



INSIGHTSIAS

SIMPLIFYING IAS EXAM PREPARATION

INSTA MINDMAPS



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AUGUST 2023

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General Studies – 1

Topic: Salient features of Indian Society, Diversity of India.

1. Inclusive Workplaces

Introduction

- Every June, thousands of rainbow-coloured flags flutter across the world as people celebrate the spirit, resilience and achievements of the Pride movement.
- The movement inspires people to fully embrace diversity and create a sense of belonging for all.
- Workplaces have a vital role to play in Pride inclusion by fostering a truly inclusive workplace culture.

Present Status

- According to a study across 26 countries, only 31% of LGBTIQ+ employees were fully open about their gender identity.
- The gendered language typically used in human resource policies prevents non-binary individuals from availing certain benefits.

Way Forward

- Organizations need to regard diversity and inclusion just as they would regard any other strategic business priority.
- Proactive hiring of diverse talent in a meritocratic manner.
- Scrub job descriptions of gendered language.
- Conduct sensitization workshops for recruiters to eliminate unconscious biases.
- Skills gaps, if any, should be bridged through developmental programmes focused on the community.
- Company policies must be periodically reviewed to ensure that they are inclusive.
- Examples of this include gender-agnostic parental leave options and equal access to company-led medical and life insurance programmes.
- Mentorship and counselling for LGBTIQ+ people willing to open up to others is critical
- Role models are a huge source of courage and inspiration for people to be their authentic selves.

Topic: Population and associated issues

2. Demographic Transition

Introduction

- The World Population Day reminds us to look at how India's demographic journey has changed the lives of its citizens, particularly women.
- India's population grew from about 340 million at Independence to 1.4 billion.
- The Total Fertility Rate fell from 5.7 in 1950 to 2.1 in 2019.

What is Demographic transition

- Demographic transition refers to a population cycle that begins with a fall in the death rate, continues with a phase of rapid population growth and concludes with a decline in the birth rate.
- India is in transition phase between 3rd and 4th stages of demographic transition.

Stages of demographic transition

- Stage I: It is characterised by high birth rate, death rate and low rate of population growth.
- Stage II: It is characterised by high and stationary birth rate, rapidly declining death rate and very rapid increase in population.
- Stage III: It is characterised by a falling birth rate, low and stationary death rate and rapidly rising population.

- Stage IV: It is characterised by low birth rate and low death rate with stationary population at a low level.
- Stage V: It is characterised by death rate slightly exceeding the birth rate, and this causes population decline.

Impact of demographic transition on the lives of women

- Demographic shifts affect women's lives as they age.
- With rising life expectancy, the proportion of the female population aged 65 and above has increased from 5% to 11% between 1950 and 2022.
- Women, who generally marry older men, are more likely to outlive their husbands.
- Consequently, a significant portion of elderly women, around 55%, become widowed, leading to dependence on their children.
- This perpetuates the vicious cycle of son preference.

Preference for Son

- As families began having fewer children, ensuring at least one son became more difficult.
- With smaller families, the chance of not having a son increased from 6% to 25%.
- **Deeply rooted social norms, combined with patrilocal kinship patterns and financial insecurity, have reinforced the preference for sons.**
- The India Human Development Survey (IHDS) found that 85% of women respondents expected to rely on their sons for old age support.
- The number of girls per 100 boys, ages under five dropped from 96 to 91 between 1950 and 2019.
- Enhancing women's access to employment and assets will reduce their reliance on sons.

Way Forward

- **Improved infrastructure, skill development, access to easy finance, and forums for mentorship of emerging entrepreneurs in partnership with corporates are some of measures.**
- India has to invest more in human capital formation at all levels, from primary education to higher education.
- Better transportation links between rural areas and regional urban hubs.
- Focus on elderly people to make use of their wisdom and experience.
- Increasing the number of formal jobs in labour intensive, export-oriented sectors such as textiles, leather and footwear, gems and jewellery.
- Efforts to improve women's labour force participation must be accompanied by access to safe and affordable childcare.
- By doing so, India can break the cycle of gendered disadvantage and achieve the much-desired demographic dividend.

3. Decline in Working-age Population

Introduction

- According to the UN's World Population Prospects 2022 (WPP2022) report, the global fertility rate, which stood at 2.3 overall in 2021, will hit 2.1 by 2050, owing to decline in birth rates, including in Africa and Latin America.

Decline in fertility rate across the world

- Since 2011, sales of adult diapers in Japan have outpaced those for infants, reflecting a decline in the country's fertility rate.
- Fertility rates have also dropped below the replacement level in all eurozone countries.
- South Korea and Hong Kong's 2021 fertility rates are among the lowest in the world.
- The US fertility rate has more than halved over since 1960.

Consequences

- Declining fertility rates have shifted the age distribution of the population upward in many economies.
- According to the WPP2022, “Worldwide, persons aged 65 or over outnumbered children under five for the first time in 2018.
- The consequences will be immense, particularly in high-income economies.
- In addition to straining pension and health-care systems, low fertility rates will reduce the working-age population, in turn lowering household consumption and economic growth.

International migration

- International migration from low-income, high-fertility countries to those with higher average incomes and lower birth rates has helped shield the latter from demographic headwinds.
- According to the WPP2022, high-income countries’ population growth between 2000 and 2020 was driven primarily by international migration.
- International migration is set to become the sole driver of population growth in these economies in the coming decades.
- International migration has helped high-income countries sustain economic growth and support their growing elderly populations.

Concerns / Challenges

- The coming decades will become very challenging for the work- age population who will not have the numbers to support the increasing economically inactive people.
- If global fertility does fall below the replacement rate within the next 30 years, the consequences for the entire planet may be dire.
- Our children may be the future, but they will be growing up in a geriatric world.

Way Forward

- At a time of heightened geopolitical tensions, it is important to recognize the mutually beneficial relationship between low- and high-fertility countries.
- The appropriate solution is through a policy of maintaining the optimal rate of world population growth which is consistent with changing social trends and technological advances.
- Need for improved technologies, biotechnological revolution, wider range of food sources, more land made available for production, and more production in the regions where it is needed.
- Much will depend on political wisdom, will, and resolutions made by the global community.

