres (HWCs) and Anganwadi centres (AWCs).

7.4 Seasonal Flu

Why in news?

Recent reports of a rise in the seasonal influenza cases in the Delhi-NCR area signifies the importance of seasonal flu vaccination, especially for high-risk groups like the elderly.

What is seasonal flu?

- It is an acute respiratory infection caused by influenza viruses.
- **Spread** – According to the World Health Organization (WHO), there are around a billion cases of seasonal influenza annually, including 3–5 million cases of severe illness.
- **Transmission** – It is contagious and can be passed on from one person to another when they cough or sneeze.
- **Onset of symptoms** – It begins 1–4 days after infection and usually lasts around a week.
- **Symptoms** – They are high fever, cough, sore throat, body aches and fatigue.
- **Severity** – It causes mild to serious illness and in a few cases, mostly coinciding with a delay in hospitalisation, can even lead to death.
- **Treatment** – Most people recover without treatment.
- Medicines such as paracetamol, antihistamines and cough Syrups can help and in severe cases, antiviral medications are recommended.
- **Prevention** – Vaccination is the best way to prevent the disease.
 - **Injectable form** – Inactivated influenza vaccines and recombinant influenza vaccines.
 - **Nasal Spray** – Live attenuated influenza vaccines.

Seasonal flu causes 2, 90, 000 to 6, 50, 000 respiratory deaths annually. 99 % of deaths in children under 5 years of age with influenza-related lower respiratory tract infections are in developing countries.

Similarities between Seasonal Flu and Common Cold

- Similar symptoms like sudden cough and sore throat, with high fever, accompanied by muscle pain, body aches, headaches, fatigue and stuffy nose.

Dissimilarities between Seasonal Flu and Common Cold

- Both are caused by different viruses.
- Both can have varying symptoms and severity.

What are the different types of influenza viruses?

- There are 4 types of influenza viruses
 - Influenza A, B, C and D.
- Influenza A and B viruses circulate and cause seasonal epidemics of disease.

Types of Influenza Viruses

Influenza A Viruses

- They are classified into subtypes as per the combinations of the proteins on the surface of virus.
- Currently circulating in humans are
 - Subtype A(H1N1)
 - Subtype A(H3N2)
- Only influenza type A viruses are known to have caused pandemics.

Influenza B viruses	<ul style="list-style-type: none"> • They are <u>not classified</u> into subtypes but can be broken down into lineages. • They belong to either <u>B/Yamagata</u> or <u>B/Victoria lineage</u>.
Influenza C virus	<ul style="list-style-type: none"> • It is <u>detected less frequently</u>. • It usually causes mild infections, thus does not present public health importance.
Influenza D viruses	<ul style="list-style-type: none"> • It <u>primarily affect cattle</u> and are <u>not known to infect people</u>.

What are the control measures taken?

- **Surveillance** – India has developed a near real time surveillance of cases of Influenza like Illness (ILI) and Severe Acute Respiratory Infections (SARI) presenting themselves in health facilities.
- It is also through the country-wide network of diagnostic laboratories.
 - Integrated Disease Surveillance Programme (IDSP)
 - Virus Research & Diagnostic Laboratories (VRDLs)
- **Public awareness campaigns** – Information, Education, and Communication (IEC) materials are used to inform the public about symptoms, preventative actions, and when to seek medical assistance.
- **Efficient healthcare guidelines** – Extensive guidelines covering ventilatory care, treatment procedures, and patient classification have been released to reduce complications and mortality.
- **Supplying antivirals** – The public health system provides free access to oseltamivir (Tamiflu), which is advised by the WHO.
- Its sale has been allowed under Schedule H1 of the Drug and Cosmetic Act from February 2017.
- **Protecting healthcare professionals** – Steps are being taken to provide safety kits like N-95 face masks and personal protective equipment (PPE) kits.

There are **2 peaks of seasonal influenza in India**, one from January to March and the other in the latter part of the southwest monsoon, in August-October. Predominant strains in this season are Influenza A & B.

What are the challenges in control measures?

- **Continuous evolution of Influenza viruses** – High population density, poor hygiene practices, indiscriminate antimicrobial use and conducive weather lead to the survival and spread of the virus.
- **Low vaccination rates** – Influenza vaccine is not included into the government's Universal Immunisation Programme.
- **Low adult vaccination rates** – It is often overlooked due to a lack of information, misconceptions, and financial hurdles.
- No national policy requires flu vaccine for high-risk persons, leaving it up to state discretion.
- **Disparity in healthcare access** – Rural & marginalized communities have limited access to immunizations and treatments.
- **Surveillance gaps in private healthcare** - While public facilities disclose incidents, private healthcare data is frequently underreported, limiting real-time monitoring.
- **Climate change** – Seasonal epidemics of influenza may shift spatially and temporally.

What lies ahead?

- **Improve preparedness** – Anticipating an outbreak and inculcating a sense of preservation, particularly among the high-risk groups.
- **Prioritise vulnerable groups** – More attention to children, senior citizens and people with chronic respiratory conditions.
- **Targeted awareness campaigns** – It must be clear, urgent in tone, and make an impact on the high-risk groups particularly, because, very simply, vaccines save lives.
- **Formulating a national flu vaccination strategy** – Steps can be taken to make annual flu vaccines mandatory for high-risk populations and incorporating influenza vaccines into government health programs and subsidize expenses.

- **Strengthening surveillance** – Encouraging private hospitals to *provide real-time data to flu surveillance networks*.

8. GOVERNANCE

8.1 Habitual Offender Laws in India

How the habitual offender laws originated and evolved in India?

- **Habitual offender** – A person repeatedly convicted of crimes.
- **Beginning of criminalising communities** – It began with *Regulation XXII of 1793* in India.
- It gave magistrates “summary powers” to put to work or imprison certain communities or tribes based on suspicion alone.
- **Evolution** – The *Indian Penal Code of 1860* and the *Criminal Procedure Code of 1861* set up the mechanism to maintain a register of “dacoits and thugs” which culminated into Criminal Tribes Act.
- **Criminal Tribes Act (CTA), 1871** – The **phrase ‘criminal tribe’ was 1st referred**, and the system of registration began.
- It provided for “a gang, a tribe, or a class of people” to be declared criminal.
- In 1924, it was applied to all of colonial India which increased the number of communities declared “criminal” exponentially.
- **Independent India** – In 1952, based on Criminal Tribes Act Enquiry Committee Report, the Government of India *repealed all criminal tribal laws* across the country.
- It left the communities notified under these laws to be classified as “denotified, nomadic, and semi-nomadic” (DNT, NT, SNT) tribes.
- **In states** – The Madras Restriction of Habitual Offenders Act, 1948, was extended *to Delhi in 1951*.
 - Rajasthan passed a similar law in 1953, and over the next 2 decades Andhra Pradesh, West Bengal, Karnataka, Goa, Himachal Pradesh, Uttar Pradesh, etc. had adopted laws.
- **Reframing of definition** – All state laws moved away from the premise of classifying communities as “prone to crime”, by defining a “habitual offender” in terms of the convictions they have had.

According to National Crime Records Bureau’s prison statistics 2022 - About 1.9% of India’s 1.29 lakh convict population have been classified as “**habitual offenders**”. It is higher in Delhi, where 21.5% of convicts are classified as such.

Criminal Tribes Act Enquiry Committee Report (1949-50) recommended the repealing of the Criminal Tribes Act and encouraged “central legislation applicable to all habitual offenders without any distinction based on caste, creed, or birth”.

How states in India police habitual crimes?

- **Defines schedule of crimes** – Being a thug, belonging to a gang of dacoits, living on the earnings of prostitution, and half-a-dozen entries on lurking.
- **Procedural structure** – Registers were maintained, and rules and regulations were formulated by States on how ‘habitual offenders’ were to be treated within prisons.
- It led to *jail manuals* across the country adopting the language of “habitual offenders”.
- Some of them explicitly allowed for erstwhile “criminal tribe” community members to be designated as “habitual offenders”.
 - For example in Rajasthan.

What is the current response of its legality in India?

- **Supporting states** – This law *continue to operate across at least 14 States and Union Territories* in India.
 - Gujarat, Uttar Pradesh, Delhi, Goa, Rajasthan, Punjab, Himachal Pradesh, Jammu and Kashmir, Karnataka and Telangana, among others.

Supporting State

Supporting Argument

Gujarat	It has claimed that this law “does not intend to” harass or harm any community.
Uttar Pradesh	The provisions of the habitual offender legislation are already covered under the U.P. Control of Goondas Act, 1970, and hence it does not matter either way.
Goa	Since there are no denotified, Nomadic and Semi-Nomadic Tribes in the State, there is no need for repealing the law.

- **Opposing states** – Some states says that the law is *practically redundant and not implemented* by them.
 - Punjab, Andhra Pradesh, and Telangana.
- A total of 9 States have reported that there are no “habitual offender” laws in their State, or that they had never been enacted, or that there were no tribals in their jurisdictions.
 - West Bengal, Assam, Mizoram, Tripura, Bihar and Sikkim.
- Further, the legislation had been *repealed in Haryana and Ladakh*.
- **Supreme Court** – In 2024, on caste-segregation in prisons, it had *questioned the very basis* of a “habitual offender” classification.
- It noted that the provisions was “*constitutionally suspect*”, given the “vague and broad language”, “which is used to target members of denotified tribes”.
- It had *asked States to reconsider the use*, further asking if it was needed at all.

In 1998, the custodial death of Budhan Sabar, a member of a denotified community in West Bengal, led to national outrage over the concept of habitual offenders” and how it was being used by the police.

Opposing States	Current trend
Punjab	It has not maintained a register of habitual offenders, nor have any orders been passed under it in the last 5 years.
Andhra Pradesh	No one in their current jail population is in custody under the habitual offender law.
Odisha	No cases have been registered under this law in the last 5 years.

What lies ahead?

- **Reviewing relevance** – States should conduct an objective analysis of the relevance of habitual offender laws.
- **Fair legislation** – States can ensure that legal frameworks do not stigmatise entire communities.
- **Empowerment programs** – Alternative crime-prevention methods like rehabilitation and social reintegration programs can be initiated.
- **Sensitisation** – Training can be given to police forces to prevent discrimination against Denotified Tribes.

Recommendations to Repeal Habitual Offender Laws
<ul style="list-style-type: none"> • National Human Rights Commission 2000 – It formed an Advisory Group, concluded that these laws can be repealed. • United Nations Committee on the Elimination of Racial Discrimination 2007 – It noted the way “habitual offender” laws were being applied and called for its repeal. • National Commission on DNT, SNT, NT headed by B.S. Renke 2008 – It noted the negative effect of the laws on the lives of these communities. • Xaxa Committee (2014) - The tag of criminality attached to DNTs and to the nomadic way of life of nomadic tribes persists to the present day.

8.2 United Nations Convention against Torture

Why in the news?

Recently High Court of Justice in London ruled against the extradition of Sanjay Bhandari.

What is United Nations Convention against Torture (UNCAT)?

- **UNCAT** - The Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (the "Torture Convention") was adopted by the UN General Assembly in 1984 and entered into force in 1987.
- **Definition of Torture** - The convention defines "torture" as any act by which severe pain or suffering, whether physical or mental, is intentionally inflicted on a person for purposes such as obtaining information or a confession, punishing an act, or intimidating or coercing a person.
- **Prohibition of torture** - States are obligated to criminalize and prosecute torture under their domestic law and to ensure that evidence obtained through torture is inadmissible in legal proceedings.
- **Non-Refoulement** - States are prohibited from returning (refouler) or extraditing a person to a country where there are substantial grounds for believing that they would be in danger of being subjected to torture.
- **Monitoring mechanism** - The UN Committee against Torture (CAT) monitors the implementation of the convention by its State parties.
- **Obligations of States Parties** - States are required to prevent torture within their jurisdiction, investigate and prosecute alleged acts of torture, and provide redress to victims
- **India's Status** - India signed the UNCAT in October 1997 but has not yet ratified it.

What are the implications of not ratifying the convention?

- **Hindrance in extradition cases** - Courts in foreign countries may continue to deny extradition requests citing India's poor record on torture.
- **Erosion of democratic and constitutional values** - Failure to criminalize torture contradicts India's commitment to human rights and justice.
- **Damage to India's global reputation** - Non-ratification of UNCAT places India among authoritarian regimes like Sudan and North Korea.
- **International criticism** - Non-ratification exposes India to criticism from international human rights organizations and the United Nations, which may affect its diplomatic relations and credibility on human rights issues.
- **Weakens legal framework** - Despite constitutional protections and Supreme Court rulings against torture, the *absence of a specific anti-torture law* has weakened India's legal framework.
- **Domestic accountability issues** - The absence of a binding commitment to prevent torture limits avenues for accountability within India, allowing impunity for law enforcement and public officials involved in torture practices.
- **Impact on victims** - Victims of torture and custodial violence lack legal recourse, which can perpetuate cycles of abuse and discourage reporting of such incidents due to fear of reprisals

What are the challenges in enacting an anti-torture law?

- **Legislative Hurdles** - India requires the enactment of national legislation, specifically the Prevention of Torture Bill, before ratifying international treaties.
- **Political and bureaucratic apathy** - Despite multiple judicial and expert recommendations, no concrete action has been taken.
- **Police brutality and lack of accountability** - Widespread use of torture in interrogations continues due to weak enforcement of existing laws.
- **Weak institutional mechanisms** - The lack of independent oversight of custodial violence contributes to impunity.
- **Fear of international scrutiny** - Ratifying the UNCAT would require India to submit to international human rights monitoring, which some policymakers resist.

What are the constitutional and legal framework against torture in India?

- **Article 21** - Protects the *right to life* and *personal liberty*, which includes freedom from torture.

- **Article 20(3)** - Provides protection against *self-incrimination*, indirectly discouraging *forced confessions* obtained through torture.
- **Article 22** – It safeguards against arbitrary arrest and detention, ensuring that individuals are informed of the grounds for arrest, have the right to consult a lawyer, and are produced before a magistrate within 24 hours.
- **Article 32** – It guarantees the "Right to Constitutional Remedies," empowering citizens to approach the Supreme Court for enforcement of their fundamental rights if they are violated.
- **Judicial enquiry** - In custodial deaths, Magistrate is empowered to hold inquiry under Section 196 of the Nagarik Suraksha Sanhita.

India has ratified several other international treaties against torture, including the Universal Declaration of Human Rights (1948) and the International Covenant on Civil and Political Rights (1976).

What are the judicial rulings against custodial violence?

- **D.K. Basu vs. State of West Bengal (1997)** – The Supreme Court of India laid down guidelines to prevent custodial violence and ensure the rights of arrested individuals, including the right to legal representation and medical assistance.
- The guidelines laid down in the case have been incorporated in the Criminal Procedure Code, 1973 by the Code of Criminal Procedure (Amendment) Act, 2008
- **Puttaswamy Judgment (2017)** - Reinforced the idea that human dignity and privacy are fundamental rights.
- **Nambi Narayanan (2018)** - In 2018, the Supreme Court exonerated Nambi Narayanan, a former ISRO scientist, in the ISRO espionage case, awarding him ₹50 lakh in compensation for the mental cruelty he endured.
- **Sunil Batra v. State (UT of Delhi)** - The Supreme Court of India struck down the provisions of separate confinement in the Prisoners Act on the grounds of arbitrary and violative of prisoners right to life and personal liberty guaranteed under Article 21 of the Constitution of India.
- **People's Union for Civil Liberties v. State of Maharashtra (2014)** - The Supreme Court held that the inquiry in the cases of death by police torture must be invariably conducted by Judicial Magistrate.

