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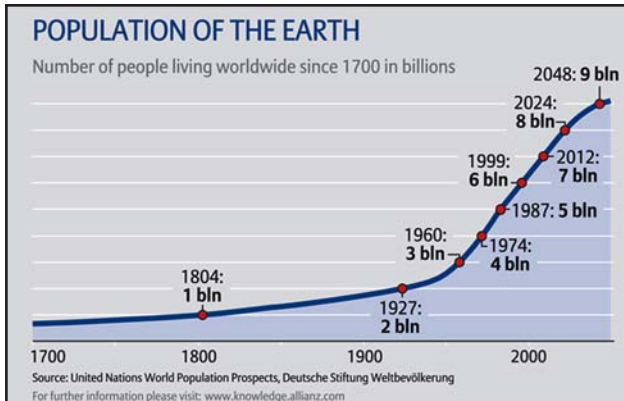
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India's 'Highest Population Tag': Prospects & Issues

India is projected to surpass China as the world's most populous country in the mid of 2023 reported in 27th edition of the United Nations' World Population Prospects, 2022.



Major Highlights:

- Reason: China's fertility is lower than anticipated
- Population Trend:** The global population is expected to grow to around 8.5 billion in 2030, 9.7 billion in 2050 and 10.4 billion in 2100.
- Distribution of Population:** The rate of population growth significantly vary across countries and regions over the world.

Prospects for India:

- Demographic Transition:** Theory of demographic transition suggests that population growth is linked to overall levels of economic development.
- Demographic Dividend:** The demographic 'dividend' to be derived from the age structure of the population is due to the fact that India is (and will remain for some time) one of the youngest countries in the world.
- Population in India:** The rising young population provides India with a great opportunity for growth, peppered with the possibility of path-breaking innovation.
- Higher Productivity:** Population growth will lead to economic growth with more people

able to produce more goods like higher tax revenues which can be spent on public goods, etc.

- Increased economic activities:** Farming and industry have been able to benefit from economies of scale, which means as the population grows, food output and manufacturing output have been able to grow even faster than population growth.

Issues with India:

- Ageing Population:** The increase in the working-age population may lead to rising unemployment, fueling economic and social risks.
- Resource crunch:** High population growth also affects the depletion of resources
- Indian Diaspora:** Globally, one in five working-age persons will live in India. The **challenge** is that a sizable working-age population does not mean many workers. **Only about 30 percent of women aged 15 and above are employed** either in wage work on family farms and businesses.
- Social Security:** The **65+ category is going to grow quite fast** and it faces several challenges. Provisioning of social security is obviously a big challenge. This will stretch the resources of the future governments.
- Gender inequality:** Education is an enabler to bridge gender differentials. The gender inequality of education is a concern.

Way Forward

- Investments in dependent population:** India needs to invest more in children and adolescents.
- Better welfare schemes:** Countries with ageing populations should take steps to adapt public programmes to the growing numbers of older persons.
- Female workforce participation:** India needs to increase female workforce participation in the economy.
- Channelized Migration:** With industrial growth concentrated in coastal regions and the bulk of our workers coming from central areas, we will also need to figure out how to deal with interstate migration.

Mineral Boom in Africa opening new avenues for India

Landlocked in the heart of Africa, Central African Republic has the **largest reserve of iron ore** in the world and the **best quality of rare wood and timber** across the globe. It also has **uranium, iron ore, copper and manganese deposits**.

Mineral Wealth of Africa:

- ◎ **Transition Metals:** Africa hosts valuable “**transition metals**” – a group of elements including cobalt, nickel, manganese and chromium, which will play a key role in the **shift from fossil fuels to low-carbon energy sources**.
- ◎ **Decarbonisation:** It is driving demand for a range of minerals including these, graphite, lithium and “**rare earth**” elements such as neodymium, samarium and yttrium. They will underpin technologies crucial to the energy transition, including wind turbines, solar panels and electric vehicles.
- ◎ **Rich Mineral Wealth:** From north to south, Africa’s reserves of such metals are prodigious.
 - Morocco has 70% of the world’s phosphate reserves;
 - DRC has 50% of the world’s cobalt;
 - Gabon has up to 15% of the world’s manganese;
 - South Africa has 91% of the world’s platinum, 46% of its yttrium, 22% of its manganese, 35% of its chromium and 16% of its vanadium.
- ◎ **Energy Transition:** Overall, the continent has at least a **fifth of the world’s reserves** in a dozen minerals that are critical for the energy transition, according to the **Natural Resource Governance Institute (NRGI)** which makes Africa essential in the just energy transition.

Prospects for India in Africa:

- ◎ **Critical rare earth minerals:** India needs to form strategic alliances with southern African countries where critical rare earth minerals are produced, as the world looks to the continent to fulfil its ever-increasing demand as per EXIM bank report.

- ◎ **Green Economy:** The region is richly endowed in lithium, graphite, cobalt, nickel, copper, and other rare earth minerals. All of these are essential for **building the global green economy of the future** and they also comprise new market opportunities for **net-zero transitions**.

- ◎ **Joint Exploration:** India could set up joint exploration activities for securing critical mineral assets. Indian state-run companies can form joint venture to secure minor mineral assets such as lithium and cobalt that could fuel India’s plan from mass adoption of electric vehicles by 2030.

- ◎ **Increasing India’s Market share in REE’s:** Currently the World’s REE market is controlled by China and here India can play a strategic role by acquiring these mineral reserves for the development of Indo-African relationship.

The major REE consumers like the **US, the EU, Canada, Australia, Japan, and South Korea** are exploring options to develop alternative REE supply chains. Africa is one of the regions targeted as an alternative source of REE commodities, which presents African countries with the opportunity to develop their own REE value chains.

Smart Cities in India: 22 cities to be completed by mid-2023

The Smart Cities Mission is completed in 22 cities, giving people a better quality of life and a clean and sustainable environment.

Smart City and GIS based planning and management:

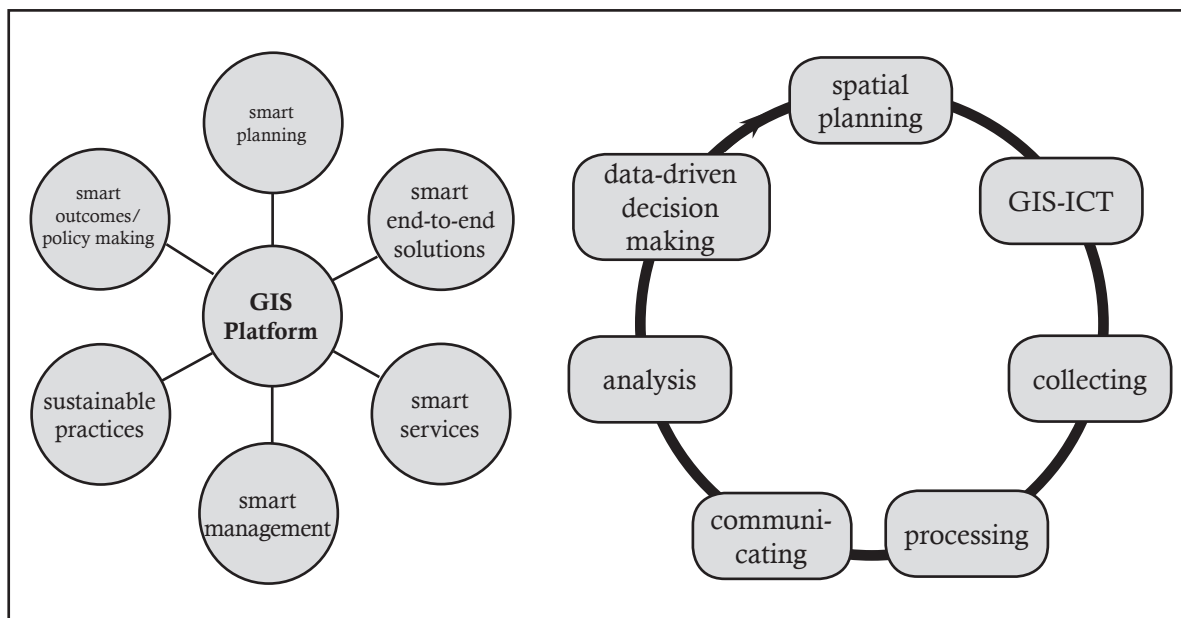
- ◎ **Unplanned Growth:** Modern urban planning in India is confronted with major challenges such as accelerated growth and land-use change, unplanned expansion and water supply management issues.
- ◎ **UAV’s and Smart Mapping:** State-of-the-art remote sensing and GIS skills including the use of UAVs will allow rising to the challenge of managing the rapidly changing urban environment of Indian cities.
- ◎ **GIS and Smart Planning:** Multidisciplinary field that includes surveying, photogrammetry, remote sensing, mapping, geographic information

systems (GIS), geodesy and global navigation satellite system (GNSS)

- Smart Data Management:** A centralized information system based on GIS provides an IT framework for maintaining and deploying data and applications throughout every aspect of the

city development life cycle.

- Remote Sensing Satellites:** Corona spy-satellite images from the 60s, now declassified, offer us a unique view of the Earth at the very early stages of intense development and thus before the urban explosion in India.



UAVs and Drones for Urban Planning

- Retrieve data from difficult-to-access areas and highly populated cities.
- Traditional building inspections can be invasive and time-consuming, cameras with thermal imagery technology can help quickly diagnose air leakages to improve a buildings' energy efficiency.
- Can map major pollution sources in the city and their pathways in the rivers and other water bodies.
- Can provide a big boost to Smart City Mission.

Way Forward for Smart City Planning in India

- Understanding of **physical and digital space** for urban planning for a smart city.
- Help provide a **clean and sustainable environment** and application of '**Smart**' Solutions by encouraging the use of remote sensing and GIS techniques.
- Use of drones** in urban planning is very promising but we need to create the enabling environment.
- Need to build **trained manpower** for the Smart

Cities Mission launched by the Government of India.

Smart cities are being viewed as the new growth centers of economic development and smart urbanization in India, which will have potential to accommodate active migrants from, inter and intra states of India. Thus their scientific planning is important for better urbanization and regional development in India.

4

Global South water-sensitive cities: Case of inclusive urban planning

In the contemporary times of climate change, the Neo-liberal capital and builder-led urban development are splitting the cities into unequal parts resulting in non-inclusive and non-equitable development.

Why 'non-inclusive' water management is an emerging issue in urban cities?

The urban cities are facing emerging crisis of **water supply, wastewater and storm water management** — from an inclusion, rights and justice perspective.

Reasons for prevalence of non-inclusivity:

- ⦿ **Economic development over Equality:** A techno-managerial discourse dominates mainstream thinking about urban water, wastewater and drainage challenges and their application in developing southern countries. They are often borrowed from research and discourse from Europe and Australia.
- ⦿ **Divided infrastructure:** The infrastructure developed in the urban cities is built with all the amenities and facilities like water, sanitation, power supply, etc. which is unevenly available in the surrounding squatter region resulting in **division of infrastructure and facilities.**

Water-sensitive cities

Water-sensitive cities are geared towards a holistic management of the water cycle to deliver basic urban water services of supply and sanitation while mitigating flood risks and protecting and enhancing the health of the receiving waterways.

- ⦿ **Issue:** Cities of global south have large informal settlements and they are suffering from large and growing inequity in urban land use, unplanned and informal settlements and their poverty. On the other hand, cities of Global North countries are planned cities.
- ⦿ **Solution:** A water-sensitive cities framework for the global south should aim to achieve outcomes and impacts relevant to the context.

Significance of “Water Sensitive cities”

- ⦿ **Water to All Residents:** The ‘water-sensitive cities’ discourse and frameworks emerging from global north countries (Europe and Australia) have their foundations in cities with planned urban development with a statutory legal entitlement to housing and basic infrastructure (including water, wastewater and drainage management) for all residents of their cities.
- ⦿ **Access to water and sanitation:** The core aim of urban planning is needed to be substantially achieved and access to water and sanitation is realised as a *de facto* human right of all residents.
- ⦿ **Water conservation and management:** A water-sensitive city, in the developed country context,

aims to achieve second-generation outcomes — higher standards and more effective water conservation and wastewater management standards.

- ⦿ **Overcoming water stress:** The outcomes include nutrient removal, carbon sequestration, energy extraction, methane reduction and adaptation to water stress and/or urban flooding accruing from climate change impact.
- ⦿ **Environmental conservation infrastructure:** The planned environment with functional grey infrastructure is at the core of a water-sensitive city.

Need for “Water Sensitive Cities” in India:

- ⦿ **Lack of sanitation and Drainage:** Small and medium-sized cities lack sanitation and drainage infrastructure. Combined sewers that also drain stormwater overflow in monsoons.
- ⦿ **Lack of 24x7 water supply:** There is hardly any city with a 24x7 water supply. No Indian city has 100 per cent sewage or septage treatment. The functionality of existing sanitation infrastructure (sewered and/or non-sewered systems) remains challenging for India and the global south.
- ⦿ **Water Politics:** For various reasons, essentially centring on the political economy of our water and wastewater management, water is a contested domain.
- ⦿ **Conflict over water sharing:** We have a range of water conflicts, including inter-city, intra-city, rural-urban and agriculture-industry-domestic water priorities. As a long-term goal, reducing the city’s water and wastewater footprint can reduce water conflicts.
- ⦿ **Water conservation in India:** Water conservation, groundwater recharge and decentralised non-sewered septage treatment systems need to be prioritised in planned settlements in a city with more open common facilities like parks, institutional buildings, footpaths and wider roads. And the benefits need to be shared with the less privileged.
- ⦿ **Water runoff:** Our large and growing cities now constitute a large watershed/catchment, generating its own runoff and increasing the risk of urban flooding during climate events of high-

intensity rainfall spells (where existing stormwater drains are not designed to capture the increased runoff).

- Urban Flooding:** This was witnessed in Bengaluru and Lucknow in 2022 and in Chennai and several other cities in the last decade. We need groundwater recharge, more grey infrastructure and enhanced drainage norms to address urban flooding.