Topic: Poverty and developmental issues, Urbanization, their problems and their remedies.

4. Perils of unplanned urbanisation

Introduction

- In the past few weeks, many major cities have been flooded.
- The consequence is majority of urban residents face water-logging and traffic congestion.

Present Status

- Due to flooding the damage and disruption have increased.
- With unplanned urbanisation and a rise in population, there has been a rise in construction and a loss of water bodies.
- With cities getting more concretised, rainwater percolation has reduced, leading to a rise in stormwater run-off.

Major Flooding Events

- Most Indian cities are situated beside a river, with extensive floodplains and wetlands.
- India has lost 40 per cent of its wetlands in the past 30 years.

- Baroda lost 30 per cent of its wetlands between 2005 and 2018.
- Delhi had 1,000 waterbodies in 1997, but now has just 700.
- With such a loss of natural “blue infrastructure”, flooding risks have increased.
- Delhi has seen four major flooding events between 2005 and 2023.

Concerns / Challenges

- Most of India’s 5,000 plus cities and towns don’t have a well-functioning sewerage network.
- Delhi’s stormwater drains are very old.
- Coordination challenges among civic agencies.

Flood Risk Management

- Studies must be conducted in all cities to understand the flooding risk associated with urban water bodies.
- Include the **participation of the local citizenry** in upkeep and a push to remove encroachments.
- Geographic information systems (GIS) may be used to tag local water bodies, to understand their seasonality.

Drainage and stormwater Management

- Revamp and expand drainage and stormwater networks across our cities.
- Most cities need to develop drainage master plans.
- Existing pipelines need to be surveyed and water-logging locations identified.

Local Examples

- The Mangalore City Corporation (MCC) established wastewater treatment plants with end-user linkages.
- Community-driven approach led to reviving the Kaikondrahalli Lake in Bengaluru in a phased manner.

Way Forward

- Investments are required in more **early warning systems** to enable real-time updates on changing weather patterns locally.
- **Invest in city-wide databases** that enable the provision of immediate relief in the event of a flooding-related disaster.
- **Coordination between agencies/institutions** must improve.
- Awareness about wetland/water body conservation must be improved.
- Require a well-defined urban water policy.
- **Regulatory bodies like the Central Wetland Regulatory Authority can be granted statutory powers.**

Conclusion

- As we advance, cities must lead on climate change, rather than simply reacting to untoward events.
- Instead of pursuing smart cities, we should invest in rainwater harvesting and better drainage.

5. India’s Urbanisation

Introduction

- **A recent report by the World Bank on financing India’s urban infrastructure needs, focuses on private investments ameliorating urban problems.**
- In the last few years, various reports have estimated a huge demand for funding urban infrastructure.

Urban Finance

- After three decades of reforms, urban finance predominantly comes from the government.

- Of the finances needed to fund urban capital expenditures, 48%, 24% and 15% are derived from the central, State, and city governments, respectively.
- Public-private partnership projects contribute 3% and commercial debt 2%.

World Bank estimates

- **The World Bank estimates that nearly ₹70 lakh crore would be needed for investment in urban India to meet the growing demands of the population.**
- The flagship programmes of the government, the Smart City mission, the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), the Pradhan Mantri Awas Yojana (PMAY), etc., are not more than ₹2 lakh crore.
- Nearly 85% of government revenue is from the cities. This means that urban citizens are contributing large revenues.
- Low service charges for municipal services undermine financial sustainability and viability.
- Urban bodies are unable to recover operations and maintenance costs, thus, constraining their ability to further execute projects.

Urban Governance

- **An important aspect of urban infrastructure is linked to urban governance.**
- Regular elections should be held in cities and there must be empowerment through the transferring of the three Fs: finances, functions, and functionaries.
- Cities primarily are run by parastatals and the city governments hardly have any role to play in the smooth functioning of such parastatals.
- State-level management of urban water and sewerage functions may be devolved in a time-bound manner.

Urban Transportation

- Comfortable, safe and affordable commuting has well-recognised multiplier effects for the economy and more generally for public health.
- India's ratio of buses to population is a low 1.2 per 1,000 people, compared to 8.6 in Thailand and 6.5 in South Africa, although some States like Karnataka are well ahead of the national average.
- The challenge of urbanisation goes beyond standalone interventions such as Metro and bus system grants.
- There is a criticism that the existing Metro and bus services are expensive for the majority, particularly for those forced to live in the suburbs due to housing costs, and sometimes making the per kilometre cost of using a two-wheeler more attractive.

Way Forward

- **Need for improving the fiscal base and creditworthiness of the Indian cities.**
- Cities must institute a buoyant revenue base and be able to recover the cost of providing its services.
- It means **increasing property taxes, user fees and service charges** to name a few.
- Plans must be made from below by engaging with the people and identifying their needs.
- **Empower the city governments and the people at large.**
- 10% of the income-tax collected from cities can be given back to cities and ensuring that this corpus fund was utilised only for infrastructure building.
- **Result/performance-based financing** can also improve institutional outcomes more than investments for specific projects.

General Studies – 2

Topic: Issues relating to development and management of Social Sector/Services relating to Health, Education, Human Resources.

6. Impact of Climate Events on Urban Health

Introduction

- There was much media focus on the monsoon season in India this year largely on account of the large-scale devastation.
- It includes cyclonic storm Biparjoy, floods in Assam, and heavy rain and devastation in parts of north India.
- The subject has been a matter of concern especially for policymakers.

Impact of Various Climate Events

- **Common water and vector-borne diseases such as typhoid, cholera, dysentery, malaria, and dengue are likely to impact people in rain-affected areas.**
- Changing climate patterns, along with urbanisation and increased movement of people and goods, have boosted the spread of disease-causing mosquitos.
- Households in less developed parts of a city such as slums and urban settlement colonies, are likely to be the most vulnerable groups.
- A large majority of these people live in poverty, and work in informal sector with no social security benefits.