In Ashwani Kumar Case (2019), despite recognizing the need for an anti-torture law, the Supreme Court has declined to direct the legislature to enact the act.

What lies ahead?

- Torture in State custody irretrievably dents democracy's soft power.
- National Human Rights Commission has been requesting the Government of India to ratify the Convention Against Torture
- The Law Commission of India in its 273rd report Commission submitted a draft Prevention of Torture Bill, 2017 which defines acts that should constitute torture and prescribed punishments for such acts.
- Enactment of a strong anti-torture law and ratification of UNCAT would strengthen India's global credibility and commitment to human rights.
- It will ensure better oversight and strict enforcement of laws against custodial violence.
- Special monitoring bodies can be setup to investigate and prosecute cases of custodial torture.

8.3 Food Wastage

Why is in News?

The United Nations Environment Programme's Food Waste Index Report (FWIR) 2024 revealed that 1.05 billion tonnes of food was wasted globally in 2022, with India ranking among the top contributors.

What is the status of food waste at global level and in India?

- **Food wastage** - As defined by FWIR 2024, it includes edible and inedible parts discarded from the food supply chain, from manufacturing and retail to restaurants and households.
- This differs from food loss, which occurs earlier in the supply chain due to issues such as poor storage, transport and handling.
- **Global level** - The United Nations Environment Programme's Food Waste Index Report (FWIR) 2024 reveals that in 2022, the world wasted 1.05 billion tonnes of food, equating to nearly 20% of all food available to consumers.

Food Waste Index Report 2024 is published by United Nations Environment Programme (UNEP) and WRAP (Waste and Resources Action Programme).

- **India's Food Waste** - India's is the second highest food-wasting nations, second only to China.
- 78 million tonnes annually, while 20 crore Indians go to bed hungry.
- **Per capita waste** – The per capita household food waste in India (55 kilograms annually) is lower than in some other countries such as the United States (73 kg).

What are the causes of food waste?

- **Inefficiency in food supply chain** - Food waste in supply chains often results from inefficiencies that span across production, storage, transportation, and distribution.
- **Household waste** - Approximately 61% of global food waste occurs at the household level.
- Household waste is driven by
 - Over-purchasing - Buying more groceries than needed.
 - Improper meal planning - Not planning meals ahead of time and then having ingredients go bad.
 - Limited storage - Small refrigerators or lack of cool, dry pantries
- **Cultural habits** - Excess food preparation during events, festivals, celebrations.
- **Overstocking** - Stores often stock excessive amounts to meet customer expectations, resulting in unsold items going to waste.
- **Limited food storage facilities** - In rural and urban areas, retail markets struggle with poor refrigeration and product short shelf life.
- **Overproduction** - Farmers often produce more food than can be sold, leading to surplus that is discarded.

What are the impacts of food waste?

- **Economic loss** - Monetary value of the waste amounts to about \$1 trillion.
- The environmental cost of food waste is immense.
- **Resource wastage** - Food production is resource-intensive, requiring huge amounts of land, water and energy.
- When food is wasted, so are these precious resources.
- **Waste generation** - In India, food waste accounts for 10%-12% of total municipal waste.
- **Green House Emission** – The UN Climate Change (2024) reports that food loss and waste generate 8%-10% of annual greenhouse gas emissions globally.
- If food waste was in the form of a country, it would be the third-largest emitter of greenhouse gases after China and the U.S.
- **Increase in carbon foot print** - Household-level activities, including food waste, excessive energy consumption and improper waste disposal (not recycling or composting), significantly increase the carbon footprint.
- **Climate change** – High carbon foot print and GHG emissions drives climate change which further intensifies food insecurity in India.
- **Social injustice** - Widespread wastage prevents food from reaching those who need it most and further increasing hunger level.
- **Hindering SDG progress** – Food waste affects attaining SDG 2 (Zero Hunger) and SDG 12.3 (reduce food waste at retail and consumer levels).

Methane is a potent greenhouse gas produced when organic matter decomposes without oxygen.

What can be done to reduce food waste?

- Food waste are need to be reduced to reduce its carbon footprint and ensure food security.
- A collaborative effort from governments, businesses, and individuals is essential for a sustainable, hunger-free future.
- **At Household Level**
 - Smart Meal Planning: Stick to shopping lists.
 - Efficient Storage: Use airtight containers and proper refrigeration.
 - Creative Leftover Usage: Reuse food (e.g., make soups from vegetables).
 - Composting: Convert kitchen scraps into organic manure.

- Donating Surplus Food: Contribute to food banks and charities.
- **At Systemic Level:**
 - Infrastructure Development: Investment in cold storage and transport.
 - Business Initiatives: Redistribution of unsold food.
 - Education & Awareness: Educational institutions can raise awareness about responsible consumption.
- **Government Policies:**
 - Subsidizing food redistribution networks (apps linking surplus food with needy people).
 - Encouraging farmers to adopt better storage and refrigeration.
 - Expanding initiatives like “Save Food Share Food”.

9. INTERNATIONAL RELATIONS

9.1 India Mauritius Bilateral Relationship

Why in News?

Indian Prime Minister is visiting Mauritius on March 11-12, 2025 to be the guest of honour at its Independence Day celebrations on March 12.

What is the historical connection between India and Mauritius?

- **India - Mauritius** - India has close and longstanding relations with Mauritius, an island nation in the Western Indian Ocean, anchored in shared history, demography and culture.

Mauritius is a former British and French colony that gained independence from British rule in 1968.

- **Indian origins** - Nearly 70% of the population of Mauritius is of Indian origin, being the descendants of Indian indentured labour who were brought by the colonial rulers to work on sugar plantations.
 - Under the nearly century-long French rule (in the year 1729), the first Indians were brought to Mauritius from the Puducherry region, to work as artisans and masons.
- **Colonial ties** - Under British rule, about half a million Indian indentured workers were brought to Mauritius between 1834 and the early 1900's.
- **Aapravasi Diwas** – It is the day on which the first batch of these workers, comprising 36 persons, arrived in Mauritius on November 2, 1834 onboard the ship ‘Atlas’.
- **Gandhi in Mauritius** - On his way to India from South Africa, Mahatma Gandhi briefly stopped over in Mauritius from October 29-November 15, 1901 and steered the destiny of Indian labourers.
- **National Day of Mauritius**- The date of Gandhiji's Dandi Salt March is celebrated on March 12 as the National Day of Mauritius.
- **Bose & Ramgoolam** - Sir Seewosagur worked closely with Netaji Subhas Chandra Bose during Bose's stay in Britain between 1919-21.
 - They were part of the Indian students' movement in London working for Indian independence.
 - He did the proof-reading for Bose's famous work, The Indian Struggle.
- **Bilateral relationship** - Independent India established diplomatic relations in 1948, even before the independence of Mauritius.
- **First responder** - India has traditionally been the 'first responder' for Mauritius in times of crisis, including during the recent Covid-19 and Wakashio oil-spill crises.



Sir Seewosagur Ramgoolam, had led the struggle for his country's independence and was its 1st Prime Minister.

What is the trade relationship between India and Mauritius?

- **Largest trading partner** - Since 2005, India has been among the largest trading partners of Mauritius.
- **Bilateral trade** - India-Mauritius bilateral trade has expanded rapidly over the past few years, reaching \$554 million in 2022-23.
 - For the FY 2022-2023, Indian exports to Mauritius was USD 462.69 mn, Mauritian exports to India was USD 91.50 mn and Total trade was USD 554.19 mn.
- **Trade growth** - Trade has grown by 132% in the last 17 years, from USD 206.76 million in 2005-06 to USD 554.19 million in 2022-23.
 - **Major exports to Mauritius** - Pharmaceuticals, cereals, cotton, shrimps, prawns and bovine meat.
 - **Major import from Mauritius** - Vanilla, medical devices, needles, aluminium alloys, scrap paper, refined copper, men's cotton shirts
- **Foreign investment** - Due to the favourable Double Taxation Avoidance Agreement (DTAA) with India, Mauritius is the second largest source of FDI into India for the FY 2023-24, after Singapore.
 - Cumulative FDI worth USD 177 billion has come from Mauritius to India since 2000 (25% of total FDI inflows into India).
- **Investment in Mauritius** - Indian companies have invested over USD 200 mn in the last five years.
- **CECPA** - Mauritius and India signed the Comprehensive Economic Cooperation and Partnership Agreement (CECPA) in 2021.
- **International financial center** - Mauritius has emerged as a successful international financial centre, mainly on the back of the DTAA.
- **Indian PSUs in Mauritius** - At present, there are 11 Indian PSUs are in Mauritius.
 - Bank of Baroda, State Bank of India (Mauritius), Life Insurance Corporation, New India Assurance Corporation, Telecommunications Consultant India Ltd, Indian Oil (Mauritius) Limited etc.

Mauritius is a part of the African Union and has preferential trade agreements with African countries.

What are the maritime security cooperation?

- **Western Indian Ocean security** - Mauritius is the sentinel of the western Indian Ocean and maritime security cooperation between our two countries is critical to enhancing India's maritime security.
- **Colombo Security Conclave** - It brings together India, Sri Lanka, the Maldives, Mauritius and Bangladesh to work together to make this ocean space safe and secure.
- **Maritime surveillance** - India has set up a chain of coastal radar stations, redeveloped the Mauritian island of Agaléga to serve as a joint surveillance facility.
- **Information cooperation** - India has given Mauritius access to the Indian Navy's Information Fusion Centre for the Indian Ocean Region (IFC-IOR) in Gurugram, India.
- **Marine survey** - India's oceanographic survey ship, INS Sarvekshak, has just completed the survey of 25,000 sq.km of Mauritius' ocean territory.

What is the cultural relations and people-to-people ties?

- **Indira Gandhi Centre for Indian Culture (IGCIC)** - In 1987, India established ITC, which is India's largest cultural centre abroad.
- **Mahatma Gandhi Institute** - In 1976, it was inaugurated as a premier institution for promoting Indian languages and culture.
- **World Hindi Secretariat** - The Island hosts the World Hindi Secretariat that is supported by India.
- **Know India Programme (KIP)** - Since 2004, youngsters from Mauritius have participated in the Know India Programme (KIP) of the Ministry of External Affairs.
- **ITEC** - Mauritius is one of the largest beneficiaries of the Indian Technical and Economic Cooperation (ITEC) programme
- **e-Vidya Bharti Arogya Bharti (e-VBAB)** - Since 2020, India has also been offering scholarships to Mauritians under this distance learning project.

9.2 India-Afghanistan Relation

Why in news?

Reports suggest that Prime Minister Narendra Modi may allow a new envoy for India's embassy in Afghanistan.

Who are Taliban?

- **Origins (1990s)** – They are founded in 1994 composed of Pashtun Islamic students and ex-mujahideen, emerged during the Afghan Civil War after the Soviet withdrawal (1989).
- **Rise to Power (1994-1996)** - They seized Kabul in 1996, overthrowing Burhanuddin Rabbani and established the Islamic Emirate of Afghanistan.
- **Rule (1996-2001)** – They imposed strict Sharia law and banned music, TV, and women's education.
- **Al-Qaeda attack on US** - Sep 11, 2001 attacks in the U.S. by Al-Qaeda, killed nearly 3,000 people.
- **US intervention** - Al-Qaeda's leader Bin Laden was in Afghanistan, under the protection of the Taliban who refused to hand him over.
- **Overthrow of Taliban** –The US intervened militarily and US-backed forces in the north swept into Kabul and removed Taliban from power in 2004.
- NATO allies had joined the US and a new Afghan government took over in 2004.
- **Doha Agreement (2020)** - The United States–Taliban deal, the Agreement for Bringing Peace to Afghanistan brought an end to the 2001–2021 war in Afghanistan and Taliban returned to power in 2021.

What is the status of India Afghanistan relation?

- **India- Afghanistan Relations** - India and Afghanistan share a deep-rooted relationship built on historical and cultural ties.
- **Strategic Partnership Agreement** – It was signed in October 2011 facilitating assistance to help rebuild Afghanistan's infrastructure and institutions, education and technical assistance.
- **Commercial Relation** - India is Afghanistan's largest trade partner in South Asia, with bilateral trade reaching USD 1.5 billion in 2019-20.
- **Chabahar Port** - Iran's only oceanic port, provides strategic direct trade route between India and Afghanistan, bypassing Pakistan.
- **Salma Dam** – India helped Afghanistan in building the Salma dam, known as Afghan-India Friendship Dam in 2016.
- **Cultural Relations** - India-Afghanistan Culture Week (2017), musical troupe visits, and instrumental performances fostered people-to-people ties.
- **India-Afghanistan Foundation (IAF)** – Established in 2007, IAF funds projects in economic, educational, technical, and cultural cooperation.
- **Sports Cooperation** - India and Afghanistan have robust relations in the field of sports.
- **Cricket**- Cricket has been a major factor in promoting people-to-people ties between the two countries.
- The Afghanistan Cricket Board (ACB) uses Noida, Dehradun, and Lucknow as home grounds.
- India also supported the construction of a cricket stadium in Afghanistan.
- **Football**- Since 2011, Afghan youth teams have participated in India's Subroto Cup International Tournament.
- **Scholarships & Training**—Over 3,500 Afghan students receive training in India annually, and more than 15,000 study on a self-financed basis.
- **Educational Initiatives**- India has assisted in establishing institutions like the Afghanistan National Agricultural Sciences and Technology University (ANASTU) and has provided technical training in sectors such as agriculture and mining.
- **Humanitarian Assistance** - India has provided significant humanitarian aid to Afghanistan during COVID 19 and other political crisis times.
- **Community Development** - Since 2005, India and Afghanistan have partnered in the area of community development through the High Impact Community Development Projects (HICDP).

- **Indian Diaspora in Afghanistan** - Approximately 1,710 Indians currently reside in Afghanistan, engaged in banking, IT, construction, healthcare, NGOs, security, and academia.

What are the challenges in India – Afghanistan relation?

- **Pakistan Factor** - Transit restrictions through Pakistan have posed challenges in accessing the Afghanistan.
- **Influence of China** - China has already accepted Taliban credentials and invested in infrastructure projects in Afghanistan and integrate into its Belt and Road Initiative (BRI).
- **Terrorism Risk** – Activities of terrorist groups like the Islamic State (IS), has increased in Afghanistan.
- The Taliban has been accused of supporting the Tehrik-e-Taliban Pakistan (TTP), which has carried out deadly attacks on Pakistan’s military.
- **Human Rights Issue** – Taliban administration has faced international criticism for human rights violations, curtailing women’s rights and freedom of expression.