Global south water-sensitive cities framework envisages cities commit to a “Just and Equitable Access, Use, Re use” of water supply to sewerage/septage and stormwater management. The framework recognizes inequity in urban settlements as the basis of planning and designing interventions for water-sensitive cities. There is no ‘leapfrogging’ possible without addressing infrastructure deficiencies, especially for the less privileged residents of our cities.

5

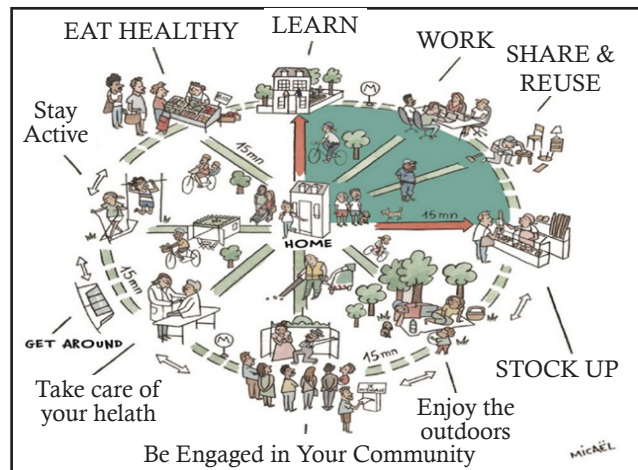
15-Minute Cities and its applicability in Indian Context

15-minute city is hailed as a spatial development model to help foster a more local, healthy, equitable and sustainable way of life.

15 Minutes Cities:

- Historical Significance:** The model highly discussed in the post-novel coronavirus disease (COVID-19) pandemic context, is the ‘15-minute city’ concept. It was first presented by Franco-Colombian scientist Carlos Moreno and envisions a more decentralised city.
- Integrated Networks:** The city is not divided into shopping, residential or business districts, but into networks of self-sufficient neighbourhoods wherein individuals can feel connected and catered for.
 - The concept propagates access to goods and services, smaller-scale offices, retail and hospitality, co-working and open green spaces.
- Spatial Development Model:** The spatial manifestation of this concept could override the need to travel and convert long-distance trips through motorised modes with definite environmental impacts into shorter trips.

- Humanized City Landscapes:** The concept also humanizes the city scale and gives an opportunity to create public spaces in neighbourhoods — sidewalks, parks, squares, traditional markets, and small plazas, etc. It allows for application of other urban design concepts such as ‘eyes-on-street’, ‘build-to-edge’ conditions, etc. to enhance their liveability and human happiness.



Case Study: First 15 Minutes city of Europe: Copenhagen

Copenhagen the first European city to pedestrianize its main shopping street in 1961, an approach many other cities copied. As we moved towards the end of the 20th century, concerns rose over air pollution and more and more cities enhanced their public transport networks, and started building cycling lanes.

Limitations of 15 Minutes Cities Model:

- Urban Divide:** The concept is being criticised for the risk of creating urban divide.
- Complex Transport System:** Neighbourhoods are required to be connected to each other and to centers of work and family in other parts of the city through a reliable public transport connection.
- Transit-oriented development:** In fact, the 15-minute city is complementary to the transit-oriented development approach that integrates land use and transport by agglomerating a mix of compatible activities within 400-800 metre accessible distance around public transport services.

Applicability of 15 Minutes city in India:

- Population vs Area based growth: The ideas and principles underpinning the concept are not new:
 - The Delhi Master Plan has population-based norms for provisioning amenities (health, education, commerce, etc.).
 - Cities like Mumbai and Bengaluru have area-based norms for layout planning, which, if implemented in utopian conditions, would result in the creation of a well-facilitated complete neighbourhood.
- Distant work centers: The spatial structure of Indian cities is characterised by primary and secondary work centers, which host high-order commercial activities along with residential areas located at comfortable commuting distance (maximum one hour) from these economic hubs.
- Post Covid-19 changes: Its applicability relies heavily on the argument that the new 'work-from-home' or 'distant working' would be the new normal for a large workforce. However, considering that a majority of the Indian workforce is employed in the non-tertiary sector (71 per cent according to data aggregator Statista), nearly 90 per cent is employed in the informal sector.

15 Minutes city is one of the smart solutions to the Urban pollution in India and world, which requires development of range of modes of transport like railways and road-based modes, and non-motorised modes like micro-mobility modes, cycles, by walking, etc. But it all zeroes down to the implement-ability of the idea and supporting its application by mandating it in all future re-developments and through the formulation of appropriate guidelines and codes especially at the local level for its application in India.

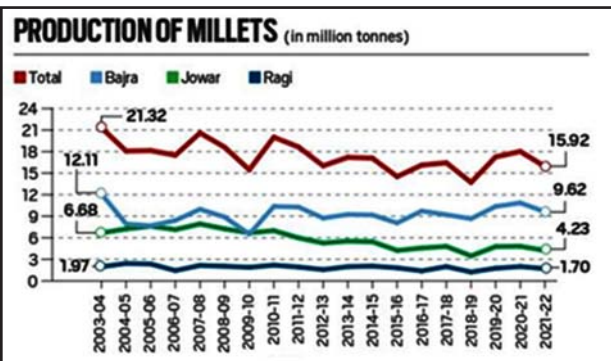
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The 'International Year of Millets'

The United Nations has declared 2023 as the International Year of Millets. Despite it having a lot to offer to consumers and farmers, millets aren't the first choice.

Positives of millets:

- Nutritionally superior traits: Millet's score over rice and wheat in terms of minerals, vitamins, and dietary fibre content, as well as amino acid profile.



- For example, Bajra (pearl millet), has iron, zinc, and protein levels comparable to that of wheat, but it's gluten-free and has more fibre.
- It can address the problem of "hidden hunger" arising from the consumption of energy-dense but micronutrients-deficient foods

Advantages as a crop:

- Millets are **hardy** and **drought-resistant crops**.
- This has to do with their **short duration** (70-100 days, against 115-150 days for rice and wheat)
- lower water requirement** (350-500 mm versus 600-1,250 mm)
- ability to grow even on poor soils** and in hilly terrain

Where do millets lag despite huge benefits?

- Eating Habits:** For the poor, both in urban and rural areas, rice and wheat were once aspirational foods
- The dominance of traditional grains:** Two-thirds of India's population receives up to 5 kg of wheat or rice per person per month at Rs 2 and Rs 3/kg respectively.
- The recent move to place two fine cereals free of cost from January 2023, further tilts the scales against millets.
- Cooking:** Rolling Rotis is easier with wheat than millet flour
- Low per-Hectare yields:** The national average is roughly 1 tonne for jowar, 1.5 tonnes for bajra and 1.7 tonnes for ragi.
- Whereas it is 3.5 tonnes for wheat and 4 tonnes for paddy — **are a disincentive**.
- Presence of Infrastructure for traditional grains:** With access to assured irrigation, they would tend to switch to rice, wheat, sugarcane, or cotton.