Concerns / Challenges

- Increasing exposure to unpredictable and extreme climatic events.
- Due to migration between states, controlling the spread of diseases can be a challenge.
- Very little is spent on primary health care and only a tiny fraction goes to urban local bodies.
- The limited ability of urban local bodies in generating revenues constrains progress of National Urban Health Mission.
- Shortage of an adequately trained workforce in health and allied areas.

COVID-19 experience

- The experience during the COVID-19 has shown that public health emergencies need greater coordination across various actors, in terms of knowledge and data sharing, preventive and curative functions.

Way Forward

- Controlling water and vector-borne diseases requires a **coordinated effort not only within but also between two or more States.**
- Need to rebuild the urban primary health-care system and ensure its resilience.
- Focus on the vulnerable urban population, especially those living in urban slums and peri-urban areas.
- Greater public investment with focus on urban areas that are vulnerable to climatic shocks.
- **Integrated Disease Surveillance Programme** needs to be universalised, made comprehensive and strengthened.

Conclusion

- Climate change-led events are only going to be more frequent and intense. Therefore the world needs to be better prepared.

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

7. Delay in the Census of India

Introduction

- In India, historical tradition of conducting a Census has been maintained in spite of several adversities like wars, epidemics, natural calamities, political unrest etc.
- Very few countries in the world can boast of such a distinction.
- India appears to be on the verge of losing that distinction now.

Importance of Census

- **The census is the foundational database for official statistics and policymaking in a modern economy.**
- Fertility rates, migration, schools, urban policy, urban housing, migration all are decided by Census.
- Outdated census data makes block and district-level planning particularly difficult.
- Survey estimates for a region or community are scaled up based on population estimates provided by the census.
- The lack of reliable population figures has created a huge challenge for statisticians across the country.

Delay in Census

- The uninterrupted run of the Indian census was broken when the 2021 census got derailed.
- The pandemic was cited as the official reason for the delay.
- **Delaying the exercise further will derail several welfare programmes, policies and resource allocations, which are based upon population data.**

International practice

- Countries across the world have conducting their decennial censuses, since the Covid pandemic.
- In Asia alone, 12 countries, including Nepal and Bangladesh, have conducted censuses in the 2021-22 period.
- In almost all G20 economies, it is the respective national statistical office that handles census operations.
- In most of them, there are well-institutionalized mechanisms to insulate statistical offices from the politics of the day.

Institutional structure governing census operations

- **The Registrar General of India (RGI), who heads census operations, reports to the home ministry.**
- The ministry of statistics and programme implementation (Mospi) has very little role in the census operations.
- An attempt was made by the National Statistical Commission (NSC) in 2011 to bring both Mospi and RGI under the umbrella of an independent statistical authority, accountable to Indian Parliament.
- However, it faced stiff opposition from the RGI and the home ministry.

Way Forward

- Madhava Menon's report must be revived if the Census of India is to be saved from needless disruptions and inexplicable delays.
- To uphold the integrity of the census data, it has to be insulated from day to day politics.
- The world's largest democracy deserves clean and honest data.

8. India's Clean-Cooking Strategy

Introduction

- Over the last 15 years, the Government has attempted to replicate the success that LPG adoption has seen in urban households, in poorer and rural households.
- The Grameen Vitrak Yojana, launched in 2009, has helped grow the rural distributor base from 18% to 60% of the total LPG distributor base today.
- The ambitious Pradhan Mantri Ujjwala Yojana (PMUY) has provided more than 9.5 crore new households with LPG connections since 2016.
- However, for the first time, LPG consumption in Indian households saw an absolute reduction in FY23.

The LPG story

- In the recent past, the share of Indian households using LPG as the primary cooking fuel had risen to 71% in 2020 from 33% in 2011.
- However, the following events have dented the universal use of LPG in Indian households
 - COVID-19 pandemic that led to loss of livelihoods and income.
 - Also, subsidy for LPG consumption was withdrawn for all consumers.
 - Russian invasion of Ukraine and the resulting surge and volatility in crude prices.

Concerns / Challenges

- Despite significant efforts, home delivery and distribution channel issues remain.
- India's dependence on imported LPG has steadily increased to over 64% in FY23.
- Indian households have seen a near-doubling in LPG prices since May 2020 in nominal terms.
- It is unlikely that India can return to a regime where a subsidy of approximately INR20,000 crore (2011-12 prices) was provided each year for LPG consumption

Way Forward

- More budgetary outlay will be needed for subsidies to entice the poor to consume LPG and avail its health benefits.
- **India's clean cooking policy must pivot towards the adoption of clean-cooking technologies and shift from an LPG-only strategy.**
- With near 100% access to electricity connections, rural households can also shift specific cooking needs to electricity.
- This can then spur the domestic manufacturing ecosystem for e-cooking technologies and reduce the dependence on imported LPG and crude, and the outflow of precious forex.
- Displacement of 'chulhas' by e-cooking would also avoid climate pollutant release.

Conclusion

- The debate needs to move from LPG subsidy alone to financing and business models that value India's clean cooking transition for its climate and clean air benefits.

Topic: Important aspects of governance, transparency and accountability

9. India's Prison Reforms

Introduction

- **At the Constitution Day celebrations, the President Droupadi Murmu highlighted that prisoners were often unaware of their fundamental rights and had been incarcerated for prolonged periods for minor offences, while their families were unable to bail them out.**

Need for Prison Reforms

- **Prison reform is necessary to ensure that human rights of prisoners are protected and their prospects for social reintegration are increased.**
- Prisons are not isolated from the society and prison health is public health. It is important to provide adequate health facilities.
- For protecting the rights of inmates with mental health-care needs.

Prisons Governance in India

- Prisons in India, and their administration, is a state subject covered by item 4 under the State List in the Seventh Schedule of the Constitution of India.
- Prisons in India are governed by the Prisons Act, 1894, a colonial legislation that treats prisoners as sub-par citizens and provides punishment to be retributive, rather than rehabilitative.
- These laws are also highly casteist and remain largely unchanged since they were drafted by the British.
- For example, some jail manuals continue to focus on purity as prescribed by the caste system and assign work in prison based on the prisoner's caste identity.