China has become the first country to name a new ambassador to Afghanistan since the Taliban retook power in 2021.

What lied ahead?

- Given Afghanistan’s history of instability and India’s past experience with terrorism, the risks of engagement remain high.
- India has begun to engage with the Taliban through high-level meetings, such as the recent discussions between Foreign Secretary Vikram Misri and Taliban officials.
- India shall work together with other like-minded states so that a regional framework for engaging with the Taliban regime can be worked out.
- India can influence the Taliban through its soft diplomacy to respect international human rights laws.

9.3 India US Bilateral Trade Agreement

Why in News?

India and USA have agreed to negotiate the first stage of a mutually beneficial, multi-sector Bilateral Trade Agreement (BTA) by the fall of 2025.

What is Bilateral Trade Agreement (BTA)?

- **Bilateral Trade Agreement** - It is a deal between two countries to set the terms and conditions for trade between them.
- **Objective** - These agreements are designed to encourage economic cooperation and remove barriers like tariffs, quotas, or import restrictions.
- **Components of BTA** - These include stipulations governing customs duties and other levies on imports and exports, commercial and fiscal regulations, transit arrangements for merchandise, customs valuation bases.
- Most bilateral trade agreements, either explicitly or implicitly, provide for
 - Reciprocity
 - Most-favoured-nation treatment
 - National treatment of nontariff restrictions on trade.

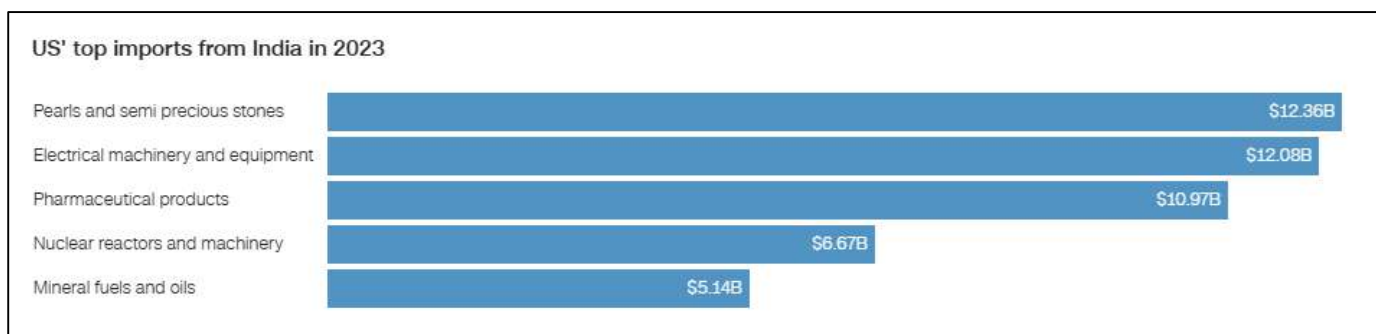
What is the trade relationship between India and USA?

- **Largest trading partner** - India’s was once the largest trading partner of US, accounting for almost \$120 billion in trade.
 - But now China overtakes US to become India’s top trading partner in FY24
 - India in trade deficit with nine out of top 10 partners in 2023-24.

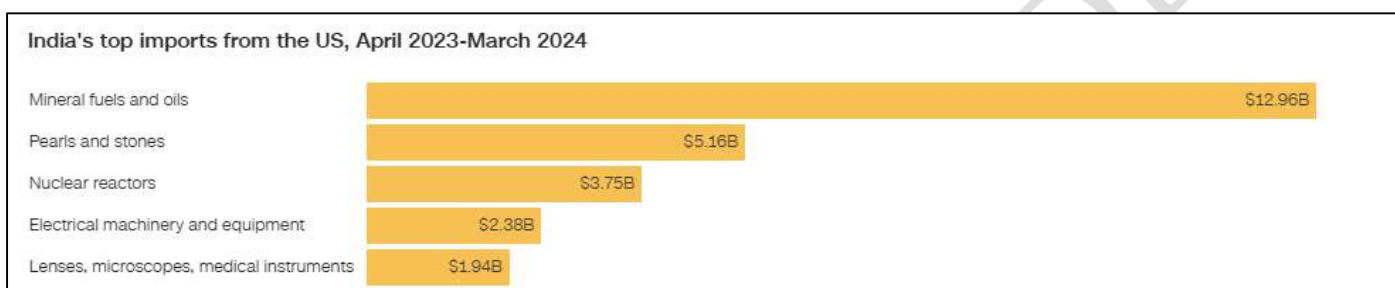
Largest trading partner for India		Largest trading partner for US	
1. US	\$119.7B	1. Mexico	\$839.9B
2. China	\$118.4B	2. Canada	\$762.1B
3. United Arab Emirates	\$83.7B	3. China	\$582.5B
4. Russia	\$65.4B	4. Germany	\$236.0B
5. Saudi Arabia	\$43.0B	5. Japan	\$227.9B
6. Singapore	\$35.6B	6. South Korea	\$197.1B
7. Iraq	\$33.3B	7. Taiwan	\$158.6B
8. Indonesia	\$29.4B	8. Vietnam	\$149.7B
9. Hong Kong	\$28.7B	9. UK	\$148.0B
10. South Korea	\$27.6B	10. India	\$129.2B

- India and USA agreed to more than double bilateral trade to \$500 billion by 2030, as part of ‘Mission 500’.

India’s export to USA – It is mostly semi-precious stones, electrical machinery, Pharmaceutical products to USA



- **India’s import from USA** - India gets crude oil and related products, gems and stones, nuclear reactors and electrical and medical equipment.



- **Investment** - USA is the 3rd largest investor in India with cumulative FDI inflows of US\$ 65.19 billion from April 2000-March 2024.

What are the challenges in implementing BTA between India and USA?

- **International trade regulations** - A significant portion of international trade law is codified in the General Agreement on Tariffs and Trade (GATT) and governed by the World Trade Organization (WTO).
- Since both the U.S. and India are members of the WTO, their bilateral trade dealings must align with the standards set by WTO law.
- **MFN principle** - The WTO system operates on the most favoured nation (MFN) principle, which prohibits discrimination between trading partners.
- Therefore, an FTA that grants preferential access to certain countries violates the MFN rule.
 - Countries can still establish FTAs under specific conditions.
- **WTO law** - If India and the U.S. reduce tariff rates on each other’s limited products, as part of some bilateral deal, without extending similar treatment to other countries, it would violate WTO law.
- **Inclusion of all trade** - Article XXIV. 8(b) of the GATT, requires member countries to eliminate customs duties and other trade barriers on “substantially all the trade” within the FTA.
- Therefore proposed BTA between India and the U.S. must cover “substantially all trade” to be legally valid.

What lies ahead?

- **Interim agreement** – India and the U.S can notify the agreement as an ‘interim agreement’, leading to the formation of an FTA.

GATT Interim Agreement

- Article XXIV of GATT permits them to sign ‘interim agreements’ that pave the way for an eventual FTA, subject to specific conditions
- Under Article XXIV.5 of GATT, countries can enter into an ‘interim agreement’ if it is necessary for forming a free trade area.

- This 'interim agreement' must include a plan or schedule for establishing an FTA within a reasonable timeframe, which should typically not exceed 10 years.
- **Enabling Clause** -WTO law provides another exception to the MFN principle in the form of what is known as the 'enabling clause'.
- As per this arrangement, WTO countries can deviate from the MFN principle if it is meant to provide better market access to the products of developing countries.
- The proposed Bilateral Trade Agreement (BTA) between India and the USA aims to deepen economic connections and reach the "Mission 500" trade target. Challenges include WTO compliance and trade requirements.
- Solutions involve interim agreements and careful negotiation to address barriers and promote growth for both countries.

9.4 India – US Agricultural Trade

Why in News?

Amid the threat of tariffs, the new US administration is seeking greater market access for American agricultural produce in India.

What is the status of India – US Agricultural Trade?

- **India-United States trade** - In 2023, India exported \$85.5B to United States.
- **United States-India trade** - In 2023, United States exported \$41.4B to India.
- **India's agri export to US** – India exported \$5.7 billion worth agricultural products to US which is 11% of the total agri exports from India in the calendar year 2024.
- **Major export items** - Top product are marine products, rice- both Basmati and non-Basmati rice and vegetable extracts.
- **US agri exports to India** - In 2024, the US exported agricultural products worth \$2.27 billion to India.
- **Major exports** included tree nuts (\$1.12 billion), ethanol (\$441.25 million), and cotton (\$210.73 million).

What are the challenges in India – US Agri trade?

- **Impending reciprocal tariff** - The intensifying demand for greater Indian market access by US, using potential reciprocal tariffs on Indian exports.
- **Agri import tariffs of India** - India's simple average agricultural tariff is 39 % and the tariff structure ranging from zero to 150 % to protect its agricultural sector.
- **US Tariffs** - The US also imposes higher tariffs on select agricultural goods - for instance, tobacco (350 %).
- **Trade Imbalances** - The US often raises concerns about its trade deficit with India, pushing for more balanced trade.
- **US interest** - The US has three major crops of interest –soyabean, corn (maize) and cotton – when it comes to securing greater market access in India.
- The US is a huge exporter of all the three commodities, whose combined shipment value peaked at almost \$62 billion in 2022.
- **Declining US export to other markets** – China's import of US agri commodities like Cotton, Corn, Soya bean has been declining.
- Due to this US has been pushing markets like India to open its market to compensate the loss.
- **Subsidies and domestic Policies** - Both nations have domestic agricultural policies and subsidies that can distort trade and create disagreements.
- **Threat to domestic production** - If India opens its dairy sector which is being demanded by the US, it could lead to an influx of heavily subsidized imports, threatening the livelihoods of millions of small-scale Indian dairy farmers
- **Global political development** – Use of trade as an instrument to achieve geopolitical objectives.

- The new US administration announcement to impose 25% additional tariffs on countries that buy oil from Venezuela.
- In 2024, India imported 22 million barrels from Venezuela, and Indian PSUs have invested about \$1 billion in the country.

What lies ahead?

- India and the U.S. can focus on increasing market access, reducing import duty and non-tariff barriers, and enhancing supply chain integration in the proposed bilateral trade agreement.
- India can continue to engage with the U.S. to achieve enhancement and broadening of bilateral trade ties in a mutually beneficial and fair manner.

9.5 Remodelling the UAE-India Aviation Partnership

Why in News?

Recently, Ambassador of the United Arab Emirates (UAE) endorsed the need for a better civil aviation cooperation between India and UAE.

What is the status of India – UAE civil aviation partnership?

- **UAE travel market** - UAE is India's most significant outbound travel market, with over 4.5 million Indian tourists visiting the UAE in 2023.
- **India UAE aviation connectivity** - Every week, Indian carriers fly over 600 times to the UAE, while UAE carriers operate over 500 weekly services to India.
- **International connectivity** - Dubai and Abu Dhabi are key transit points for Indian travellers flying to Europe, the US, and Africa.
- **Current aviation agreement** – India UAE bilateral air service agreement was signed in January 2014.
- It enables airlines from both countries to operate a combined total of 66,000 seats weekly connecting Dubai to 15 cities in India.

India's aviation market is the world's third-largest domestic market in terms of passenger numbers.

What are the impacts of restrictive bilateral aviation agreement?

- **High cost of airline ticket** - Mismatch between supply and demand has directly contributed to increased airline tickets prices.
- **Limited choices** – The restriction limits the number of airlines available for travel for the UAE and Indian travelling public alike.
- **Restricts travel ability** – Limited availability of airlines and high cost affect the ability of Indian citizens to travel abroad.
- **Economic impact** – It inhibits UAE-India economic partnerships in investment, trade.
- **Affects domestic growth** – Limited connectivity to only 15 cities, ignores key Indian growth centres, including Surat, Visakhapatnam, Indore, Tiruchirappalli and Patna to operate services.

What are the needs of broader India UAE aviation relationship?

- **Increasing demand** - Every 1% increase in Indian passport holders, a further 10 million Indians will seek to travel overseas, this situation will only grow more acute.
- **Economic partnership** – UAE and India have expanded cooperation through trade agreements such as the Comprehensive Economic Partnership Agreement (CEPA).
- **Economic growth** - A modernised aviation strategy will act as an economic multiplier, drive investment.
- **Trade development** - UAE is India's 3rd largest trading partner, and aviation boosts cargo exports such as electronics, textiles, and pharmaceuticals.
- **Regional connectivity** – UAE investment in UDAN airport scheme to better connect Tier-2 and Tier-3 Indian cities and becomes a key pillar of regional and international connectivity and growth.
- **Indian aviation dream** - UAE will support, through new investments and partnerships, maintenance, repair, and overhaul (MRO) industry and make India global aviation powerhouse.

Air cargo between India and UAE contributes 18% of India's total air freight movement.

- **Tourism development** – Better connectivity between India and UAE promotes India’s globally renowned tourism sector.
- **Develops India -UAE partnership** - Enhanced cooperation in the aviation sector unlock new avenues of mutually beneficial growth and integration in UAE-India partnership.

G.S PAPER III

10. ECONOMY

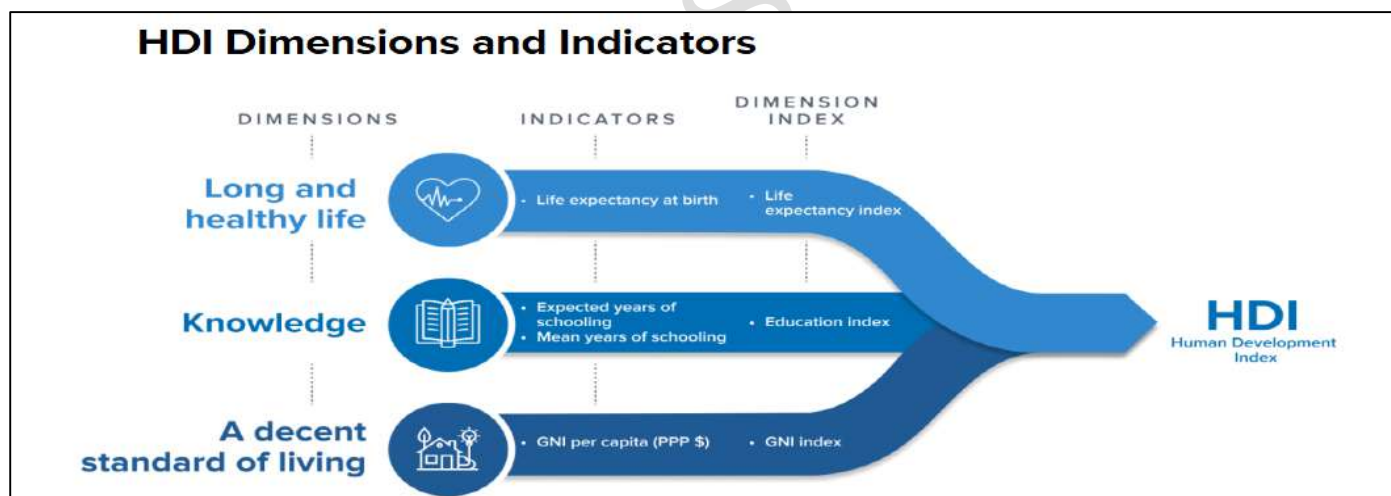
10.1 Inadequacy of Human Development Index

Why in News?