- ◎ **Absence of government procurement at minimum support price (MSP):** It makes farmers hesitant to grow even this high-yielding and naturally bio-fortified bajra, suitable for both post-monsoon Kharif and summer cultivation.

Indian Agricultural Research Institute (IARI) contribution:

- ◎ **Hybrid varieties:** Pusa-1201, a hybrid bajra that gives an average grain yield of over 2.8 tonnes and a potential of 4.5 tonnes per hectare.
- ◎ **Characteristics:** It matures in 78-80 days.
- ◎ It is **resistant to downy mildew and blasts**, both deadly fungal diseases.

Millets have become a very important crop of India in the contemporary times due to its high resilience to high temperature, low water utilization; sustain heat waves, capability to grow during drought periods, etc. making it one of the most suitable crop to be replaced with rice and wheat forming a basis of the food security in the times of climate change.

7

Indian Blue Economy is Thriving but Country needs to be Careful about Marine Litter

The blue economy in India is thriving, but at the cost of rising marine litter throughout its geographical space with abandoned, lost or discarded fishing gear becoming a serious threat in India and the World.

India and the Blue Economy:

- ◎ **International Maritime Cooperation:** India's engagement in the Blue Economy is rising, as the country issues policy proposals, and actively participates in **international and regional dialogues** on the Blue Economy, maritime and marine cooperation.
- ◎ **Food Security and Climate Change:** The **Federation of Indian Chambers of Commerce and Industry (FICCI)** published the **Blue Economy Vision 2025**, which states that the Blue Economy's impacts are not limited to the ocean but these are crucial for countries' food security, poverty, resilience against dangerous

consequences of climate change, maritime cooperation, job opportunities and countries' socio-economic growth.

India's Vision:

- ◎ **Integration of Indian Ocean:** India has greater potential to foster cooperation in the **Indian Ocean** to design blue economic strategies.
- ◎ **Blue Economy and Sustainability:** Under its **G20's presidency**, India looks forward to ideate concrete Blue Economy policies.
- ◎ **Deep Ocean Mission:** India also has significant ambitions for its offshore mining industry. It has hence announced the Deep Ocean Mission, a plan to mine the metals in the Indian oceans, including **Copper, Nickel, Cobalt, and Manganese**, estimated to be \$110 billion. These industries will no doubt be essential to the blue economy.
- ◎ **Biodiversity Conservation:** With the ocean economic activities and governance, the preservation of marine biodiversity and resources is stressed.

Challenges related to the blue economy in India

- ◎ Climate change
- ◎ Marine pollution
- ◎ Overexploitation of marine resources

The Blue economy is important for India as it provides broader avenues of food production which adheres to the principles of sustainability, but the marine litter is becoming a big challenge which hampers the marine environment and biodiversity. Thus a sustainable fishing practice is the need of the hour for achieving the SDG 14 of life below water and SDG 2 of Zero Hunger.

8

Black soil in red: Climate change threatens world's food basket

The **Food and Agriculture Organization (FAO) report** finds most black soils found in the world have moderate to severely eroded due to land-use change and unsustainable practices.

Black Soils (Food Basket of World):

- Black soils, which feed the global population, are under threat, with most losing at least half of their soil organic carbon (SOC) stocks.
- World Distribution:** The distribution of black soil areas used as croplands varied in each region.
 - Europe and Eurasia accounted for 70 per cent of the soil in the total cropland, while North America, Latin America and the Caribbean and Asia had 10 per cent each.
- These soils are characterised by a thick, dark-coloured soil horizon rich in organic matter.
- The inherent fertility of the soils make them the food basket for many countries and are considered essential to the global food supply.

Reasons for degradation of Black Soils

- Unsustainable practices:** Land-use change, unsustainable management practices and excessive use of agrochemicals are to blame.
 - Factor contributing to soil degradation** Industrial activities, mining, waste treatment, agriculture, fossil fuel extraction, processing and transport emissions
 - Reasons behind soil nutrient loss:** soil erosion, runoff, leaching, burning of crop residues
- Erosion of soil:** Most of the black soils suffered from moderate to severe erosion processes, as well as nutrient imbalances, acidification and biodiversity loss.

Significance of Black Soil:

- Population Support:** Black soils are home to 2.86 per cent of the global population and had 17.36 per cent of cropland.
- Fertility and high moisture retention:** Black soils are extremely fertile and can produce high agricultural yields thanks to their elevated moisture storage capacity.
- Carbon Sequestration:** This signifies their importance for climate change mitigation and adaptation.
- Impact of Global Warming:** However, black soils are quickly losing their soil organic carbon (SOC) stocks. They have lost 20 to 50 per cent of their original SOC stock, with the carbon being

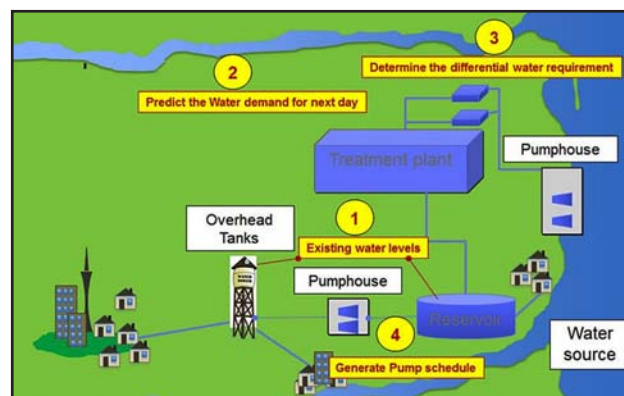
released into the atmosphere mostly as carbon dioxide, exacerbating global warming, the report pointed out while quoting previous studies.

Preserving natural vegetation on black soils such as grasslands, forests and wetlands and adopting sustainable soil management approaches on cropped black soils were the two main goals highlighted by FAO. Thus, for their conservation FAO had made various recommendations for farmers, national governments, research and academia and the global platform International Network of Black Soils.

9

Smart Water Management: An Innovative Solution to Water Scarcity Offered by the AI

The Ministry of State for Science and Technology has announced that the government is providing financial support to a start-up incubated at the Indian Institute of Technology, Kanpur for developing smart water management technologies.



Benefits of smart water management:

- Maintain water flow:** With AI and ICT, stream flow can be determined to check the level of water to help in taking real-time decisions for water use by household, industry, agriculture, etc.
- Pollution control:** With the integration of AI and ICT, the timely report of water containing various pollutants (turbidity, arsenic, pathogens) can be assessed to smartly control water pollution.
- Erosion of soil and land:** The smart systems can help in the checking the erosion of the river channels and banks to assure the checking of land erosion and degradation.

- ◎ **Sedimentation:** Though the use of smart technologies, the sedimentation could be checked.
- ◎ **Use of GIS:** Geographical Information System can integrate various regional aspects (land elevation, water basin, flood plains, agricultural land use, etc.) for their better planning and management.