Present Status

- Dalits and Adivasis are over-represented in Indian prisons.
- Legislations such as the Habitual Offenders Act and Beggary Laws allow the police to target them for reported crimes.
- The primary reason why prisons are overcrowded is that India has not done enough to truly prevent crime.
- Prisoners' health conditions deteriorate in prisons which are overcrowded, where nutrition is poor, sanitation inadequate and access to fresh air and exercise often unavailable.
- Imprisonment disproportionately affects individuals and families living in poverty.
- When released, often with no prospects for employment, former prisoners are generally subject to socio-economic exclusion.

Way Forward

- **In the words of Nelson Mandela, "a nation should not be judged by how it treats its highest citizens, but its lowest ones".**
- Progress is antithetical to setting up prisons, and we must address congestion in prisons in non-carceral ways.
- These could include releasing unwell or old inmates, reducing penalties, allowing bail at affordable costs, employing anti-carceral ways of holding people accountable for their crimes, and expediting trials.
- **Our approach to crime should be preventive, rather than reactive.**
- Instead of investing thousands of crores in finding "state-of-the-art" ways to cage and harm people, the state should reflect on the soul of India's Constitution which imposes welfare obligations on the state.
- **Prisons should have reformatory approach rather than retributive one.** Basic human rights of the prisoner should be protected and be given another chance to live a meaningful life.
- Inculcation of scientific method of investigation in Police force and curtailing the practice of third-degree torture.

SIMPLIFYING IAS EXAM PREPARATION

Topic: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

10. India - Japan Tech Diplomacy

Introduction

- Recently India and Japan agreed to collaborate on semiconductors to create a more resilient supply chain and joint development of the semiconductor ecosystem.
- This will pave the way for government-to-government and industry-to-industry collaborations.

Partnership

- The partnership fosters the exchange of technical knowledge, research, and innovation.
- It facilitates technology transfer and enables both countries to stay at the forefront of semiconductor advancements.
- **India's "Make in India" initiative and Japan's "Society 5.0" vision share the goal of technological self-reliance and innovation-driven growth.**
- Japan has long been a global leader in chip manufacturing and research.
- India has a growing information technology sector and a burgeoning demand for semiconductor products.
- The partnership also emphasises skill exchange programmes, workshops, and training.
- This partnership will also have far-reaching implications for the global technology ecosystem and the geopolitical partnerships in the Indo-Pacific.

Importance

- Semiconductor technology is important in driving innovation, economic growth, and national security.
- Joint research initiatives enable the pooling of resources and expertise to tackle challenges in semiconductor design, manufacturing, and materials science.
- The agreement with Japan follows charting of a technology partnership for the future between the United States and India.

Strategic Curbs

- **U.S.'s CHIPS and Science Act of 2022, places strategic curbs on the expansion of semiconductor manufacturing by countries posing a direct threat to the U.S., including China.**
- Japan and the Netherlands joined the U.S. in restricting exports of semiconductor manufacturing materials to China.
- Tokyo is on board because of the geopolitical concerns over China's expanding chip-making capabilities.

Way Forward

- The confidence placed in India by the two Quad countries signal India's own capabilities in the development of semiconductors and related technologies.
- The collaboration on semiconductors displays a shared commitment to pushing the boundaries of technological excellence.

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General Studies - 3

Topic: Major crops cropping patterns in various parts of the country

11. Role of Technology to Boost Indian Agriculture

Introduction

- Agriculture and allied sectors are central to the Indian economy.
- India is promoting technology-enabled sustainable farming, including natural, regenerative and organic systems.

India's Food Security

- Though India has achieved food security, the demand for coarse cereals, pulses, oilseeds and vegetables is not fully met.
- They are not affordable for a large part of the population, leading to under/malnourished population.

Indian seed industry

- Indian seed industry was built on a strong foundation in the 1960s with the establishment of the National Seeds Corporation.
- Milestones towards the era of a technology-driven seed sector
 - introduction of the Protection of Plant Varieties & Farmers Rights Act, 2001
 - release of Bt cotton hybrids for commercial cultivation in 2002.
- The focus of the seed industry should be to promote varieties to combat the threats posed by climate change.
- The advancements made in seed technology can maximise the availability and quality of seeds.
- Applied seed technologies would ensure good performance even under less favourable, unpredictable, and harsh environments.
- R&D efforts of the public and private sectors must complement each other in developing environment-friendly, better-performing seeds at affordable costs.

India's millet production

- Millets are recognised as well-suited for sustainable agriculture.
- India is the global leader in millet production.

Technologies includes

- Genetic manipulation in variety development, subject to regulatory compliances.
- Seed treatments with biologicals.
- Bio-stimulants and nutrients for higher germination and faster seedling establishment.
- Incorporation of AI responsive sensors/substances in seed to help modulate plant responses to external stimuli.
- Incorporation of pesticidal formulations through film coating on seed.
- Most of these technologies are in commercial use globally, and some have been introduced in India.

Concerns / Challenges

- Depleting natural resources.
- extreme weather conditions and natural disasters because of climate change.
- India agriculture dominated by smallholder farmers.
- India's performance in achieving the SDGs linked to agriculture, are yet to reach desired levels.
- The costs of inputs such as seeds, fertilisers, and pesticides, besides land, labour and water, are the major determinants of profitability in agriculture.

Way Forward

- Increasing profitability in agriculture and its share of export in the world market.
- India needs to

- close the gap between potential and achievable productivity in most grain crops and vegetables,
- reduce the cost of production,
- promote cultivation and consumption of nutritionally-rich crops like millets, and
- focus on the quality of the agricultural produce.
- Focus must be on ensuring the availability of quality seeds and maximising the performance value of every seed.
- To meet the targets for food and nutrition security, effectively utilise every available technology including traditional knowledge in agriculture.
- A robust regulatory mechanism covering quality seedlings and planting materials is needed.