Recently human development index was released by United Nations Development Program (UNDP).

What is Human Development Index (HDI)?

- **HDI** - The Human Development Index is a summary measure of average achievement in key dimensions of human development
 - Long and healthy life
 - Being knowledgeable
 - Having a decent standard of living.
- **HDR report** – The index was released by the United Nations Development Program as part of its annual Human Development Report.
- **Objective** - It was created to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone.



- **Sub-Indices** - HDI figure is an aggregate of the Life Expectancy Index (LEI), the Education Index (EI) and the Income Index (II).
- Each of the indices are classified into Low, Medium, High and Very High grades.
- **Categorization of development** – The index subdivides performances of countries into four category tiers - very high, high, medium and low human development.
- **India’s score** - India currently has a reported HDI of 0.644 in 2023-24 report with medium human development category.

Cutoff Score	Performance Tier
Below 0.600	Low Human Development
0.600 to 0.699	Medium Human Development
0.700 to 0.799	High Human Development
0.800 to 1.000	Very High Human Development

How are the sub-indices measured?

- **Life Expectancy Index** - It is a scaled expression of life expectancy at birth of a country, as a fraction of the age range 20 to 85 years.
- A life expectancy of 20 years or below means the index is 0.000 and 85 years or more means 1.000.

$$\text{Life Expectancy Index (LEI)} = (\text{Life Expectancy} - 20) / (85 - 20)$$

- **Education Index** - It is an unweighted mean of two parameters - mean years of schooling, and expected years of schooling.
 - **Mean of years of schooling** – It is an aggregate measure of the average years of education received by a country’s adult population of aged 25 years and above.
 - It is expressed as a scaled index that saturates at 15 years of education.

Life Expectancy	LEI Performance Tier
Below 59 years	Low Human Development
59 to 65.4 years	Medium Human Development
65.5 to 71.9 years	High Human Development
72 years or more	Very High Human Development

Mean Years of Schooling	Performance Tier
Less than 9 years	Low Human Development
9 to 10.4 years	Medium Human Development
10.5 to 11.9 years	High Human Development
12 years or more	Very High Human Development

$$\text{Mean Years of Schooling Index (MYSI)} = (\text{minimum}(15, \text{MYS}) / 15)$$

- Thus, a country with 0 years of average education for its adult population scores 0.000 and it scores 1.000 if it achieves 15 or more years of schooling for its adult population.
- **Expected years of schooling** - It is measured from current enrollment data in primary, secondary and tertiary education tiers relative to the total population of each of those age groups.
- It is expressed as a scaled index that saturates at 18 years of education.

Expected Years of Schooling	Performance Tier
Less than 10.8 years	Low Human Development
10.8 to 12.5 years	Medium Human Development
12.6 to 14.3 years	High Human Development
14.4 years or more	Very High Human Development

$$\text{Expected Years of Schooling Index (EYSI)} = (\text{minimum}(18, \text{MYS}) / 18)$$

- **Education Index**- It is the unweighted mean of MYSI and EYSI.
- **Income Index** - It quantifies the economic prosperity of an entity as a logarithmic scale expression of gross national income in purchasing power terms, per capita (GNI PPP per capita).
- It ranges between the range of \$100 and \$75000 international dollars.

$$\text{Education Index (EI)} = (\text{MYSI} + \text{EYSI}) / 2$$

GNI (PPP) per capita	Performance Tier
\$5308 or less	Low Human Development
\$5309 to \$10292	Medium Human Development
\$10293 to \$19954	High Human Development
\$19955 or more	Very High Human Development

$$\text{Income Index (II)} = (\log(\text{minimum}(75000, \text{GNIPPPperCapita})) - \log(100)) / (\log(75000) - \log(100))$$

Final GDI – The actual human development index is the geometric mean of the LEI, EI and II figures.

$$\text{HDI} = \text{GeoMean (LEI, EI, II)}$$

What are the inadequacies of HDI?

- **Over simplification** - The HDI simplifies complex human development inequality, poverty, human security, and empowerment aspects into a single composite index.
- **Unrepresentative data** - The principal failure of the UNDP HDI score in the context of India is unrepresentative data.
- **Inconsistent data** – The data used by UNDP for measuring life expectancy is inconsistent with the health ministry data.
- **Backward looking of MYSI** - Mean years of schooling measures the historical educational attainment over at least half a century ago.
- **Undermeasurement of GNI** – UNDP number measured the Covid 19 period value and did not took account of the growth since the covid period.
- **Neglects Inequality** - Two countries with the same HDI score can have vastly different levels of inequality.

Expected year of schooling	
As per UNDP	National Data
12.6	13.75
India's Life Expectancy	
As per UNDP	National Data
67.7	72.5

- **Exclusion of Other Factors** - The HDI does not consider other important factors such as environmental sustainability, political freedom, and cultural diversity.

What lies ahead?

- To address these issues, alternative indices such as the Inequality-Adjusted HDI and the Augmented HDI can be used.

National Income	
As per UNDP	National Data
\$ 6951	\$12000

10.2 Impact of GeM on India's Economy

Why in News?

In the last financial year, GeM order volume reached 62, 86, 543, with an order value of Rs. 4, 03, 305 Crore.

What is GeM?

- **GeM** - Government e-Marketplace (GeM) is the Public Procurement Portal for procurement of goods and services for all Central Government and State Government Ministries, Departments, Public Sector Units (PSUs) and affiliated.
- It was launched in 2016 by the Ministry of Commerce and Industry.
- **Objective** - To create an open and transparent centralized and unified public procurement procurement platform for government buyers and suppliers of goods and services.
- **Core principles of GeM**
 - **Openness** - GeM shall be an open marketplace wherein it promotes access to information on sellers, goods, and services.
 - **Fairness** - GeM allows sellers, big and small, to gain direct access to Government buyers fairly provided with a level playing field.
 - **Inclusiveness** - GeM shall promote inclusiveness, which means that all Government buyers and sellers shall be accepted on the platform.



What are the key features of GeM?

GeM: Mission

- Institute a unified procurement policy to encourage behavioral change and drive reform.
- Establish a lean, dynamic organization capable of continuous innovation and market driven decision making.
- Build an easy to use, fully automated platform to ensure transparency and efficiency in procurement
- Demonstrate commitment to delivering value by ensuring right quality at right price
- Create a sustainable ecosystem covering all stakeholders and driving inclusive development in India

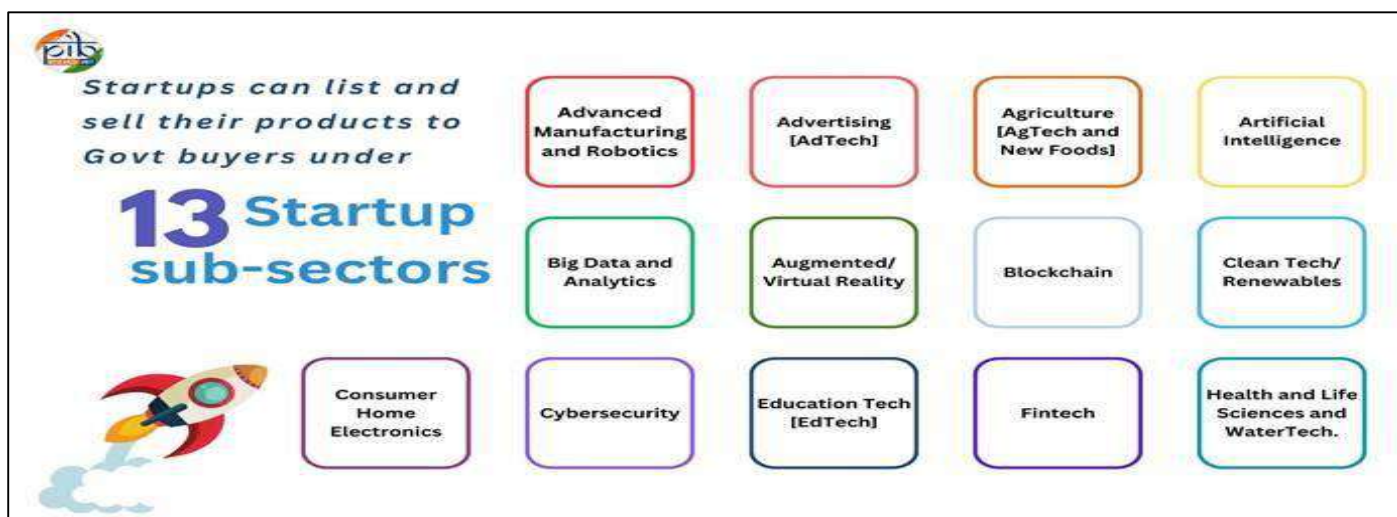
Key Features of GeM

- SWAYATT: Promoting Ease of Doing Business
- Startup Runway 2.0: Showcasing Innovation
- Womaniya: Empowering Women Entrepreneurs
- MSME SC/ST entrepreneurs on GeM

- **SWAYATT** – To enhance ease of doing business and establish direct market linkages for startups, women entrepreneurs, Micro & Small Enterprises (MSEs), Self Help Groups (SHGs) and youth, especially those from backward sections of the society.

Startups, Women & Youth Advantage through Transactions (SWAYATT) initiative was launched in 2019.

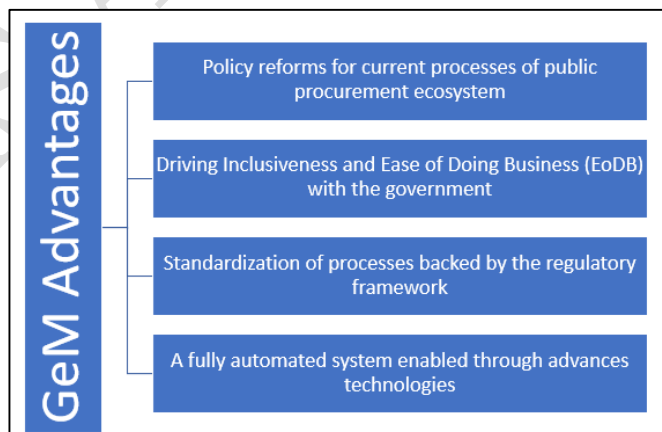
- **Startup Runway 2.0** – To enable Startups to showcase their innovative products and services to Government buyers and engage in public procurement.



- **Womaniya** - To showcase products made by women entrepreneurs and women self-help groups [WSHGs], and spur Women entrepreneurship.
- **MSME SC/ST entrepreneurs** – GeM mandates procurement of 25% from MSMEs and a sub target procurement of 4% goods and services from MSME entrepreneurs within SC/ ST communities.
- **SARAS Collection** - It is a pristine handcrafted collection of handicrafts, handloom textiles, furnishings, accessories from top of the line SHGs in India.

What are the impacts of GeM?

- **Economic growth** - Public procurement plays a crucial role in a nation's economic growth, directly impacting the lives of its citizens.
- **Effective use of public funds** - When governments purchase goods and services efficiently and transparently, it ensures the effective use of public funds.
 - In the 2023-24 financial year, the order volume reached 62, 86, 543 with an order value of Rs. 4, 03, 305 Crore.
- **Drives employment** – Procurement by the government stimulates economic opportunities for businesses of all sizes and employment for citizens.
- **Inclusive growth** – GeM is an open and inclusive platform that benefits not just government buyers but also local entrepreneurs, startups, and small businesses.
- **Promotes innovation** - GeM has enabled startups to fulfil orders worth Rs. 35,950 Crore.
- **Women empowerment** - Women entrepreneurs comprise 8% of the total seller base on GeM, with cumulative 1, 77, 786 Udyam-verified women micro, and small enterprises (MSE).



10.3 Women's invisible labour

Why in News?

The Time Use Survey 2024 (January-December), released by the Ministry of Statistics and Programme Implementation last week, confirms that women take on a lion's share of unpaid work.

What is the gender divide in domestic labor?

- **Women's unpaid work** - Women perform over eight times the amount of unpaid work, valued at 15% to 17 % of the GDP notionally.
- **Participation gap in unpaid domestic services** – While 81% of female participated in unpaid domestic services, it was just 21% of male.

- **Contribution gap in unpaid domestic services** - In 2024, women spent 289 minutes a day on unpaid domestic services, 10 minutes less than in 2019, but still 201 minutes more than men.
- **Participation gap in care giving** - 41 % of females aged 15-59 years participated in caregiving for their household members, male participation in this age group in such caregiving was 21.4 %.
- **Contribution gap in care giving** - Female participants in caregiving activities spent about 140 minutes in a day, compared to 74 minutes spent by male participants.

What are the impacts of gender divide in domestic labour participation?

- **Low Female Workforce Participation** - Women spend almost 5 hours daily on unpaid work, which limits their ability to engage in formal employment.
- **Job insecurity** - Women engaged in unpaid work often enter low-paid, informal jobs with little job security.
- **Wage gap** - This structural inequality exacerbates wage gaps, with women earning significantly less than men for similar work.
- **Wastage of human resources** – Valuable ability and potential of educated and skilled women is kept unused in households.
- **Affects skill development** - The extensive hours spent on household responsibilities limits women ability to acquire additional qualifications.
- **Reinforcement of gender roles** - Traditional norms continue to associate women with domestic work and men with paid employment.
- **Psychological and health burdens** - The physical and mental toll of managing unpaid labor leads to burnout, stress, and health issues.

India's female labor force participation rate (FLFP) is 41.7%, compared to 78% for men (Periodic Labour Force Survey 2023-24).

What can be done to bring equality?

- Inclusivity will have to begin with a re-imagining of the foundation of household dynamics.
- Dismantling the stereotype around the household work and encouraging shared domestic responsibilities.
- Incorporating unpaid work in GDP calculations to measure the economic value of household work.
- Invest in care economy, particularly in early childhood care and education to increase the female labour force participation rate.
- Promoting behavioral change through campaigns like "Share the Load" (ariel) to successfully challenge gendered domestic roles.

10.4 Sustaining change in Indian labour markets

Why in News?

The Ministry of Statistics and Programme Implementation (MoSPI) has released the results of Annual Survey of Unincorporated Sector Enterprises (ASUSE) for 2023-24.

What are the changes in the labour market?

- **Employment growth** – As per the RBI KLEMS database, 46.7 million jobs were created in FY24, more than double the 19.1 million in FY23.
- **Increase in MSME job** - The MSME Udyam portal has jobs rising from 121 million in 2023 to 201.9 million in 2024.
- **Increase in manufacturing employment** - The Annual Survey of Industries (ASI) FY23 found manufacturing employees increased 7.5% to 18.4 million from 17.2 million in FY21.

Periodic Labour Force Survey (PLFS) shows the average rate of growth of manufacturing employment rising from 1.15 per annum (pa) over 2017/18-19/20 to 5.8 pa over 2019/20 to 2022/23.