The role of Smart Water Management better management of water in water stressed region

- ◎ **Water Conservation:** The Smart use of water will help in smart use of water in water stressed region which will result in conservation of water. **E.g.** According to Central Ground Water Authority, India has 256 water stressed districts with highest water scarcity in Maharashtra, Gujarat, Punjab, Rajasthan, and Uttar Pradesh.
- ◎ **Illicit discharge detection and elimination:** The smart system will detect the illicit discharge through pipelines, water storage tanks, etc. and will help in reducing them in the water stressed regions of India.
- ◎ **Smart water supply:** The smart water-shed management system will calculate the flow discharge of rivers in the river basin; it will provide real-time data which can be followed for the use of water in water stressed regions.
- ◎ **Improve water quality:** The smart water-shed management will help in the assessment of polluted water and giving inputs for their treatment for maintaining the quality for water which is important in the water stressed region in India.

The Smart Water management System will revolutionize the way in which the water is managed in the urban and rural cities in India, which will help in improving conservation practices and participation of communities for collective use of water. Thus helping in socio-economic development, regional development and **achieving SDG 6 i.e. 'Ensuring access to water and sanitation to all'**.

10 Palm oil & alternatives

Palm oil is water-intensive and requires large patches of land for its cultivation which has paved way for development of greener alternatives of vegetable oil sources in India.

India and Edible Oil:

- ◎ India is the **second-largest consumer of edible oil** globally and its largest importer. While the government has taken several initiatives over the years to increase the domestic production of edible oils due to its shortage and high price.

India and Palm Oil:

- ◎ **Growth of Palm Oil production:** Palm oil production grew between 2015-2016 and 2020-2021 at a compound annual growth rate of 6.1 per cent, as reported in the Economic Survey 2021-2022.
- ◎ **India's Palm Oil Import:** India continues to import around 60 per cent of edible oil requirement. More than half of this is palm oil, primarily from Malaysia and Indonesia, followed by soybean and sunflower oils. It is projected that the imports will continue to grow.

How Oil Palm gain the highest producing share in India:

- ◎ **Lower Yield than Global Average:** Oil Yield levels in India are usually lower than the global average. The decade of the 1980s saw a series of Technology Missions (TM) to increase productivity, including a TM on oilseeds.
- ◎ **Technology Mission on Oilseed and Pulses (TMOP):** In 1990, with the Technology Mission on Oilseed and Pulses (TMOP), there was an increase in yield and production, improvement in extraction technology and a reduction in import bills after the inception of TMs.
- ◎ **Integrated Palm Oil Production:** Oil palm started receiving special attention in the early 1990s with an oil palm development program under the TMOP. This metamorphosed into an integrated scheme on oilseeds, pulses, oil palm and maize in 2004-2005.
- ◎ **Rashtriya Krishi Vikas Yojana:** Also, a special initiative was undertaken in 2011-12 under the **Rashtriya Krishi Vikas Yojana** for the expansion of the area under oil palm cultivation.
- ◎ **National Mission on Oilseeds and Oil Palm:** The 12th Five Year Plan period saw a National Mission on Oilseeds and Oil Palm from 2014-2015 to 2017-18. This was subsumed into the National Food Security Mission-Oilseeds and Oil Palm in 2018-2019.

Need for Greener Alternatives to Palm Oil:

- ☉ **Deforestation and exploitation of Groundwater:** It seems to be encouraging deforestation and exploitation of groundwater at a time when efforts should be in place for their conservation. It is reported that the yield per hectare of oil palm is higher than other oilseeds.
- ☉ **Better Nutrition:** In terms of nutrition, oil from rice bran, groundnut, sunflower and oilseeds such as sesame, mustard and linseed is higher in nutrient content.
- ☉ **Tree-Borne oil:** Indian farmers are familiar with the cultivation of various alternative greener oilseeds and tree-borne oils such as Mohua, Karanja and linseed.
- ☉ **Lower Gestation Period:** Mustard and its variant rapeseed are less water-intensive and can produce output without any gestation period.
- ☉ **Better health benefits:** Rice bran has 18 to 20 per cent oil content that can be extracted and processed as edible oil. The oil contains oryzanol which is very good for metabolism.

Challenges in developing Greener Alternatives:

- ☉ **Low Yield and high Gestation:** The yield from other oilseeds in India is much below the global average. Further, while four years is stated to be the gestation period for the crop, it takes about seven years to stabilise yield and produce good quality oil.
- ☉ **Below MSP Procurement:** Groundnut, soybean, sunflower seed, sesamum, niger seed, rapeseed, mustard, safflower and copra are the oilseeds among the 22 mandated crops for which minimum support price (MSP) is announced by the government. But more often, they are sold at a price below the MSP.

Palm Oil is one of the highly demanded edible oil in India due to its multi-faced use helping in economic development and food security. But at the same time its cultivation is also detrimental to the environment and biodiversity due to loss of forestlands. Thus, development of greener alternatives is indeed necessary for the sustainable development of edible oil production in India for self-sufficiency and environmental conservation.

11

South-East Asian Farmers Tap into Sustainable Rubber Industry

Recently Thailand farmers developed practices to develop sustainable rubber industry in **South East Asia**.

Rubber Plantation in Thailand:

- ☉ **Largest Rubber Production:** As the world's largest producer of natural rubber (followed by Indonesia, Malaysia, India, China)— supplying more than a third of global stocks in 2021 — Thailand's policies have stimulated massive **deforestation, plummeting biodiversity and soaring soil erosion**.
- ☉ **Sustainable Practices:** The vast majority of the country's plantations are still worked **conventionally**, but a few farmers are **abandoning pesticides** to try and lessen their impact on the environment.
- ☉ **Environmental conservation over Economic gains:** Economic benefits are kept at the bottom line while the small-scale benefits of turning to greener methods are given more emphasis.

Cultivation of Rubber Trees:

- ☉ **Soil:** The trees demand well-drained and well-weathered soils.
 - **Lateritic type, alluvial, sedimentary types, and non lateritic red soils** are best for the growth of these trees.
- ☉ **Precipitation and Temperature:** An evenly distributed rainfall with **at least 100 rainy days a year** and a temperature range of about **20 to 34°C** are optimum conditions for the growth of the Hevea rubber tree.
 - **A humidity of around 80%, 2000 hours of sunshine, and absence of strong winds** are also necessary for the best results.

Status of Rubber Production in India

- ☉ According to FAO 2019, India is the **fourth largest producer and consumer of Rubber in the World**.

The future of natural rubber is very bright, as the alternative i.e. synthetic rubber produced from oil is highly polluting. Also rubber is planned to be banned by the European Union as it causes large scale deforestation in the Tropical region. Thus, sustainable rubber plantation is needed for the achieving of dual goal i.e. economic development and environmental conservation.

12

Climate Change Affecting Tea Farming In India

Recently, Assam tea growing region did not see a second flush of tea leaves due to the impact of climate change.

Assam Tea:

- Assam tea is generally known for the second flush (period when the tea plants start growing new leaves to be harvested), which comes in May-June and is characterised by its boldness and robustness and is topped with classic flavours of malt and woody astringency.
- It is valued for its rich taste, bright liquors and is considered to be one of the choicest teas in the world. Tea planters in Assam say the pure second flush character is missing.