Topic: Conservation, environmental pollution and degradation

12. Decarbonisation

Introduction

- The energy market has fragmented and energy nationalism is the driving force behind policy.
- Against this international backdrop, India must pivot the needle of its energy compass towards short-term energy security and long-term decarbonisation.

Coal Ecosystem

- **Coal will remain the bulwark of India's energy system for decades.**
- Hundreds of thousands depend on the coal ecosystem for their livelihood.
- The option of phasing out coal whilst environmentally compelling is not yet a macroeconomic or social possibility.
- In the interim, the government has to find an energy transition route that balances livelihoods and pushes forward the green agenda.
- Some small feasible steps in that direction would include
 - increased R&D expenditure for coal gasification and carbon capture and sequestration technologies;
 - setting a carbon tax;
 - the establishment of regulatory and monitoring mechanisms for measuring carbon emissions from industry;
 - the closure of inefficient and old plants and a decision not to approve any new ones.
- Niti Aayog could pull together a group of economists and energy experts to determine the competitiveness of coal versus solar on a full-cost basis.

Demand conservation

- Energy security cannot be achieved by focusing only on the supply and distribution side.
- **The demand conservation and efficiency side is equally important.**
- Europe will save 10 bcm of gas annually by simply adjusting their thermostats downwards by 1-degree centigrade.
- The government has conceptualised several demand management measures, but these have not been rigorously implemented.

Energy Security

- The government must increase the productivity of our existing Oil producing fields.
- Additional resources should be allocated for accessing relevant enhanced oil recovery technologies.
- India should enhance the strategic petroleum reserves to cover at least 30 days of consumption.
- The construction of a pan-India national gas pipeline grid should be expedited.

Policy Measures

- The underlying structural issues currently impeding the scaling up of renewables must be addressed. These include
 - repair of the balance sheets of state distribution companies (discoms),
 - easing the procedures for the acquisition of land and
 - removal of regulatory and contract uncertainties.
- It will take decades to harness our indigenous resources for the build up a domestic chip industry.
- In the interim, diplomats should secure diversified sources of supply to reduce the country's vulnerability.
- Creation of an enabling ecosystem for developing and commercialising third-generation clean energy technologies like hydrogen, biofuels and modular nuclear reactors.

Decarbonisation

- India is not responsible for global warming, but it will be amongst the worst affected.
- The livelihoods of those who live around the coastline will be undermined by rising sea levels.
- Millions will also be affected by melting glaciers and extremes of temperatures.
- So irrespective of who is to blame, India has to stay on the path of decarbonisation.

13. India's Marine Litter Problem

Introduction

- India generates 55 million tonnes of municipal waste annually, of which only 37 per cent is treated, according to the Central Pollution Control Board.
- From the deepest parts of the ocean to the most remote oceanic islands, plastics and microplastics are all-pervasive.

Municipal solid waste

- Growing population, rapid urbanisation, shifting consumption pattern and changing lifestyles have resulted in the mismanagement of plastic waste, leading to the accumulation of municipal solid waste.
- Most of these items, especially plastic items, contribute significantly to the growing burden of marine debris.
- Land-based sources account for most of the plastic in the water.
- Unaccounted waste from urban agglomerations is carried by river systems to oceans for final dumping.
- Many states claim Single Use Plastic above 50 microns is banned, but on the ground, the ban is not effective.

Marine Debris

- India's coastline contributes to its ecological richness, biodiversity and economy.
- Every year, thousands of tonnes of garbage, composed of plastics, glass, metals, sanitary products, clothes, etc., are dumped into it.
- Plastics contribute a major portion of about 60 per cent of the total marine debris that reaches the oceans.
- Waste management in this intensely populated region is a meticulous task.
- Only 60 per cent of the total collected plastic waste is recycled.
- India is reeling under the marine debris crisis, which poses serious threats to its particularly rich marine biodiversity.
- Marine litter is spread along the entire water column.
- High quantities of sediments are noticed during monsoon due to their spread into coastal water through creeks/rivers/estuaries.
- Extreme weather events such as heavy rainfall and cyclones may be transporting a significant amount of plastic litter into the sea, according to a new study.

Government Initiatives

- **The Ministry of Earth Sciences, through its attached office National Centre for Coastal Research (NCCR), has undertaken beach clean-up initiatives, awareness programmes and beach litter quantification studies at regular intervals.**
- Many studies have been conducted across coastal states and Union Territories Puducherry, Andaman and Nicobar and Lakshadweep.
- NCCR has initiated monitoring of the temporal and spatial distribution of marine litter along the Indian coasts and adjacent seas.

Way Forward

- The **National Marine Litter Policy of India**, announced in 2018, should be formulated.
- Understanding the source and distribution of plastics can help target priority areas to implement mitigation policies.
- A **forum of coastal cities** should be created to build a synergetic association of urban local bodies and local administration located on the coast.
- Initiatives like a **multi-stakeholder approach** that will recognise knowledge, expertise, technology, research and capacity building to safeguard life below water can be beneficial.
- **Regular beach clean-up and awareness programmes should be conducted instead of annual ones.**
- **Steps should be taken to execute the ban of single use plastics.**

14. Coral reefs Ecosystem

Introduction

- As many as 10 per cent of coral reefs have degraded; another 30 per cent are likely to disappear within next 20 years across the globe.
- If proper conservation and management measures are not taken, all coral reefs of the Indo-Malayan region may disappear in the next 40 years.

Coral reefs

- Coral reefs are unique and the most diverse marine ecosystems on Earth.
- Corals are composed of hundreds of thousands of individual animals known as polyps.
- Most corals feed on microscopic animals during the night time.