- **Increasing diversity in rural jobs** – The 2023-24 PLFS annual report shows only 59.8% of usual status rural workers are in agriculture, the rest are in various types of RNFE.

- **Rise in rural female labour force participation rate (LFPR)** - The share of male workers in agriculture fell to 49.4 per cent and that of female rose to 76.9 per cent.
- **Declining share of agri income** - The share of agriculture in average household income fell from 22 % to 8 %.
- **Rise of rural manufacturing employment** - It has grown at 4 %, exceeding the 3.8 % growth in urban manufacturing.
- **Self-employed Wage growth** - PLFS shows the self-employed had the largest average wage growth in 2023-24 at 9.6 %, followed by casual workers at 7.4 %, compared with regular wage at only 5.5 %.

What are the reasons for the change?

- **Balanced growth** - Steady and balanced high growth of the past few years is delivering more jobs at all levels.
- **Migration** - As males migrate or shift to rural non-farm employment (RNFE) more women are working.
- **Skill development** - Income growth tends to come more from moving up the job ladder with skill-growth than from rising average real wages.
- **Digital Penetration** - Digitalization has created new job opportunities in fields like IT, e-commerce, and digital marketing.
- It has also led to job displacement in traditional sectors due to automation and technological advancements.
- **Government contribution** - Post-pandemic countercyclical macroeconomic and other supportive policies were able to sustain growth despite external shocks and creating jobs.

Government schemes on labour market change

- **Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)** - Increased the rural wage and reduced rural urban migration)
- **Deendayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY)** - Enhanced the employability through skill development and placement in wage employment
- **Rural Self Employment Training Institutes (RSETIs)** - Promoted self-employment by providing training and financial assistance.
- **National Rural Livelihoods Mission (NRLM)** - Created sustainable livelihoods by enhancing access to financial services and promoting self-employment.
- **Prime Minister's Employment Generation Programme (PMEGP)** - A credit-linked subsidy program aimed at generating self-employment opportunities through micro-enterprises in the non-farm sector.

What lies ahead?

- Skilling facilities and job-specific training will help staff climb the quality and rewards ladder.
- Policies that proved both feasible and effective post pandemic must be continued to deliver high growth and more jobs.
- Emphasis on upskilling and reskilling to meet the demands of emerging sectors like AI and healthcare.

10.5 Economic Growth and Environmental Sustainability for Viksit Bharath 2047

Why in the news?

Recently Budget 2025 was presented in the parliament with aim to become a developed nation by 2047 and achieve net zero emission by 2070.

Why does India need to balance economic growth and environmental sustainability to achieve Viksit Bharath 2047?

- **Preventing Economic Slowdowns** - Climate disasters (floods, droughts, heatwaves) threaten agriculture, manufacturing, and energy, potentially reducing India's GDP by 2.8% by 2030.
- Overall, extreme heat could cut 2.5-4.5% from GDP by 2030, climbing to a 10 % plunge by 2050.
- **Labour Productivity** - Labour productivity loss due to extreme heat could cost the economy \$220 billion by 2030.

- **Reducing Fossil Fuel Dependence** – Coal (55-60% of power) raises costs, import reliance, and emissions.
- **Energy Security** - Over reliance on imported fossil fuels – 85 % of crude oil and 50% of natural gas are imported – could leave the economy exposed to price volatility, and geopolitical and supply chain shocks.
- Renewables (solar, wind, hydro, hydrogen) ensure cheaper, stable, and self-sufficient energy.
- Energy security puts India in a stronger position to weather global shocks and to stand more firmly on the geopolitical stage.
- **Job Creation & Green Economy** – Green growth contributes to fast growth and can create jobs – 50 million new jobs in India by 2070 – according to the World Economic Forum’s Mission 2070 report.
- This translates to \$1 trillion in additional economic value by 2030 and up to \$15 trillion by 2070.
- **Trade Benefits** – High-carbon economies face trade restrictions such as EU’s Carbon Tax).
- Carbon cost penalties imposed by importers of Indian goods could cost \$150 billion annually in export revenues by 2040 if industries are not decarbonised.
- **Global Investments** - Green policies attract funding from banks (World Bank, IMF), green bonds, and private investors.
- **Public Health** – Carbon-intensive industries cause air pollution, water contamination, and health issues.
 - Clean energy reduces health costs and boosts productivity.
- **Meeting Climate Pledges** – India’s net-zero by 2070 goal requires 50% emission reduction and 500 GW renewables by 2030, avoiding global pressure and trade risks.
- **Long-Term Competitiveness** – Investing in green hydrogen, EVs, and battery storage positions India as a global leader in future industries, ensuring sustainable economic growth.

What are the challenges persisting in India's efforts towards sustainable development?

- **High Dependence on Fossil Fuels** - 55-60% of power generation still depends on coal, with peak demand expected around 2035.
 - **Import Dependence:** Heavy reliance on oil & gas imports increases economic vulnerability.
- **Slow Renewable Energy Expansion** - Large-scale solar & wind projects face land acquisition and grid integration hurdles.
 - **Intermittency** - Renewable energy generation is weather-dependent, requiring better storage solutions.
- **Industrial Carbon Intensity** - Steel, cement, and manufacturing remain carbon-intensive due to outdated technologies.
 - **Cost of Transition** - Shifting to green technology requires heavy investments, discouraging MSMEs.
- **Challenges in Electric Mobility** - EV adoption is hindered by an inadequacy of charging stations & battery recycling.
 - **High Upfront Costs** - EVs remain expensive despite subsidies, limiting widespread adoption.
- **Agricultural Sustainability Issues** - Over-extraction of groundwater for irrigation threatens long-term agricultural productivity.
 - **Methane Emissions** - Livestock and mono scale paddy, wheat farming contributes significantly to greenhouse gases.
- **Financial & Investment Barriers** - Green projects require significant upfront investments, limiting participation.
 - **Limited Green Financing** - Private investors remain hesitant due to uncertain returns and policy risks.

What are the steps India needs to take to achieve the balance?

- **Clean Energy Transition** - Renewable energy can be expanded by scaling up solar, wind, hydro, nuclear (500 GW by 2030).
 - Example- National Solar Mission
- **Green Hydrogen Development** – Investments can be made in production & storage for industries & transport.

- Example - National Green Hydrogen Mission
- **Decarbonize Industries** - Sustainable manufacturing can be adopted to make cleaner processes, carbon capture, circular economy.
- **Green Construction** – Low-carbon materials can be used for energy-efficient buildings.
- **Transport Electrification** – Electric Vehicles and charging infrastructure can be expanded in public and private transport.
 - Example - Faster Adoption and Manufacturing of Electric Vehicles (FAME-II)
- **Climate-Resilient Agriculture** - Sustainable farming can be promote with precision farming, resilient crops, organic fertilizers, water conservation.
 - Example - National Mission for Sustainable Agriculture
- **Green Investments** - Green bonds can be expanded to attract more investments to the green economy.
- Guarantees can be obtained from multilateral development banks to encourage private sector players in key risky sectors, such as green hydrogen and grid modernisation.

10.6 Regional Disparities in Southern States

Why in news?

Economic surveys released by several southern states reveals concentration of economic prosperity in a few districts.

What is the recent status of growth in southern states?

- **Weaker economic growth than national average** - India's GDP in 2023-24 grew by 9.2%, while the southern states recorded slower growth.
- For example: Tamil Nadu – 8.2%; Telangana – 7.4%; Karnataka, Kerala, and Andhra Pradesh – 6% to 6.5%.
- **Higher per capita income** – The per capita income of southern states is higher than national average.

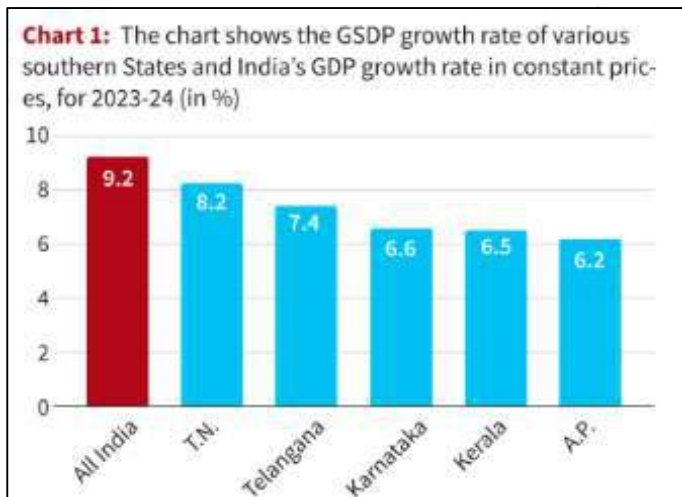


Table 2: Shows the average per capita incomes of the five southern States (in ₹) and the number of districts with higher incomes than the State average. Data for 2022-23

State name	Average per capita income (in ₹)	Total districts	Districts above State's avg. per capita income level
A.P.	2,19,881	26	9
Karnataka	3,04,474	31	4
Kerala	2,86,595	14	7
T.N.	2,77,802	38	8
Telangana	3,11,649	33	3

- **Unequal distribution of economic prosperity** – Despite these States having higher per capita incomes than the Indian average, the economic advantages are highly concentrated in a handful of districts within the States.
- **Declining labour force participation** - The average labour force participation rate (LFPR) in India in 2023-24 was 60.1%.
- The LFPR of Tamil Nadu, Karnataka, and Kerala was 58.8%, 56.8%, and 56.2% respectively.
- **High unemployment rates** - Though the unemployment rates of most of the southern States declined compared to 2017-18, they all had an unemployment rate higher than the Indian average in 2023-24.
- **Employment pattern shift** - There is a reduction in casual labour and an increase in self-employment, primarily

Unemployment Rates of Southern States

As per the PLFS (Periodic Labour Force Survey) report, the Unemployment Rate (UR) in 2022-2023 stood at 3.2%.

- Kerala: 7.6%

because individuals are increasingly taking up employment as helpers in household enterprises instead of salaried employment.

- Telangana: 4.8%
- Andhra Pradesh: 4.5%
- Tamil Nadu: 3.4%

- **Tamil Nadu:** Casual labor declined from 33.5% (2017-18) to 31% (2023-24), while self-employment increased from 32.8% to 34.2%.
- **Telangana:** Self-employment rose by 8 percentage points to 55.9%, and casual labor declined by 5.7 percentage points to 18.7%.
- **Dominance of services sector** – This sector dominates the economies of these states, contributing more than 50% to their GDP, except in Andhra Pradesh.
- Andhra Pradesh stands out as an exception where the contribution of agriculture rose from 30% to 34% during the last decade, while that of services fell.
- **Limited manufacturing contribution** – Manufacturing is still weak and contributes less than 20% of GDP in all southern states, including Tamil Nadu.

Table 5: The table shows the sectoral contribution in the State-wise gross state value added (in %) for the years FY15 and FY24

State	Agriculture		Manufacturing		Services	
	FY15	FY24	FY15	FY24	FY15	FY24
A.P.	30.4	34.1	11.2	12.2	44.1	40.2
Karnataka	13.1	13.0	14.4	12.5	62.3	66.7
Kerala	12.9	9.6	9.1	7.9	60.7	66.5
T.N.	13.1	12.7	18.5	18.6	54.2	53.6
Telangana	16.3	15.4	11.7	8.9	61.3	66.8

What are the causes for the disparities?

- **Economic stagnation** – Lower growth rate than the national rate indicates economic stagnation.
- **Inequal opportunities** – Uneven growth indicates economic opportunities are concentrated in specific urban & industrial centers.
- **Inadequate growth in formal employment** - Increased shift towards self-employment indicates a lack of opportunities for formal jobs.
- **Concentration of service industries in Tier 1 cities** – The economies of all the southern states are mostly supported by service sectors like Information Technology.
- These sectors concentrated in Tier 1 cities like Chennai, Bangalore, Hyderabad.
- **Higher education** – Gross Enrollment Ratio of Southern states are above 40% which is higher than the national average of 28%.
- This leads to frictional employment where graduates are looking better opportunities and workers in between jobs.
- **Skill development deficiencies** - While the southern region has a strong workforce, it lags in high-value manufacturing and advanced professional skills.

What needs to be done?

- While still economically powerful, southern states need to correct imbalances of growth, unemployment, and job creation in order to maintain long-term advancement.
- **Balancing regional development** - Development of socio economic infrastructures like higher education institutions, health centers and banking centers in tier III towns, municipalities, town panchayats and rural could help in reducing the divide and distribute the development.
- **Strengthening manufacturing** - Incentivizing investments in manufacturing in backward regions could generate more formal employment opportunities.
- **Improving employment** - Increasing skill development programs and promoting entrepreneurship could minimize unemployment.
- **Targeted social policies** - Reducing regional income inequalities through improved infrastructure and business incentives in less-developed areas.

10.7 Indian Automotive Industry

Why in the News?

Having completed 10 years, the Make in India initiative has significantly transformed India's automobile industry, fostering domestic car production and accelerating electric vehicle (EV) manufacturing.

How automotive industry fares in Indian economy?

Status of auto component industry

- **Auto components** – It covers a broad spectrum of products, including engine parts, transmission systems, braking systems, electrical & electronics components, body and chassis parts, etc.,
- It supplies critical *parts to domestic vehicle manufacturers and exporting* to major global markets.
- **Significance** – It contributes *2.3% to India's GDP*, directly employing over 1.5 million people.
- **Exports** – It exports *over 25% of its production annually* and are valued at \$21.2 billion in FY24.
- Major exports are to Europe (US\$ 6.89 billion), followed by North America (US\$ 6.19 billion) and Asia (US\$ 5.15 billion).

- It is one of the fastest-growing sectors.
- **Development** – It entered a *transformative phase in 1991 with de-licensing* of the sector and subsequent opening up for 100 % Foreign Direct Investment (FDI) through the 'automatic route'.
 - It has attracted \$36 billion in FDI over the past 4 years
- **Globalisation** – Since then, almost all the *global majors have set up their manufacturing facilities* in India.
 - Major automobile giants like Hyundai, Toyota, and Mercedes-Benz expanding their production in India.
- **Supports employment opportunities** – As per the Annual Report 2024-25 of the Ministry of Heavy Industries, *around 30 million jobs* are supported.
- **Economic value** – It accounts for *6% of India's GDP*.
- Its production had grown from 2 million vehicles in 1991 -92 to 28 million in 2023 -24 and its turnover is about USD 240 billion.
- *Exports reached 4.5 million units* in FY24 while industry exported vehicles and auto components amounting to about USD 35 billion.

Indian Government has set a target to reach the \$100 billion export target in auto component by 2030



How 'Make in Initiative' supports India's automobile industry growth?

Make in India

- It is an initiative under Atma Nirbhar Bharat Abhiyan.
- **Launched in** - 2014.
- **Role** - To promote entrepreneurship, innovation, and skill development in India's manufacturing, infrastructure, and service sectors.
- **Pillars** - New processes, new infrastructure, new sectors, and new mind set.
- **Significance** - It was one of the *first 'Vocal for Local' initiatives* that exposed India's manufacturing domain to the world.