Climate Change and Tea Cultivation:

- The tea industry in Assam and Bengal is facing the consequences of climate change. Erratic weather patterns, prolonged periods of drought, prolonged periods of rain, and a lot more.
- The crop harvest of the tea estates across Assam has been badly affected due to the **moisture stress conditions** resulting in stunted growth, wilting, defoliation and die back of branches in varying degrees which has even led to withdrawal of plucking temporarily in some tea estates.

Tea is an important cash crop of Himalayan region (including Himachal Pradesh) and Southern states helping in the growth of farmers and industries in these regions. But the effects of climate change resulting in loss of moisture and humidity is affecting the tea cultivation is becoming a new challenge to the farmers which will result in various socio-economic consequences and hampering regional development.

13

The Future Tech Epicentres in India: Tier II & III Cities

As per the **Ministry of Science and Technology**, India ranks globally 3rd in Start-Up ecosystem and also in terms of number of **Unicorns** with 49 per cent of the start-ups from tier-2 and tier-3 cities working in the fields like IT, agriculture, aviation, education, energy, health and space sectors.

Key-highlights:

- Unicorns:** As per the latest data, there are currently 105 unicorns, out of which 44 were born in 2021 and 19 in 2022.
- R&D:** As per the latest data, India has over 5 lakh R&D personnel, the number that has shown a 40-50% increase in the last 8 years.
 - Women in R&D:** In the last 8 years, women's participation in extramural R&D has also doubled and now India occupies 3rd rank in terms of number of PhDs awarded in Science and Engineering (S&E) after the USA and China.
- Start-ups:** India in its 75th year of Independence is now home to as many as 75,000 StartUps.
 - The special focus on Science, Technology and Innovation has fired the imagination of the youth in the country to innovate and solve problems with new ideas.
- Spread to tier-2 and tier-3 cities:** India's startups today are not limited to only metros or big cities and 49 per cent of the start-ups are from tier-2 and tier-3 cities.

Tier II & III Cities - Growth Engines for the Future

- Plus points:** In spite of low public investments, these cities are promising a great potential. They have some inherent advantages like-
 - possessing basic amenities
 - ample availability of land and skilled labour
- Driving factors:** There are many factors driving the growth of real estate in these two tiers - walk-to-work concept, quality lifestyle, media exposure, the emergence of software companies and an increased affinity to retail.

- ◎ **Deviating pressure from metro cities:** The growth of these two tiers gestures towards a positive sign for the nation with their efforts to deviate the pressure on the metros which are dwindling under the burden of space, time and infrastructure.

Tier II and Tier III cities with Startups:

- ◎ Even in case of design, cities like Ahmedabad and Pune with their multitude design centres and institutes point towards the availability of skilled design talent in these cities.
- ◎ In smaller cities like Mysore and Mangalore where less rentals are complimented with good infrastructure, even pre-schools have been growing at an incredible 120% per annum.
- ◎ Chandigarh, Coimbatore, Vadodara, Jamshedpur have become the hub of e-commerce and feature as the top four small cities for online shopping.
- ◎ Towns of Gujarat like Ahmedabad, Surat and Vadodara have made huge progress industrially.

Tier II and Tier III cities of India due to various geographical advantages and ease of living have become new growth centers of start-ups in India leading to development of industries with forward and backward linkages and helping in socio-economic and regional development.

14

First Industrial Corridor in South India

South India's first Industrial Corridor Project is set up at Tumkuru, Karnataka under the National Industrial Corridor Programme.

National Industrial Corridor Development Programme

- ◎ With the objective to increase the share of manufacturing in the GDP of India, the **National Industrial Corridor Development Programme** is being implemented whereby **32 greenfield industrial smart cities** under 11 industrial corridors are being developed with world class Plug-n-Play infrastructure.

Tumkuru Industrial Township:

- ◎ **PM-GatiShakti:** Tumakuru Industrial Township has been planned with a holistic and integrated approach in line with the principles of **PM-GatiShakti** to address the issue of last-mile multi-modal connectivity to the economic zone.
- ◎ **Multi-modal connectivity:** The multi-modal connectivity ecosystem will ensure a seamless movement of raw materials and finished goods.
- ◎ **Self-reliance cities:** The project will be a mixed-use development comprising land uses like industrial, residential, institutional, green spaces, commercial, etc., making it a completely self-sustainable and resilient smart industrial city.
- ◎ **Integrating Industrial Nodes:** The CBIC project includes the development of industrial townships at **three nodes:** Krishnapatnam (Andhra Pradesh), Tumakuru (Karnataka), and Ponneri (Tamil Nadu).
- ◎ **Innovation and Global Integration:** This project will facilitate investments, foster innovation, enhance skills development and build finest manufacturing ecosystem for pitching India as a global investment destination. Target sectors are Food Products, Textile and Apparels, Electronics, Auto & Auto Components, Pharmaceuticals, Chemicals, Engineering, General Manufacturing etc.

Industrial corridors are the new growth centres of India which are integrating the ancillary industries with forward and backward linkages supporting manufacturing and service sector firms in the region. Thus the effective execution of the project will help in the better socio-economic growth and regional development.

15

Sugar Industry to Soon Transform into the Energy Sector

According to **Department of Food and public Distribution**, sugar industry is an agro-based industry providing employment to 50 million sugarcane farmers and 5 lakh workers directly and indirectly in India, making India the **second largest producer and largest consumer of sugar in the world**.

Indian sugar industry

Indian sugar industry's annual output is valued more than Rs. 80000 crore and sugar production in 2022-23 is estimated at 340 lakh tonnes and 45 lakh tonnes of sweetener towards ethonal manufacturing (Indian Sugar Mills Association).

Potential of sugar industry in becoming new energy industry of India:

The future of the sugar industry, as a whole, lies in development of sugarcane bio-refineries i.e. bio-electricity, bio-ethanol, bio-gas/ bio-CNG, bio-manure, bio-plastic and chemicals etc.

- ◎ **Cogeneration from Bagasse:** The electricity is generated by bagasse, which is also contributing towards the clean energy development of India. As per MNRE, the sugar mills in India generate more than 8000 MW of electricity from bagasse.
- ◎ **Biofuel:** The production of biofuel in India for petrol has been done for 9547 crore litres, out of which 619 litres have been produced from molasses (Ministry of Consumer Affairs, Food and Public Distribution)
- ◎ **Bio-Gas and Bio-CNG:** The Compressed bio-gas and Bio-CNG are other sources of energy from sugar industry through press-mud and it is estimated that Bio-gas and Bio-CNG produced by the sugar industry can contribute 3% of the total fuel.

The Sugar industry in India is expanding in the North-western India and it is contributing to the socio-economic development of farmers, industries and workers, while it has also become one of the important sources of energy helping in reducing petroleum import and import bill and achieving energy security for India.

16

Jute Industry Seeks Govt. Support for Revival, Growth

The spurt in demand for jute bags from key export markets like the US, the UK, the rest of Europe and the UAE has certainly rekindled a hope for India for revival of its jute industries.