Benefits

- **Corals play a crucial role in supporting the flora and fauna in the marine ecosystem.**
- They have provided pleasure and protection from storm and other natural calamities.
- **They are also described as 'underwater tropical rainforest, biologist's paradise, magnificent repository of resources, genetic garden, submerged meadows and treasure house of wealth'.**
- They act as barrier against waves and thus prevent coastal erosion.
- Mangroves and the sea grass beds, which act as breeding ground of various marine faunal species, are protected by coral reefs.
- Coral reefs act as breeding, spawning, nesting and feeding areas for many fishes and other marine organisms.
- They provide revenue and employment through tourism and recreation.
- They provide habitats for fishes, starfish and sea anemones.
- It has been assessed that one square kilometre of coral reef produces 20-35 mega tonnes of fishes sufficient to feed about 600 people annually.
- They are used in jewellery and as curios.
- The lime supplied by corals is used in cement industries.

Global Distribution

- Indonesia has the largest coral reef area in the world.
- India, Maldives, Sri Lanka and Chagos have the maximum coral reefs in South Asia.
- The Great Barrier Reef of the Queensland coast of Australia is the largest aggregation of coral reefs.
- India has four coral reef areas: Gulf of Mannar, Andaman and Nicobar Islands, Lakshadweep islands and the Gulf of Kutch.

The threats

- Coral reefs face threats due to **anthropogenic activities** such as coastal development, destructive fishing methods and pollution from domestic and industrial sewage.
- They have been deteriorating at a faster rate due to **increased sedimentation, over-exploitation and recurring cyclones.**
- Dynamite and cyanide fishing cause serious threat to coral reefs and their biodiversity.
- Domestic wastes, industrial wastes, fertilisers and other toxic chemicals when let into the oceans cause serious damage to coral reefs.
- When the ocean water becomes too warm, the corals bleach as the symbiotic algae (Zooxanthellae) leave them.

Way Forward

- An **integrated coastal management plan** is the need of the hour for effective management of coral reefs.
- An act to protect them from man-made activities has to be brought in.
- Over-exploitation of the coral reefs should be brought under control.
- Fishing by using dynamite, cyanide and explosives in the areas where coral reefs are found should be banned.
- Pollution caused by domestic sewage, industrial wastes, chemicals and fertilisers should be restricted.
- Anchoring of boats in the areas where coral reef areas are present should be banned.
- Planting of mangrove species in reef areas can be undertaken with the involvement and support of the local community.
- **The Union Ministry of Environment, Forest and Climate Change and the state governments concerned should take speedy action to conserve the coral reefs which are being pushed towards the verge of extinction.**

15. Nature-based solutions to fight Climate Change

Introduction

- Nature-based solutions refer to a collection of actions and policies that harness the power of nature to protect and restore ecosystems.
- It involves **conserving, restoring or better managing ecosystems to remove carbon dioxide from the atmosphere.**
- **Forests** are probably the most well-known nature-based solution for climate change, but there are many more - including **peatlands, mangroves, wetlands, savannahs, coral reefs and other landscapes.**

Why is it important?

- Our planet is facing a **dual climate and biodiversity crisis.**
- Around a million animal and plant species are now threatened with extinction - more than ever before in human history.
- At the same time, the **climate emergency** threatens to expose millions of people to extreme heat waves and could leave a billion people affected by sea-level rise within decades.
- Nature-based solutions can **transform our energy, land, urban and industrial systems.**
- It is required to **protect and enhance biodiversity.**

Regenerative farming

- An essential example for nature-based solution is regenerative farming, which **works to harness the power of nature rather than depleting it**.
- **Regenerative farming improves soil health** – and healthy soil is the biggest carbon pool on the planet.
- A regenerative practice called **agroforestry** – not only increases carbon storage, but it also creates a protective canopy that helps to regulate temperature and humidity, boost biodiversity and improve productivity.

Progress of NbS in some countries

- **Argentina** launched the **Forest AR2030**. The initiative aimed to restore two million hectares of forested land.
- **China** has been aggressively pursuing the NbS since the 1998 mass flooding. They have **planted trees on a massive scale** to reduce the flood runoff and established the **sponge cities project** to develop better urban centres.
- **Italy** has developed an instrument through which local enterprises and firms can decrease their carbon footprint by paying for local afforestation and contributing to the community's environmental and social benefits.
- **The United States** is pursuing the agenda of NbS, which has also been included in **hazard mitigation plans**.

How Nature based Solutions can benefit India

- **India can potentially leverage these global practices and harness multiple benefits** by implementing NbS.
- Planting mangroves can play a crucial role in **climate-proofing India's coastal cities**.
- NbS can be an effective tool in **mitigating urban heat island problems**, urban flooding and poor air quality to develop resilient cities.

Concerns / Challenges

- **Finance** around nature-based solutions is still not adequate. Much more investment is needed to unlock the full potential of it.
- Much of the world still seems to favour **destruction for short term gains** over the longer-term benefits of sustainable management.
- There is **limited technical expertise** within governments to identify nature-based solutions targets in order to integrate them into development strategies.

Way Forward

- Promoting nature-based solutions and prioritizing actions that could have climate benefits.
- Need to **increase investment in high-quality nature-based solutions**.
- Advocating for **policy changes** and the increased inclusion of nature-based solutions for climate in national climate targets.
- **Global standards for nature-based solutions** like those developed by the IUCN are key to advancing a rigorous, consistent and accountable framework for implementation.
- To ensure long-term resilience, projects involving nature-based solutions should adhere to four high-level principles.
 - Nature-based solutions are not an alternative to decarbonization;
 - They need to involve a wide range of ecosystems;
 - They should be designed in partnership with local communities while respecting Indigenous and other rights; and
 - They must support biodiversity, from the level of the gene to the ecosystem.
- **The world must invest now in nature-based solutions that are ecologically sound, socially equitable and designed to pay dividends over a century or more.**

Topic: Science and Technology- developments and their applications and effects in everyday life.

16. Voice Biometrics

Introduction

- Bank and cyber frauds in India are on the rise.
- **One way to reduce losses is by adopting Voice Technology (VT), which encompasses voice biometrics or voice/speech recognition technology.**
- The voice biometrics industry is growing exponentially now.