- **Localization & self-reliance** – It boosted domestic production of advanced automotive technology (AAT) products.
- **Development of manufacturing hub** – Major automobile giants like Hyundai, Toyota, and Mercedes-Benz has base in India.
- **Infrastructure development** – It promotes expansion of highways, EV charging networks, and vehicle testing facilities.
- **Innovation** – It encourages the development of EV technology, battery manufacturing, and charging infrastructure.
- **Leveraging China plus one strategy** – It is used to boost exports of auto components through make in India scheme.
- **Promotes electric vehicles (EV) market** – It strengthens domestic lithium-ion battery manufacturing, leveraging lithium reserves in Jammu & Kashmir.

*The **China Plus One (C+1) strategy** is a supply chain strategy where companies diversify manufacturing activities away from China to reduce risks.*

What are the government initiatives to promote electric vehicles in India?

- India is also advancing in sustainable mobility, with 4.4 million Electric Vehicles (EV) registered by August 2024.
- **Ministry of Heavy Industries** aims to promote electric vehicles (EVs) through the following schemes
- **FAME India Scheme Phase-II** – Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles incentivise e-2Ws, e-3Ws, e-4Ws, e-buses and EV public charging stations.
- **Production Linked Incentive (PLI) Scheme for Automobile and Auto Component Industry** – It was notified in 2021 for enhancing India's manufacturing capabilities *for Advanced Automotive Technology (AAT) products.*
- **PLI Scheme for Advanced Chemistry Cell (ACC)** – It aims to establish a competitive domestic manufacturing ecosystem for 50 GWh of ACC batteries.
- **PM E-DRIVE Scheme** – PM Electric Drive Revolution in Innovative Vehicle Enhancement was notified in 2024.
- It is a 2-year scheme which aims to support electric vehicles including e-2W, e-3W, e-Trucks, e-buses, e-Ambulances, EV public charging stations and upgradation of vehicle testing agencies.
- **PM e-Bus Sewa-Payment Security Mechanism (PSM) Scheme** – It was notified in 2024, which aims to support *deployment of more than 38,000 electric buses.*
- **Scheme for Promotion of Manufacturing of Electric Passenger Cars in India (SMEC)** – It was notified in 2024 to promote the manufacturing of electric cars in India.

Initiatives by other ministries	
Ministry of Power	<ul style="list-style-type: none"> • It has issued guidelines and standards for EV Charging Infrastructure. • It outlines standards and protocols to create a connected & interoperable EV charging infrastructure network in the country.
Ministry of Finance	<ul style="list-style-type: none"> • It has <i>reduced GST on EVs</i> from 12% to 5%.
Ministry of Road Transport & Highways (MoRTH)	<ul style="list-style-type: none"> • It announced that the <i>battery-operated vehicles will be given green plates</i> and be exempted from permit requirements.
Ministry of Housing and Urban Affairs	<ul style="list-style-type: none"> • It has <i>amended the Model Building Bye-Laws</i>, mandating the inclusion of charging stations in private and commercial buildings.

Interoperable EV charging networks enable EVs to charge at any station, regardless of the network operator

What lies ahead?

- Government can increase focus on hydrogen fuel-cell vehicles and biofuels.
- Attracting more FDI by Encouraging global OEMs to expand R&D and manufacturing operations in India.
- Strengthening local battery production & supply chain.

- Increasing production of automatic transmissions & high -tech auto components.
- Expanding EV charging infrastructure in rural and semi -urban areas.

11. AGRICULTURE

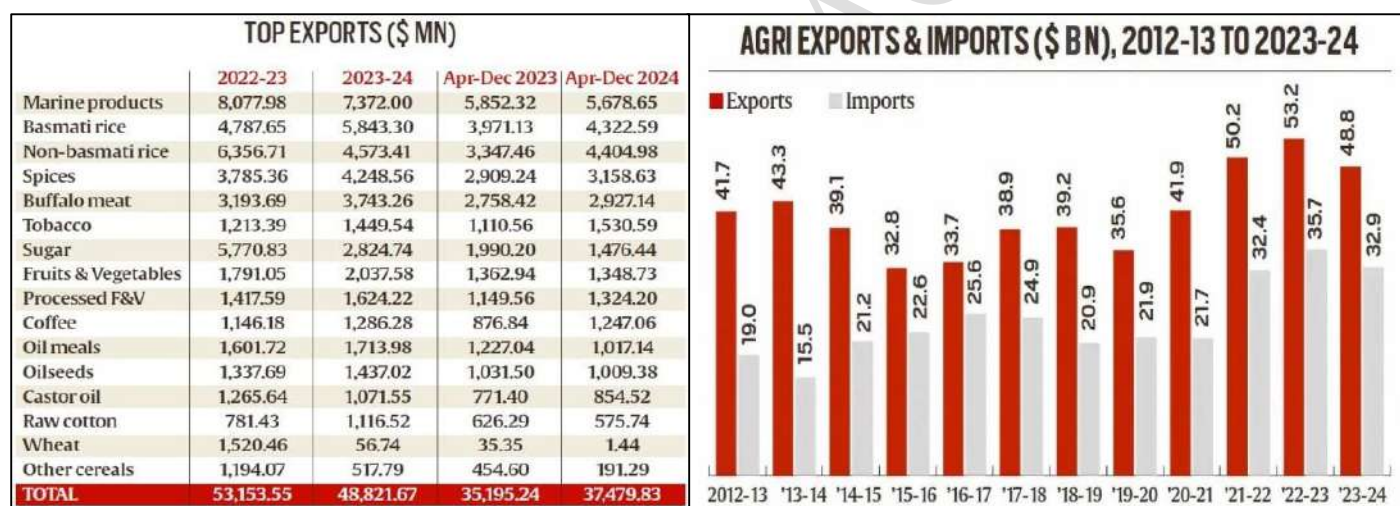
11.1 Shrinking Agriculture Trade Surplus

Why in News?

The agricultural trade surplus has reduced from \$10.6 billion in April-December 2023-24 to \$8.2 billion for the corresponding nine months of the current fiscal (April-March).

What is the status of international agricultural trade of India?

- **India net exporter** - India is a net agri-commodities exporter, with the value of its outward shipments consistently exceeding imports.
- **Agri export growth** - India's agriculture exports have risen 6.5%, from \$35.2 billion in April-December 2023 to \$37.5 billion in April-December 2024.
- It is 1.9% more than the overall increase in the country's merchandise exports for this period.
- **Agri imports growth** – Farm import has risen 18.7% (from \$24.6 billion to \$29.3 billion) during April-December 2024 over April-December 2023, while India's total goods imports during were 7.4%.
- **Reduction in agri trade surplus** - It has reduced from \$10.6 billion in April-December 2023-24 to \$8.2 billion for the corresponding nine months of the current fiscal (April-March).



- **Decadal trend** - The trade surplus, which peaked at \$27.7 billion in 2013-14, shrunk to \$8.1 billion by 2016-17.
- It rose thereafter to \$20.2 billion in 2020-21, before falling to \$16 billion in 2023-24. It is set to further decline this fiscal.

What are the reasons for narrowing surplus?

- **Declining export** - Exports dipped from \$43.3 billion in 2013-14 to \$35.6 billion in 2019-20, even as imports climbed from \$15.5 billion to \$21.9 billion.
- **Crash in international commodity prices** - The UN Food and Agriculture Organization's (FAO) food price index (base period: 2014-16=100) plunged from an average of 119.1 to 96.4 points between 2013-14 and 2019-20.
- **Competition** - Low world prices made India's agricultural exports less cost competitive, and its farmers more vulnerable to cheaper imports.
- **Declined export of marine products** - It has registered a drop from \$7.8 billion in 2021-22 and \$8.1 billion in 2022-23 to \$7.4 billion in 2023-24.
- **Political change in destination countries** – The conservative and import restrictive policies of new government in US can further hurt Indian seafood exports.

India's marine exports – of which frozen shrimp accounts for roughly two-thirds – are mainly to the US (34.5% share in 2023-24), China (19.6%), and the European Union (14%).

- **Concerns over domestic availability** – Sugar and wheat exports have also taken a hit due to government restrictions following concerns over domestic availability and food inflation.
 - *Sugar exports more than halved from \$5.8 billion in 2022-23 to \$2.8 billion in 2023-24.*
- **High import** - India's agricultural imports are dominated by two commodities, Edible oils and pulses.
- **Reduced pulse production** – Reduction in domestic pulse production will make pulse import crossing \$5 billion for the first time.
- **International agri market volatility** –Russia Ukraine wars drove up global edible oil prices which increased India's import billing.
- **Spices net import** - In spices, India is both an exporter and an importer and in 2023-24 it was a net importer of these two traditional plantation spices.
 - *India's imports of pepper (34,028 tonnes) and cardamom (9,084 tonnes) exceeded its corresponding exports of 17,890 tonnes and 7,449 tonnes.*
- **Collapse in cotton export** – India's cotton exports decline from \$4.3 billion in 2011-12 to \$781.4 million in 2022-23 and \$1.1 billion in 2023-24.

India is the largest producer of cotton globally, accounts for 23% of total global cotton production and in 2022, India stood as the 3rd highest exporter of raw cotton, accounting for about 11% of the total global exports.

What lies ahead?

- Encourage the export of value-added agricultural products like processed foods, spices, and organic produce.
- Ensure a stable trade environment to encourage farmers to respond to market signals with confidence, redirecting resources towards high-return products.
- Avoid export restrictions on processed and organic products unless absolutely necessary for food security.

11.2 Agricultural Impact of Coal Power

Why in News?

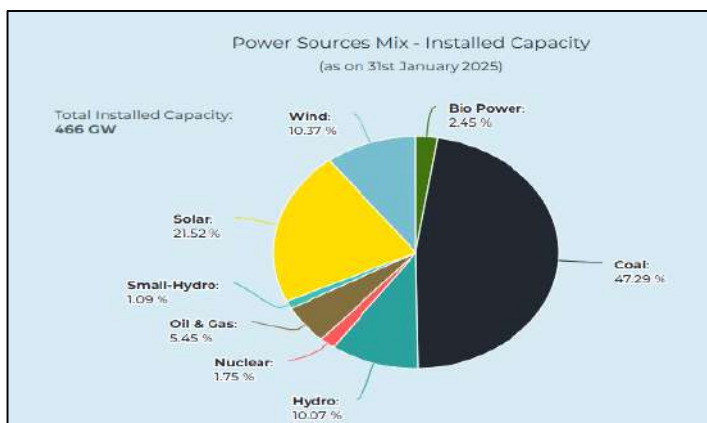
According to a new research led by researchers at Stanford University in the US, coal-fired power plants are quietly depleting India's rice and wheat output.

What is the status of coal power in India?

- **Total capacity** – India has total installed capacity of 466 GW.
- **Share of coal power** – Coal power accounts for about 47 % (220 GW).
- **Coal plants in India** – There are about 194 coal powerplants in India.
- **Coal reserve** - According to the National Coal Inventory of 2023, published by Geological Survey of India, the total estimated coal reserve (resource) of India is 378.21billion tonnes as of 01.04.2023.

What are the pollutants of coal power plants?

- **Coal power plants emission**- It consists of carbon dioxide (CO₂), nitrogen oxides (NO_x), sulphur oxides (SO_x), fly ash, soot, suspended particulate matter, and other trace gases.
- Coal-based Thermal Power Plants (TPPs) are responsible for a disproportionately higher share of emissions than the industrial sector.
- **CO₂ Emission** - About 1000 metric tonne of carbon di oxide is emitted from coal plants.





- **Mobility of pollutants** - Once emitted, NO₂ can travel long distances, affecting regions up to 100 kilometres away from the source.
- **Varied exposure** - Coal's contribution to air pollution varied by region and those located near fertile farmland with a high emissions exposure caused the most agricultural damage.

*Chhattisgarh, a major hub for **coal-fired power**, had the highest share of NO₂ pollution from coal plants: about 19% of NO₂ detected in the monsoon season and 12.5% in winter came from coal plants.*

*Uttar Pradesh had high **overall NO₂ levels** but only a small portion of that came from coal power, while Tamil Nadu had relatively low NO₂ pollution but the bulk of it came from coal power.*

Emissions from burning coal

Pollutants	Effect
Sulfur dioxide	Acid rain and respiratory illnesses
Nitrogen oxides	Smog and respiratory illnesses
Particulates	Smog, haze, respiratory illnesses, and lung disease
Carbon dioxide	Primary greenhouse gas produced from burning fossil fuels (coal, oil, and natural gas)
Mercury and other heavy metals	Neurological and developmental damage in humans and other animals
Fly ash and bottom ash	Pollutes air, water, soil.

What are the impacts of coal power on agricultural output?

- **Affects plant growth** - Nitrogen oxides (NO_x) are phytotoxic, meaning they stress plants, and have been known to hinder cellular function and interfere with crucial enzymatic activities.
- **Crop damage** - NO_x also contribute to the formation of ozone, which in turn exacerbates crop damage.
- **Reduces photosynthesis** - Particulate matter limits the amount of sunlight available for photosynthesis.

- **Blocks carbon intake** - Plants with one gram of mining dust on their leaves absorbed around 2-3 grams less carbon per square metre.
- **Yield reduction** - coal-fired power plants are quietly depleting India's rice and wheat output, destroying up to 10% of the yield in several states.
- **Monetary loss** - The monetised loss per gigawatt-hour of electricity generated for wheat and rice touched up to \$17,370/GWh and \$13,420/GWh, respectively.
- **Seasonal impacts** - About 20% of coal-fired electricity generation during the monsoon season accounted for half of all coal NO₂-related rice losses.
- 12% of total winter season generation was linked to 50% of wheat losses.

What can be done reduce the pollution caused crop loss?

- Targeting a relatively small subset of highly polluting power stations could still have significant benefits for agricultural productivity.
 - The yield of 5.7% of cropland in West Bengal near coal-fired power stations could increase 5-10% while the gains of 1.66% could exceed 10%.
- Considering crop impacts alongside health and greenhouse gas emissions can help policymakers prioritise where pollution control should be affected.
- Install flue gas desulphurisation and electro static precipitator in power plants to reduce the pollutants in the emission gas.
- Use of carbon capture to separate CO₂ from emissions sources and recovers it in a concentrated stream.

11.3 Financial Mechanisms for Climate Resilient Agriculture

Why in the news?

The current agricultural credit mechanisms have been increasingly adapted to address the emerging challenges of climate-resilient farming practices, providing financial support to farmers to help them adapt to the impacts of climate change.

What is climate resilient agriculture?

- **Climate Resilient Agriculture (CRA)** – It is an approach designed to enhance the ability of agricultural systems to withstand the impacts of climate change.
- **Components** - It involves a set of practices and technologies aimed at improving productivity, reducing vulnerability to climate-related risks, and promoting sustainable use of natural resources.
 - **Crops** - Crop varieties that can survive extreme weather conditions.
 - **Soil** - Practices like conservation agriculture help improve soil health and resilience.
 - **Water management** - Techniques include rainwater harvesting, micro-irrigation, and efficient irrigation scheduling
 - **Agroforestry** - Integrating trees into agricultural landscapes to improve biodiversity, soil health and farmer's income.
- **Mitigation of greenhouse gas emissions** - Practices like carbon farming and reduced tillage help minimize agriculture's carbon footprint.