Current Status

- ◎ As per the **Food and Agriculture Organisation (FAO)**, India is the largest producer of jute followed by Bangladesh and China.

- ◎ However, in terms of acreage and trade, **Bangladesh takes the lead** accounting for **75% of the global exports in comparison to India's 7%**. **West Bengal, Bihar and Assam** account for almost 99% of India's total production.

Challenges faced by industry and reasons for sub-optimal performances- Despite major government support schemes and intervention, following mentioned points are pulling down the growth of Jute Industry:

- ◎ **Supply of Raw material:** India is not self-sufficient in the supply of raw material. To meet the growing need of the industry, raw material is **imported from Bangladesh, Brazil, and Philippines**.
- ◎ **Lower production:** Outdated machineries and technological solutions lead to low production.
- ◎ **Higher procurement cost:** Mills do not acquire their raw material directly from the farmers, but instead through intermediaries.
- ◎ **Lack of storage; modernization; and demand**
- ◎ **Lack of incentive mechanism for improving the Jute quality:** The focus of **Indian Council of Agricultural Research** has been on **improving the yield of the jute seeds** leading to the fiber quality being compromised. Further the **Current pricing mechanism doesn't consider quality**

Some government supportive scheme

- ◎ **Jute (Jute – ICARE) An Initiative to Double the income of Jute Farmers:** Improved Cultivation and Advanced Retting Exercise for Jute (Jute – ICARE) was launched in 2015 to popularize/ introduce some of the better agronomic practices like microbial assisted retting among farmers intensively in a few blocks in West Bengal and Assam on pilot basis.
- ◎ **Jute Integrated Development Scheme (JIDS):**
 - To establish local agencies and units in remote areas of the nation by working with legitimate organizations to carry out various tasks.
 - Its role is that of facilitator, delivering Basic, Advanced, and Design Development training programs. They also provide backward and forward links to the existing and potential entrepreneurs at the grass-roots level.
- ◎ **The Jute Technology Mission (JTM):** With the objective to develop high-yielding varieties to improve productivity and acceptability in markets. Improve retting practices to get better quality fiber

and transfer of cost-effective technologies to the farmers further Creating strong market linkages. The Jute industry occupies an important place in the national economy of India. Given the huge potential of jute and its nature being Bio-degradable, eco-friendly, jute made-ups have a very big international market. But there is an urgent need for the domestic jute market to diversify. The need of the hour is to upgrade and adopt new technology, new manufacturing standards and evolve with time.

17

Integrated Rice-fish Farming by Apatanis

The Apatanis, one of the major ethnic groups of the eastern Himalayas, practise a distinctive form of agriculture where rice and fish are grown together. These farmers have been practising integrated rice-fish farming in their mountain terraces of Arunachal Pradesh since the 1960s.

Need for Integrated rice-fish farming

- ⦿ Rapid human **population growth** poses numerous challenges, especially **food shortages, malnutrition, limited means of irrigation** and shrinking land resources besides deteriorating **environmental quality**.

- ⦿ **India's traditional primitive farming** involves dual-farming culture and fish as rice both are the staple food of India.

Geographical factors favourable for the integrated rice-fish farming in India

- ⦿ Rice-fish farming constitutes a **unique agro-landscape across the world**, especially in tropical and sub-subtropical Asia.
- ⦿ Rice-Fish farming is widely practiced in Asian countries and tropical, sub-tropical countries.
- ⦿ **Rain fed medium lands, waterlogged lands** like wetlands or **doab areas** are most conducive conditions as it provides round the clock availability of water.
- ⦿ **Low lying areas like eastern part of India** where water flows easily and is available in needs. The fertile soil rich in organic manure and with **high water holding capacity** is used for rice fields. In general **soils with medium texture and loam with silty clay** are most preferable for rice-fish farming.
- ⦿ **Natural geographic location** is suited in areas of high humidity and rainfall-eastern and north eastern India, tropical and humid areas.

BENEFITS FROM RICE-FISH FARMING	
Food and nutritional security	Environmental friendly and sustainable
⦿ Nutritional balance -It provides a good mix of protein and carbohydrates and can be game changer in achievement of food and nutritional security in lagging states of eastern India.	⦿ Lowering down emissions - Rice-fish cultivation system is capable of lowering the emission of methane and other GHGs . Aquatic creatures especially bottom feeders (crabs and carps) disturb the soil layers by their movement or sometimes searching for food. Thus, they influence the CH ₄ production processes.
⦿ Regional impact - It will provide good production without compromising environment in areas identified under second green revolution.	⦿ Impact on soil productivity - It Restore soil fertility and avoid soil degradation , which is a major global environmental issue thus ensuring sustainability of food production.
⦿ Multi-dimensional and stakeholders impact -RAF increased the efficiency by way of enhancing cost-benefits from labour and investments. Additionally, increased the income from fish production enhanced the live and livelihood options.	⦿ Low input cost and enhanced income - The rice-fish system requires only a small amount of pesticide and fertiliser as it is a low input system. The adoption of this system has led to an increase in economic efficiency of farmers.

- ◎ **Optimum utilisation-** The **rice-fish system** yields **higher net return** with fish, as compared to a single crop of rice. Further tying the aquaculture industry to the agricultural industry in a social way, increases contacts among various stakeholders providing or **share useful skills and technical knowledge**.

Thus it's Multi-ecological functions covering biodiversity, food security, and soil enrichment and emissions reduction is apt for agricultural and livestock dominated country like India. There shall be considerations from policymakers on the problems of initial investment for poor rural communities and compensate them with farmer-friendly policies, easy loan schemes etc.



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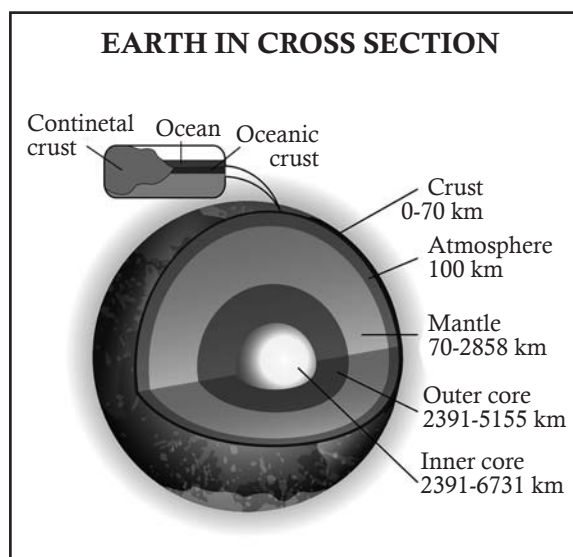
Topic of This Chapter

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2.	Earth's Inner Core May have Started to Spin in Opposite Direction
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1

Earth Might have Another Secret Layer Inside its Inner Core

Researchers trying to uncover the secrets of Earth's geology have revealed the **fifth layer of the planet**. Seismic waves generated by earthquakes have revealed new insights about the deepest parts of Earth's inner core.