Bank and cyber frauds

- According to data by the Reserve Bank of India, frauds have cost the country an estimated ₹100 crore a day over the last seven years.
- The frauds reported in 2021-22 were 23.69% higher than in the previous year.
- The main reasons for the rise in fraud include greater use of digital payments, telephone banking, and online banking services.
- Growing fraud also means rising losses for financial institutions and increasing cases for law enforcement to solve.
- Although banks have traditionally relied on the use of passwords, passwords are the weakest link in security.

Voice Technology (VT)

- The global adoption of smartphones has led to a dramatic increase in biometrics for security.
- However, these methods are cumbersome, not entirely secure, and vulnerable to deep fakes.
- **One of the best ways to reduce fraud is through the use of voice biometrics.**
- In February 2019, HSBC became the first bank to take the revolutionary leap in introducing voice recognition for mobile banking customers — telephone banking fraud cases fell by over 50%.

Benefits

- Voice authentication can significantly **improve security over knowledge-based authentication methods, which fraudsters have exploited to scam people.**
- Compared to other biometrics, **voice use is the cheapest technology**, and does not require a reader or special device.
- Unlike a password, a customer's voice is impossible to spoof or copy, and is far more challenging to hack.
- VT verifies a caller swiftly in seconds by analysing the caller's voice and flags suspicious calls.
- VT **allows privacy** because it does not require users to reveal personal information.
- Voice biometrics can **help financial institutions to ensure higher levels of protection** for customers and employees.

Growing applications

- VT is an essential tool for **forensics and law enforcement.**
- The police can leverage voice to improve investigation efficiency, identify criminals, track criminals, and better respond to and prevent crimes.
- Voice is finding use from criminal background checks to airport security.
- Voice has a much lower error rate, and requires no eye contact.
- VT has the advantage of reducing call handle times and call centre costs, besides ensuring high-accuracy authentication in seconds.
- Voice could be an excellent tool for the Government to disburse money for various schemes and verify the proof of life of pensioners from their homes.

Concerns / Challenges

- The technology may not be 100% fool proof, may give false positives, and has an accuracy between 90% and 99%.

Way Forward

- In the context of fraud, the Government needs to develop a mechanism for proper coordination between financial institutions and the police to investigate and prosecute fraudsters and to maintain an extensive database of such criminals.
- Voice biometrics tech is making waves in the world of fraud protection by providing an extra layer of protection for data.
- Although the technology is not yet perfect, the potential benefits are significant.
- Once it is in place, user establishments can reap the benefits from a substantial reduction in fraud, making the technology an essential feature in the security toolkit of the future.

17. Regulating Deepfakes

Introduction

- Deepfakes are the digital media (video, audio, and images) manipulated using Artificial Intelligence.
- Deepfakes are a new tool to spread computational propaganda and disinformation at scale and with speed.
- From deepfakes the potential for damage to individuals, organisations and societies is vast.

What is Deepfake and how is it made?

- Advances in **Artificial Intelligence (AI) and Machine Learning (ML)** have enabled computer systems to create synthetic videos, a.k.a. deepfakes.
- A deepfake video can show a person saying or doing something that they never said or did.

What Deepfakes Does?

- Deepfakes can inflict **damage to individuals, institutions, businesses and democracy.**
- They make it possible to fabricate media — swap faces, lip-syncing, and puppeteer — mostly without consent and bring threat to psychology, security, political stability, and business disruption.
- Deepfakes can depict a person indulging in antisocial behaviours and saying vile things.
- Deepfake videos can be used to spread misinformation and propaganda.
- They seriously compromise the public's ability to distinguish between fact and fiction.
- Deepfakes have been used for financial fraud.
- Deepfakes can be used to influence elections. Recently, Taiwan's cabinet approved amendments to election laws to punish the sharing of deepfake videos or images.

Impact of Deepfakes

- **Targeting Women**
 - Deepfake pornography exclusively targets women.
 - It inflicts emotional, reputational, and in some cases, violence towards the individual.
- It can have severe implications on a persons reputation, sabotaging their professional and personal life.
- A deepfake can also aid in **altering the democratic discourse** and undermine trust in institutions and impair diplomacy.
- Leaders can also use them to increase populism and consolidate power.
- Deepfakes can become a very effective tool to sow the seeds of polarisation, amplifying division in society, and suppressing dissent.

Concerns / Challenges

- Even if the victim could explode the fake, it may come too late to remedy the initial harm.
- Deepfakes can be deployed to extract money, confidential information, or exact favours from individuals.

- Deepfakes can cause short- and long-term social harm and accelerate the already declining trust in news media.
- The ability for social media to make things viral compounds the problem.
- It can be used by insurgent groups and terrorist organisations, to represent their adversaries as making inflammatory speeches or engaging in provocative actions to stir up anti-state sentiments among people.
- The lack of proper regulations creates avenues for individuals, firms and even non-state actors to misuse AI.
- Currently, very few provisions under the Indian Penal Code (IPC) and the Information Technology Act, 2000 can be potentially invoked to deal with the malicious use of deepfakes.
- In India, the legal framework related to AI is insufficient to adequately address the various issues that have arisen due to AI algorithms.

Way Forward

- To defend the truth and secure freedom of expression, we need a **multi-stakeholder and multi-modal approach**.
- Legislative regulations, technology intervention, and media literacy can provide effective and ethical countermeasures to mitigate the threat of malicious deepfakes.
- Artificial Intelligence can help detect deepfake videos.
- Media literacy for consumers and journalists is the most effective tool to combat disinformation and deepfakes.
- The Union government should introduce separate legislation regulating the nefarious use of deepfakes and the broader subject of AI.

18. Fourth Industrial Revolution

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Introduction

- On May 26, 2022, US researchers unveiled a pacemaker that dissolves in the human body after completing its job.
- The pacemaker is a near-perfect example of the ongoing fourth industrial revolution (4IR).
- Another example of is the reproductive ability of the first living robot, called xenobots.
- Xenobots, which are less than a millimetre long, were created in 2020 from the stem cells of the African clawed frog and can be programmed using artificial intelligence.
- Such inventions make the ongoing 4IR different from the earlier three industrial revolutions.