IIRR Hyderabad has released climate resilient rice varieties like the DRR Dhan 42 & DRR Dhan 44, which focus on drought resilience. In 2024, PM dedicated 109 climate-resilient and bio-fortified varieties of crops.

What are the agricultural credit mechanisms available for climate resilient agriculture?

- **Modified Interest Subvention Scheme (MISS)** – It is a centrally funded scheme under the Kisan Credit Card (KCC)
 - **Features** - It provides 7% concessional interest rates on short-term agricultural loans.
 - Farmers affected by natural calamities can have their loans restructured.
 - In severe natural calamities, interest subvention and Prompt Repayment Incentive (PRI) is extended for up to five years with government

- **Agriculture Infrastructure Fund (AIF)** – AIF supports climate-resilient initiatives like decentralized solar power plants under PM-KUSUM, precision agriculture tools, and organic input production.
 - **Features** - AIF provides medium to long-term loans for decentralized infrastructure development like farm gate storage, logistics, and post-harvest management to reduce losses and intermediaries.
 - **Interest concessions** - Loans under AIF have a capped 9% interest rate and farmers receive a 3% per annum IS for loans up to Rs.2 crore.
 - PM-KUSUM provides central subsidies up to 30% to 50% for the installation of standalone solar pumps and for solarizing existing grid-connected agricultural pumps.
- **Agri Fintech platforms** – Initiatives like Jai kisan, Hesa, ITC MAARS (Metamarket for Advanced Agriculture and Rural Services) helps farmers to use KCC and input loans facilitating the adoption of climate-smart agricultural practices.
- **National Bank for Agriculture and Rural Development (NABARD) Initiatives** – NABARD's Green Climate Fund (GCF) and the National Adaptation Fund for Climate Change (NAFCC) promote mitigation measures.
 - **Additional livelihood support** - NABARD supports tribal families by providing financial assistance such as orchard development, animal husbandry and micro-enterprise initiatives.
 - **Tech adoption** - NABARD funds digital agriculture projects which uses technologies like IoT, AI, drones, and geospatial tools for efficient farm management.
- **Kisan Rin Portal** – It connects **1.89 lakh bank branches**, providing farmers easy access to financial resources.
- **Voluntary carbon market in Agriculture** - 11 projects have been registered under the Voluntary Carbon Market (VCM) in agriculture on the Veera VCS platform, which focuses on promoting sustainable farming practices.

12. ENVIRONMENT

12.1 Mainstreaming Wetland Conservation

Why in News?

The suo motu public interest litigation by the Meghalaya High Court very recently, to monitor the conservation of wetlands in the State brings the focus back on this important ecosystem.

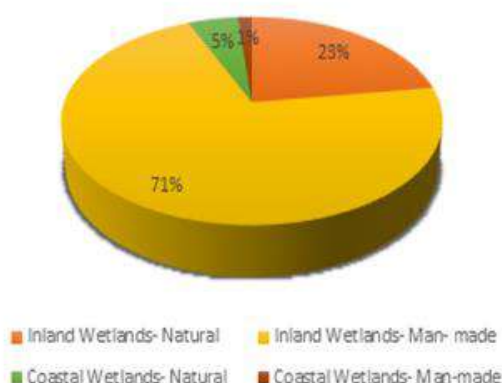
What is the status of wetlands in India?

- **Ramsar sites** – As on February 2025, India has 89 Ramsar sites, covering 8% of total wetlands area in India.

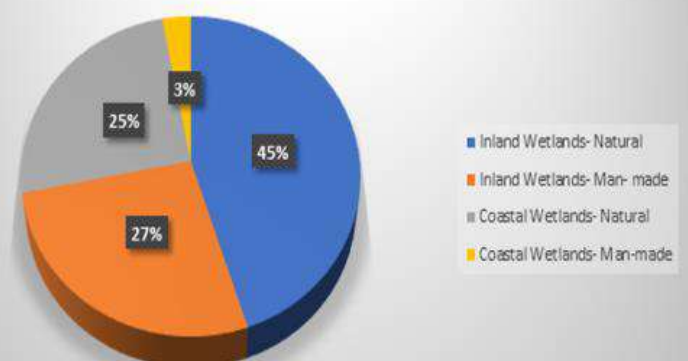
Since 1971, February 2 is observed every year as **'World Wetland Day'** to mark the adoption of the Ramsar Convention. **2025 theme** was **'Protecting Wetlands for Our Common Future'**.

- **Distribution** - These are distributed from the coasts to Himalayan territory, and are diverse in nature.
- **Types** - Based on the location, wetlands are classified as inland and man-made and by 2017-18, India had 66.6% of wetlands as natural wetland (43.9% as inland wetland and 22.7% as coastal wetland).

Wetlands Distribution in India (Type-wise)



Wetlands Distribution in India (area-wise)



- **Recent trend** - The general trends indicate a reduction in natural wetlands and an increase in man-made wetlands across the country.
- **Decline in wetlands vegetation** - Nearly 30% of the natural wetlands in India have been lost in the last four decades due to urbanisation, infrastructure building, agricultural expansion and pollution.
- **Urban loss** - The loss is more in urban areas, especially around major urban centres.
- Mumbai lost 71% of its wetlands between 1970 and 2014 and Chennai has lost 85% of its wetlands.

What are the pressures on wetlands?

- **Diversification** - Since 1900, as much as 50% of the area under wetlands has been diverted to accommodate various other uses.
- **Global decline** - Wetland surface area, both coastal and inland, declined by about 35% between 1970 and 2015.
- **Rate of loss** - Globally, the rate of loss estimated with the Wetland Extent Trends (WET) index is (-) 0.78% a year.
- It is more than three times higher than the loss rate of natural vegetation as estimated by the Food and Agriculture Organization of the United Nations.
- **Loss of wetland species** - Around 81% of inland wetland species population and 36% of coastal and marine species have declined since 1970.
- **Infrastructure projects** - Construction of dams, weirs, and other water management structures alters natural water flows, affecting wetland health.
- **Non-native plants and animals** - Species like water hyacinth and killer shrimp outcompete native species, disrupt food chains, and alter ecosystem functions.

How wetland conservation is linked with development activities?

- **Agriculture development** - Wetlands ensure a reliable water supply, supporting agriculture and human needs, especially during droughts.
- **Disaster risk reduction** - Wetlands protect against storms and floods, enhancing resilience in the face of climate-related disasters.
- **Climate regulation** - Wetlands play a crucial role in regulating climate by storing carbon and moderating temperature and humidity.
- **Livelihood support** - Wetlands are crucial for the livelihoods of communities that depend on them for fishing, agriculture, and other economic activities.
- **Job creation** - Wetlands sustain millions of jobs in tourism, fishing, and other industries, contributing to economic growth and poverty reduction.
- **Research and education** - Wetlands serve as valuable sites for scientific research and environmental education.

Ramsar Convention COP14, laid stress on preparation of the 5th Ramsar Strategic Plan & recognised that the conservation and management of wetlands cannot be a stand-alone initiative.

How Ramsar convention contributes to other international environmental treaties?

- **Biodiversity conservation** - Wetlands are crucial for maintaining biodiversity and contributes to achieve Kunming-Montreal Global Biodiversity Framework (KMGBF).
- **Climate change mitigation** - Natural carbon sequestration capability of wetlands supports UNFCCC goals by reducing atmospheric CO₂ levels.
- **SDG** - Wetland conservation is integral to achieving several SDGs including those related to clean water (SDG 6), climate action (SDG 13), and sustainable agriculture (SDG 2)
- **Combating desertification** - Wetlands play a crucial role in maintaining soil moisture, preventing land degradation and contributes to the implementation United Nations Convention to Combat Desertification (UNCCD).
- **Migratory species protection** - The Ramsar Convention collaborates with the Convention on Migratory Species (CMS) to protect migratory waterbirds and their habitats.
- **World Heritage Sites** - Many Ramsar sites are also designated as World Heritage Sites, highlighting their global significance

What lies ahead?

- Recognise the larger dimension and investigate the physical, social and economic factors affecting wetland degradation.
- Evaluate the drivers which have led to modifications in wetland surroundings, and the ex-situ pressure contributing to wetland degradation.
- More effective and comprehensive management strategies are required in response to escalating stress from various climatic and anthropogenic factors.
- Mainstream wetland conservation within the development plan, as advocated during the Ramsar COP14.

12.2 Water conservation

Why in news?

World water day was celebrated recently on March 22, emphasizing the importance of **collective action** in conserving water for present and future generations.

What is the water situation in India?

- **India's water resource** - India has 18 % of the world's population, but possesses only 4 % of global fresh water resources, leading to high water stress nationwide.
- **Growing demand** - The NITI Aayog report predicts that the country's water demand will be twice that of the available supply by 2030.
 - This will affect a large section of the population and could lead to around 6 % loss in the country's GDP.
- **Inadequate access to safe water:** Yale University's 2022 unsafe drinking water index ranked India 141 out of 180 countries.
 - 70 % of the country's freshwater is polluted.
 - This is estimated to cause 200,000 deaths annually.
- **Depletion of ground water resources** - According to the World Bank, groundwater is being abstracted much faster than it is being replenished, so that 60 % of India's districts are likely to reach critical levels of groundwater depletion within two decades.

How has the water policies of India evolved?

- **1987 water policy** - The first National Water Policy stressed the necessity of a comprehensive water resource development plan.
- It gave top priority to drinking water supply, irrigation, hydro-power, navigation, and industrial consumption.
- **2002 water policy** - This revision emphasized the need for a national perspective on water planning.
- It added the idea of planning for water as a common resource, highlighting the importance of community participation.
- **2012 water policy** - It is the current policy and it encourages treating water as an economic good in order to encourage conservation and efficient use.
- It underscores the necessity of integrated water resources management, rainwater harvesting, and the augmentation of water availability through direct use of rainfall.
- Additionally, it calls for rationalizing water pricing to reflect its scarcity and economic value.
- **Draft 2021 policy** - To address the present challenges in water sector, revision of National Water Policy has been envisaged and a drafting committee was constituted to revise the National Water Policy.

What are the water conservation measures taken?

- **Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)** - Supports the construction of water conservation and harvesting structures in rural areas to improve groundwater recharge.
- **Jal Shakti Abhiyan (JSA)** - Encourages states and cities to repair and construct rainwater harvesting structures, using funds from various schemes like MGNREGS and AMRUT.

Water being a State subject, steps for augmentation, conservation and efficient management of water resources are primarily undertaken by the respective State Governments.

- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0** - Helps cities manage rainwater by channeling it into water bodies and promoting rainwater harvesting.
- **Atal Bhujal Yojana** - Focuses on managing groundwater efficiently in 8,213 water-stressed villages across seven states.
- It encourages communities to actively participate in water conservation.
- **Pradhan Mantri Krishi Sinchai Yojana (PMKSY)** - Aims to ensure every farm gets water efficiently.
- It includes repairing water bodies, improving irrigation, and promoting water-saving techniques.
- **Bureau of Water Use Efficiency (BWUE)** - Works to improve water efficiency in agriculture, drinking water supply, power generation, and industries.
- **Mission Amrit Sarovar** - Aims to develop or rejuvenate at least 75 water reservoirs (Amrit Sarovars) in every district for long-term water storage and conservation.

What are the challenges in water conservation policy?

- **Lack of decision making power for communities** - Existing policies provide for their participation, but it is limited to the management of water sources.
- Decision-making powers remain with state authorities.
- **Uniform practices** – Formalisation of water governance by introducing uniform practices have often overlooked the need to identify and empower communities' own ecological practices on water management.
- **Fragmented water management** - Different parts of the ecosystem, such as forests, water, land, and biodiversity, are regulated by different policies and authorities.
- Such an approach fails to consider the interdependence of these constituents and adversely affect each other's potential to do so.
- **Vulnerability of Weaker Sections** – Weaker social and economic sections are disproportionately affected by environmental disasters, such as water scarcity and climate change.
- Among these, individuals at the nexus of social and economic marginalization (e.g., landless farmers, tribal groups, women) are most vulnerable.
- **Neglect of non-human environment** – Non human environment are integral intrinsic part of water management.
 - For example, the amount of water available for irrigation is partly dependent on its sufficient availability for animals.
- Water policies have often overlooked this aspect and focused more on human needs of water.
- Indian courts have acknowledged the rights of nature in a number of judgments, yet water policies continue to favor human use over ecosystem equilibrium.

Water User Associations (WUAs),
brought in during the 1990s, and were intended to increase participatory irrigation management farmers have been entrusted with responsibility but without actual decision-making authority.

What lies ahead?

- New environmental challenges and renewed understandings of ecosystems underscore the need to recalibrate water policies.
- **Effective community participation** - Policies need to ensure effective participation from communities and mainstream their ecological practices along with entrusting significant decision-making power.
- **Recognizing diversity** - Water policies need to consider the disproportionate vulnerability of certain groups to environmental crises and recognise their agency in managing water and ensure their participation in decision-making.
- **Integrated ecosystem-based approach** - For example, the practice of establishing orans in rural areas of western India.
- Orans are sacred forests which hold deep religious and cultural significance to local communities which is also used for water conservation.
- By augmenting tree and grass cover, orans trap surface runoff and support in-situ rainwater harvesting.
- **Non-human environment** - Considering the interests of the non-human environment in laws and policies that regulate the environment and water management.

- **Incorporating climate change adaptation into water management** – Water policies need to focus on creating climate-resilient water systems and increasing the climate resilience of existing systems.

13. SCIENCE & TECHNOLOGY

13.1 DNA Fingerprinting

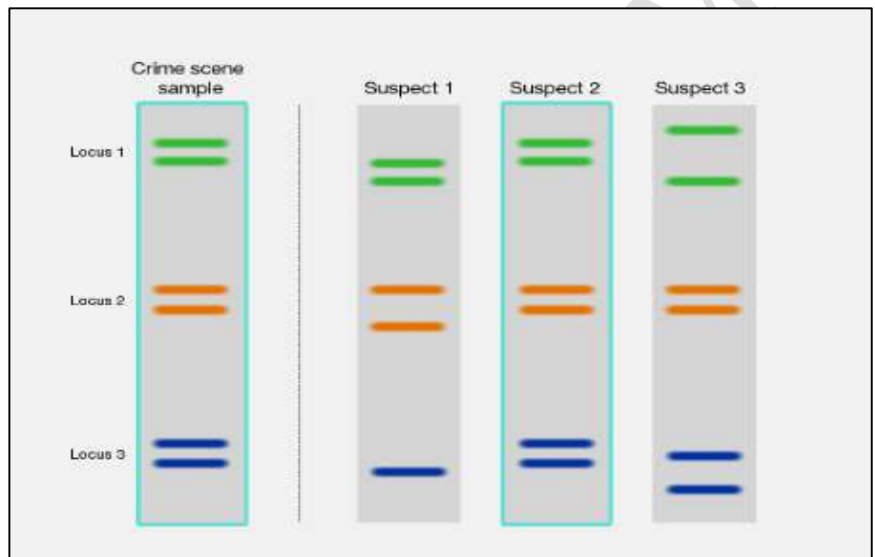
Why in News?

In the Pune rape case, police conduct DNA fingerprinting of the accused to match with the forensic evidence collected from the crime scene.

What is DNA Fingerprinting?

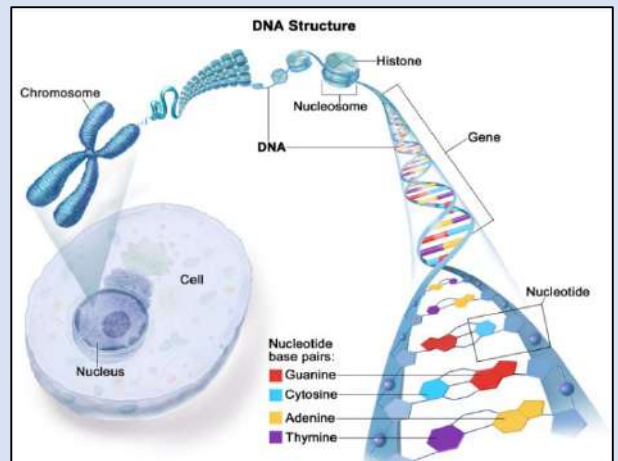
- **DNA fingerprinting** - It is a forensic technique, also known as DNA profiling, that identifies individuals based on unique patterns in their DNA, particularly in repetitive DNA segments called short tandem repeats (STRs).
- **DNA Sample** - Fingerprint can be established using DNA from teeth, bones, blood (a drop is enough), spit, semen, skin cells, etc.

Centre for DNA Fingerprinting and Diagnostics (CDFD), an autonomous organization funded by the Department of Biotechnology (DBT), is located in Hyderabad.

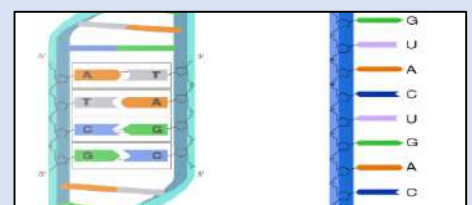


DNA Basics

- **Chromosome** - Each of an individual's cells – in one's skin, blood, teeth, bone, etc. – contain 46 DNA molecules.
- One set of 23 is inherited via sperm from the father and the other 23 via the egg from the mother.
 - *Sperm and egg cells are exceptional because they have only 1 copy of the genome each, not 2.*
- The DNA is packed inside chromosomes.
- **DNA polymorphisms** - It refers to variations in DNA sequences, including single nucleotide differences (SNPs), that occur among individuals or populations.
- A nucleotide is the basic building block of nucleic acids (DNA and RNA), composed of a sugar molecule (deoxyribose in DNA, ribose in RNA), a phosphate group, and a nitrogen-containing base
- It serves as genetic markers for analysis and can be used to differentiate one person from another.
- It is most often (but not exclusively) used together with technologies like PCR, capillary electrophoresis, and fingerprinting.
- **DNA profiles**- They are typically generated using polymorphisms in parts of the DNA called short tandem repeats (STRs).



DNA has 2 strands and each strand is a sequence of 4 chemical bases: adenine (A), cytosine (C), guanine (G), and thymine (T).



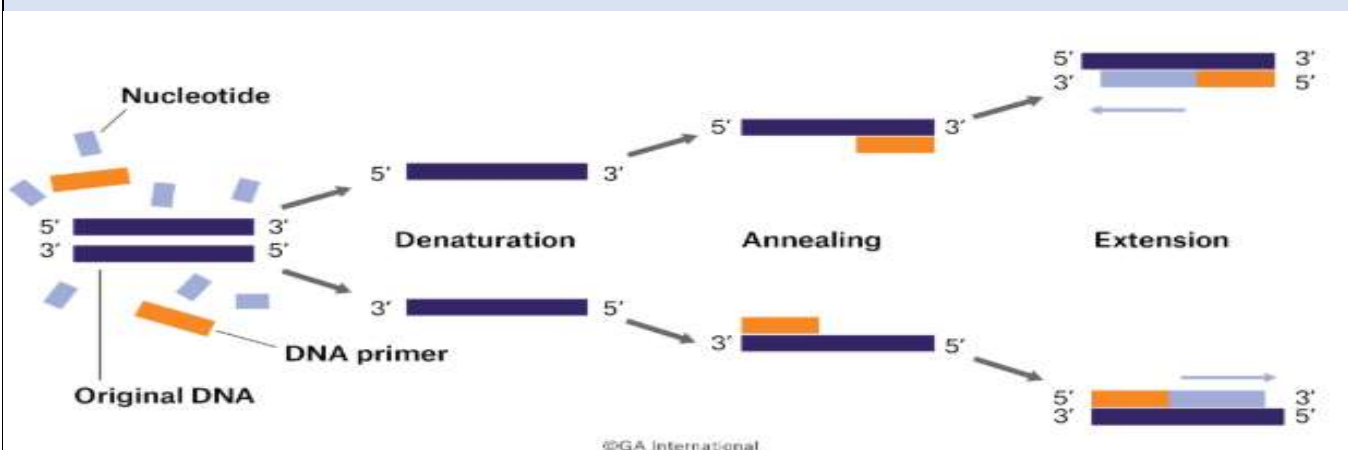
- **Short tandem repeats (STRs)** - It is the short sequence of base-pairs on the DNA that is repeated some number of times, such as GATCGATCGATCGATC.
- These STRs are unique for an individual and varies across people.

What are the applications of DNA Fingerprinting?

- The ability of DNA fingerprinting to analyze and match genetic markers makes DNA fingerprinting an invaluable tool across science, medicine, law enforcement, and more.
- **Biological identification** - Just like the Aadhaar number is used to uniquely identify an individual for social security purposes, a person's DNA fingerprint can be used for biological purposes.
- **Forensic science** - By comparing DNA found at crime scenes with that of suspects, authorities can establish links or rule out individuals.
- **Paternity and family testing** - DNA fingerprinting can confirm biological relationships, such as identifying parents, siblings, or other relatives.
- **Medical diagnostics** - It helps in identifying genetic disorders, mutations, or predispositions to certain diseases, enabling early diagnosis and personalized treatment plans.
- **Anthropology and evolutionary studies** - Scientists use DNA profiling to study human evolution, migration patterns, and historical connections between populations.
- **Wildlife conservation and management** - It aids in tracking genetic diversity in endangered species, solving poaching cases, and ensuring proper animal breeding practices.
- **Agriculture and food industry** - DNA fingerprinting is used to verify the authenticity of food products, improve crop strains, and study genetic characteristics in livestock.
- **Disaster victim identification** - It can be used to identify victims of accidents, natural disasters, or mass casualties by comparing DNA with family members.

PCR

- **DNA Copies** - Scientists need to make many copies of the DNA present in particular STRs to make studying them easier.
- **PCR** - Polymerase chain reaction (abbreviated PCR) is a laboratory technique for rapidly producing (amplifying) millions to billions of copies of a specific segment of DNA.
- **PCR Method:**
 - Genetic material is extracted from tissue that contains the DNA of interest.
 - It is heated to about 95° C for 25 seconds to split the strands apart.
 - A short single-stranded piece of DNA, called Primer, that binds to a single strand.
 - The sequence of bases on the primer is configured so that it binds to the portion of interest on the DNA.
 - The temperature in this phase is lowered to around 60° C.
 - Another molecule called DNA polymerase is introduced to hold the primer and synthesises the rest of it according to the complementary bases on the strand.



14. RENEWABLE ENERGY

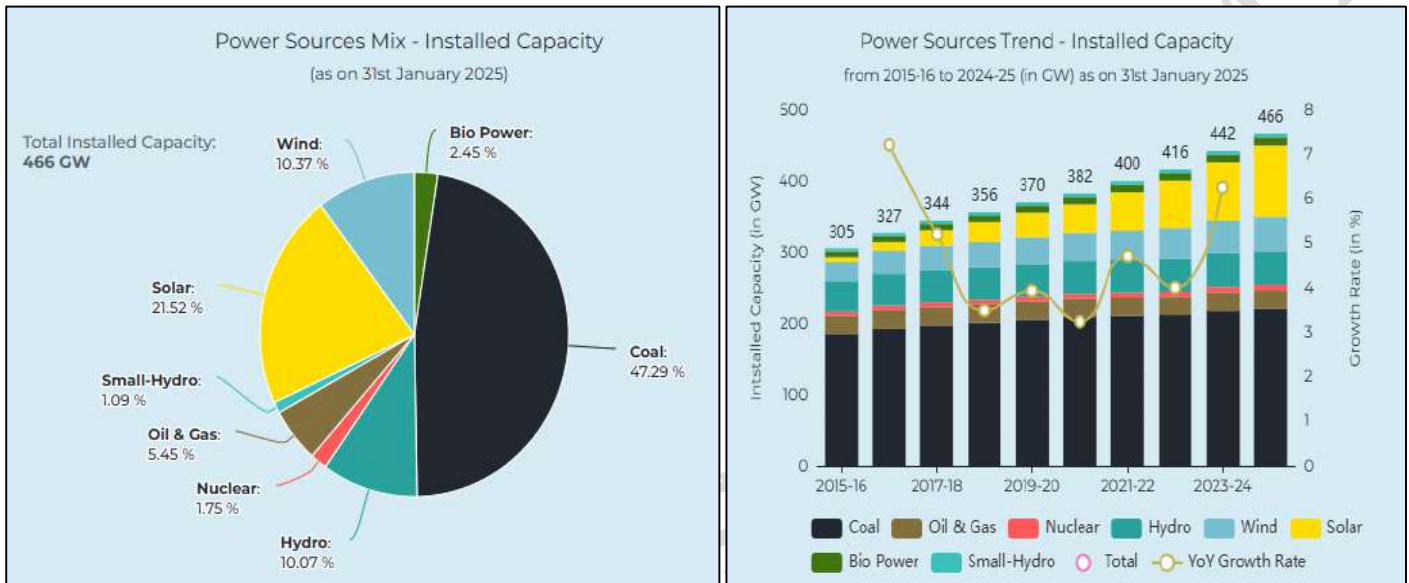
14.1 Renewable Energy in Meeting Electricity Demand

Why in news?

In recent times, Climate change-induced heat stress is one of the key factors driving electricity demand that leads to power shortages in India.

What are the factors driving India's electricity demand?

- **India's electricity capacity** - India's total installed electricity generation capacity is around 470 GW (gigawatts) with renewable energy accounting for above 40%.



- **Increasing demand** - Since FY21, India's electricity consumption has risen at approximately 9% per annum, compared to an average of 5% annually in the preceding decade.
- The Central Electricity Authority (CEA) had projected electricity demand to grow at a 6% CAGR between 2022 and 2030.
- **Peak demand spikes** - India's electricity peak demand hit 250 GW on May 30, 2024, exceeding projections by **6.3%**.
- **Economic growth** - India's aspiration to become a \$5 Trillion economy by 2030 and \$30 Trillion by 2047 requires tripling the current energy production.
- **Urbanization** - India is experiencing rapid urbanization, with its urban population projected to reach 40% by 2030, from 31.16% in 2011.
- **Climate change** - Increasingly hotter summers and colder winters are pushing up electricity demand for cooling and heating requirements.
- **Increasing household consumption** - Household electricity demand has grown the fastest over the past decade.
- In summer 2024, air conditioner sales surged by 40-50% year-on-year due to extreme heat and rising affordability.

India's Electricity Consumption: Industries - 33%, Households - 28%, Agriculture - 19%

After recording its warmest February in 125 years, India is expected to face **extended heatwaves** in 2025, with electricity demand projected to grow **9-10%**.

A new study by the **Council on Energy, Environment and Water (CEEW)** found that failure to achieve 500 GW of clean energy capacity by 2030 will lead to power shortages and higher power costs, even if demand grows moderately.

What is the role of renewable energy in meeting the demand?

- **Addressing power shortages** - Achieving 600 GW of renewable energy (RE) by 2030 will prevent supply gaps, especially in northern states facing network constraints.
- **Lower power costs** - RE expansion could save **Rs 42,400** in procurement costs in 2030 alone.

- **Overcoming network constraints** – Distributed renewable energy (RE) capacity across states reduces grid stress and improves transmission efficiency.
- **Reducing downtime** – Unlike coal plants, which face maintenance-related downtimes, RE with battery storage ensures stable power supply.
- **Lower emissions** – Scaling up RE could cut air pollutant emissions, improving environmental quality.
- **Faster deployment** – RE projects, being modular, can be set up much faster than coal plants, which take over seven years to become operational.
- **Decarbonizing the grid** – A 53% clean grid, with 39% variable renewable energy (vRE), aligns with India's Renewable Purchase Obligations (RPOs).
- **Social benefits** – A 600 GW RE target could create 1, 00, 000 new jobs (2025-30) and improve public health by reducing air pollution.
- **Improved air quality** – 50% renewable energy mix, helps avoiding 160 million tonnes of CO₂ emissions in 2030 and reducing coal consumption by 13%.
- It will significantly decrease air pollutants (PM_{2.5}, PM₁₀, SO₂, NO_x), improving health and air quality.

What are the challenges in renewable energy deployment?

Transmission/ Grid connectivity	<ul style="list-style-type: none"> • Delays in the availability of transmission equipment. • Complexities of grid balancing and slow infrastructure augmentation
Land issues	<ul style="list-style-type: none"> • Delays in securing suitable and conflict-free land • Site accessibility problems • Complexities in land aggregation and rising land prices
Tariff viability	<ul style="list-style-type: none"> • Contract signing delays • Uncertainty over inter-State transmission system (ISTS) charges ISTS waivers • Shrinking profit margins due to commissioning delays
Supply chain constraints	<ul style="list-style-type: none"> • Limited availability of specialized materials like photovoltaic cells • Low domestic manufacturing capacity and import dependence
Policy Challenges	<ul style="list-style-type: none"> • Uncertainty around incentives for inter-State RE plants.

How can India add renewables faster?

- **Regional distribution of RE projects** - Currently, 5 Indian States house three-fourths of the total RE capacity due to ISTS waiver and reverse bids.
- Encouraging distributed RE plants under the PM-KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan) and PM Surya Ghar Scheme.
- **Co-locating Solar, Wind and Energy storage** – This would help effectively utilise land and transmission networks and support grid integration of renewables.
- CEEW's study estimates that India will need 280 GWh of battery energy storage systems (BESS) and 100 GWh of pumped hydro storage to integrate 600 GW of RE by 2030.
- **Innovation in bidding and contract designs** – The Union government shall work with States to generate demand for RE procurement, devise suitable tender designs, and proactively resolve bottlenecks.
- It will pave ways for faster RE procurement and RE availability in power exchanges.
- **State-specific clean energy strategies** – States shall be given the flexibility to choose the clean energy technologies that best suit their needs.

India needs to reach 600 GW of clean energy by 2030 to meet rising demand, requiring an annual addition of 70 GW of renewable energy until then.