Fourth industrial revolution (4IR)

- **Fourth industrial revolution (4IR) is the use of different technologies to blur the boundaries between the digital, physical and biological worlds.**
- 4IR is a collection of nine technologies: cloud computing, big data, augmented reality, system integration, autonomous robots, cybersecurity, simulation, additive manufacturing, and the internet of things (IoT).
- The 4IR, which is building on the third revolution, has data at its core.
- Countries are deliberately investing in 4IR technologies.

India's 4IR initiatives

- The Modern Coach Factory (MCF) at Raebareli, Uttar Pradesh, rolled out smart railway coaches that are fitted with a battery of sensors to provide a comfortable experience to passengers.
- Union Ministry of Heavy Industries launched the **Smart Advanced Manufacturing and Rapid Transformation Hub (SAMARTH) scheme**, which brings together manufacturers, vendors, and customers to make them aware of 4IR technologies.
- 4IR-driven projects, including **Drone Shakti**, to encourage start-ups that will facilitate the use of drone services.

- India even has a 4IR centre in Mumbai run by WEF, which is closely working with several state governments.
- The Centre has recently come up with the **Fourth Industrial Revolution for Sustainable Transformation (FIRST) Cancer Care** model in which 4IR technologies would be used to provide better healthcare for cancer patients.

Pushback for embracing 4IR technologies

- Like most other countries, India is also experiencing pushback for embracing 4IR technologies from the people.
- **The immediate fear is that of job loss, particularly in the informal sector.**
- There are also concerns that as India's progresses on the journey of 4IR will take over many white-collar jobs across sectors as well.
- According to an estimate, in the next three to five years, 20 per cent of legal work in India would be taken up by artificial intelligence software.
- In India, temporary and contractual jobs are already increasing at a higher rate than full-time jobs.
- So, the advent of 4IR technologies would disrupt the job market.
- The employees of the Indian Railways have protested against the introduction of vending machines for ticket dispensation at stations and the general automation of maintenance of train tracks.
- Experts warn that jobs such as artificial intelligence engineers, data scientists and robot maintenance workers, will also shrink.

Supporters of 4IR

- **The supporters of 4IR say job losses will be temporary as new opportunities that are currently unknown will emerge.**
- For example, the third industrial revolution, which triggered widespread job losses in manufacturing. Over time, the services sector evolved and created new job opportunities for many.
- 4IR supporters say that as people will have more time to indulge in leisure, the arts will take over from the sciences and other disciplines in providing humans with work.

Concerns / Challenges

- The adoption of 4IR technologies is going to be skewed as developing and least developed countries lack the data framework and infrastructure.
- There is a growing concern that the existing fallacies in humans might only get more accentuated after 4IR.
- There are several studies that show how facial recognition technologies have a higher chance of misidentifying African and Asian people compared to their Western counterparts.
- This is due to the biases in the data being used by these technologies.

Way Forward

- The future depends on whether we take into account all kinds of diversity — economic, geographical, gender and age.
- **Technologies need to be more inclusive and acceptable to all.**
- The current debate talks about individual problems that can arise out of the 4IR.
- What is needed is a paradigm shift where processes are developed to plug the overall challenges with 4IR.
- This is going to be critical as people are already predicting a fifth, sixth and even seventh industrial revolution in the days to come.

Topic: Challenges to internal security through communication networks, role of media and social networking sites in internal security challenges, basics of cyber security.

19. Technology-facilitated sexual violence (TFSV)

Introduction

- Technology-facilitated sexual violence (TFSV) is a growing problem affecting young women across India.
- A survey found that a staggering 60% of women experienced some form of TFSV compared to only 8% of men.

Factors contributing to the rise of TFSV

- The widespread availability of the internet and smartphones.
- Online anonymity allows perpetrators to hide their identities.
- Cyberbullying and peer pressure can contribute to the perpetuation of TFSV and online abuse in educational institutions.
- Lack of Digital Literacy and Awareness.
- Privacy and security issues related to the sharing of personal information online can lead to incidents of TFSV.
- Perpetrators may use online platforms to groom and exploit students, taking advantage of their trust and vulnerability.

Consequences

- Many survivors experience depression, post-traumatic stress disorder, anxiety, and suicidal thoughts.
- Loss of academic or career prospects, social isolation, and violence and ostracisation by one's own family.
- Accessing the Internet is obstructed by TFSV— the replication of a patriarchal system that disempowers women.
- Widespread violence on the Internet has serious implications for women's role in society.

Concerns / Challenges

- India's IT Act of 2000 criminalises some forms of TFSV, but ambiguities in the law can deter survivors from reporting.
- India has the most Facebook users in the world, yet Meta has not optimised its platforms for an Indian context.
- Meta's safety moderation algorithms are trained mostly in American English, so abusive content in Indian languages is less likely to be detected.

Crucial intervention point

- Institutions of higher education (IHEs) are another crucial intervention point for online harassment of students.
- IHEs must have Internal Complaints Committees (ICCs) to investigate incidents of sexual harassment.
- Many institutions struggle to form, train, and manage these ICCs.
- Even if an ICC finds a student guilty of sexual harassment, there is no guarantee that higher authorities will hold them accountable.
- Students reported low awareness and utilisation of ICCs in their academic institutions.
- IHEs must conduct gender sensitisation programmes and empower students to engage their community.

Way Forward

- With the upcoming Digital India Act, the government has an opportunity to strengthen its regulations for technology platforms and compel social media companies to take accountability.
- Schools should provide
 - anonymous helplines and reporting options,

- mental health services from trained counsellors,
- hosting regular workshops, safety training and discussions.
- Openly discussing TFSV without shaming or blaming survivors is an essential step.
- Implementing targeted cyberbullying prevention initiatives can help reduce instances of TFSV and online abuse.
- Involving parents and the broader community in addressing TFSV and online abuse can create a supportive environment and promote responsible online behaviour.
- Strengthening laws related to online harassment and TFSV and ensuring effective enforcement can act as a deterrent and provide justice to victims.



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