The Mantle:

- ⦿ The research has revealed that the mantle normally is a **2,900 km thick layer** of solid rock sandwiched between the Earth's upper crust and lower core — has been hiding two layers inside it.
- ⦿ One is the “**low viscosity**” zone in the upper mantle, roughly **100 kilometres** in thickness.
- ⦿ The other layer is the ‘**low-velocity zone**’, which is also a part of the **upper mantle**.
- ⦿ The low viscosity zone coincides with the **transition zone** between the **upper and the lower mantle**.
- ⦿ It was also found that mantle covers the **largest area inside** the earth of about 44% of the earth.

About Earthquakes:

- ⦿ The study showed that the Earth kept moving months **after the earthquake**.
- ⦿ The mantle's **viscous properties** govern convection and help in **transfer of heat** between areas of different temperatures. This enables to understand **plate tectonics** and related phenomenon.

Significance of the study:

- ⦿ The analysis showed that the **partially molten layer** extends from **90 km to 150 kilometres**. Below this depth, the **waves resume speed** found in below the Turkey land.
- ⦿ This layer sits below the **tectonic plates**, which create **new crusts and destroy** older ones.
- ⦿ Plate tectonics is thought to have played an instrumental role in making the **Earth habitable**.

The Earth's interior helps in understanding the origin and formation of Earth while it also helps in understanding the volcanism and earthquakes which are explained by plate tectonics for planning human settlement and industries in these regions.

2

Earth's Inner Core May have Started to Spin in Opposite Direction

According to a new research, published in the journal ‘Nature Geoscience’, the inner core of Earth seems to have stopped spinning in the same direction as the rest of the planet.

Background:

- ⦿ The outer core is liquid while the inner core, with a radius of 1220 km, is solid.
- ⦿ Because the outer core has a low viscosity, it could be rotating at a different rate from the mantle and crust. This possibility was first proposed in 1975 to explain a phenomenon of Earth's magnetic field called westward drift: some parts of the field rotate about 0.2 degrees per year westward relative to Earth's surface.
- ⦿ In 1981, David Gubbins of Leeds University predicted that a differential rotation of the inner and outer core could generate a large toroidal magnetic field near the shared boundary, accelerating the inner core to the rate of westward drift. This would be in opposition to the Earth's rotation, which is eastwards, so the overall rotation would be slower.

Note: The spinning of the Earth's core is by the magnetic field that is generated in the outer core that is regulated by the gravitational effects.

New Findings and its significance:

- ☉ Earth's inner core is spinning in the opposite direction in comparison to the rest of the planet.
- ☉ The rotation of the inner core that actually is the hot iron ball, around the size of Pluto "came to near halt around 2009 and then turned in an opposite direction.
- ☉ The inner core started rotating slightly faster than the rest of the planet in the early 1970s. But it had been slowing down before coming in synchronization with Earth's rotation around 2009.
- ☉ There has been a **"negative trend"**, meaning the inner core is now rotating slower than the outer Earth's layers. Next change may occur in the mid-2040s.
- ☉ The results seem to indicate that **the Earth's inner core changes its speed of rotation every 60-70 years on average.**
- ☉ The Study can motivate **some researchers to build and test models which treat the whole Earth as an integrated dynamic system.**
- ☉ The slowdown could change how rapidly the entire planet spins, as well as influence how the core evolves with time.

The recent studies will help in understanding the formation of Earth and its different layers, spinning and different spinning of earth's core and its effect on the life present on earth and other geophysical phenomena.

3 Psyche Mission of NASA

The **Psyche mission of NASA** is a unique journey to understand the metal rich asteroid belt orbiting between the Mars and Jupiter in our solar system and recent discovery of nickel and iron metals in the belt makes it more similar to origin of Earth.

Goals of Psyche Mission

- ☉ Understand a previously unexplored building block of planet formation: iron cores.
- ☉ Look inside terrestrial planets, including Earth, by directly examining the interior of a differentiated body, which otherwise could not be seen.

- ☉ Explore a new type of world. For the first time, examine a world made not of rock and ice, but metal.

What is Asteroid Psyche?

- ☉ Psyche is a NASA mission to explore a 140-mile-wide (225 kilometers) metallic asteroid called 16 Psyche.
- ☉ It is similar to the project "Lucy" launched to study the primordial asteroid near Jupiter.
- ☉ The Psyche Asteroid may be the leftover core of an earlier planet which lost its crust and mantle during the multiple collisions during the formation of our Solar System.

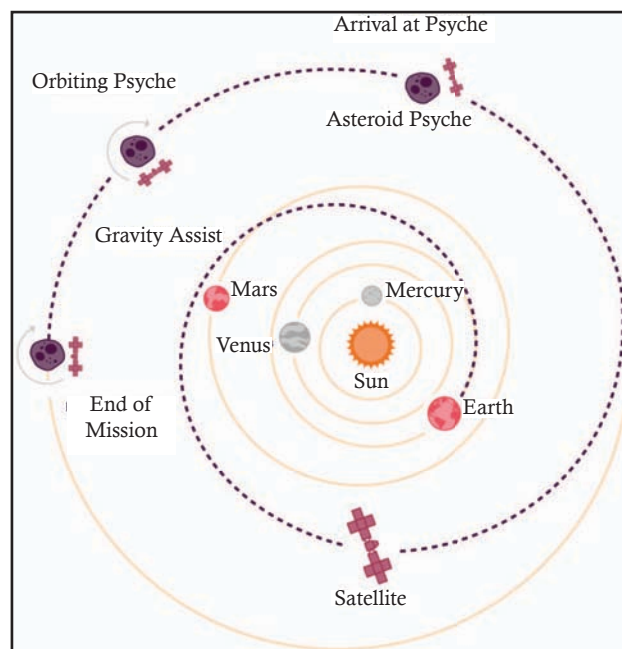


Fig: Asteroid Psyche between Mars and Jupiter

The significance of Psyche mission of NASA in understanding the Asteroid belt and the origin of Earth:

- ☉ **Origin of Asteroid:** The Psyche mission aims to understand that how the planets originated from the planetesimals which are hypothesized in Nebular Hypothesis theory.
- ☉ **The Position of Psyche Asteroid:** The inner planets have their solid core while the outer planets are gaseous in composition while the asteroid Psyche is present between these two types of planets and Earth having solid core with presence of **Nickel and Iron** will replicate the conditions of formation of Psyche Asteroid.

- ☉ **Interior of Planets:** The mission will also help in the understanding the formation of **different layers of planets such as lithosphere, mantle and core**. It will also help in understanding the **composition** of these layers. Though the asteroid is under the consistent influence of **solar flares** which resulted in the **loss of lighter elements**, but it can help in getting the insight of the interior of asteroid psyche.
- ☉ **Other Metals:** The Asteroid Psyche is known to have other rare metals like **gold, platinum, cobalt, iridium and rhenium**, which are also found in the Earth in different layers and in different composition.

The study of Psyche Asteroid will help in understanding the interior of Earth through “Indirect Study” and also help in understanding the core of the Earth and its composition which is very significant in the presence of life on Earth.

4 Turkey Earthquake

Recently, Turkey witnessed a **7.8 magnitude earthquake** which is one of the most powerful earthquakes in the past two decades with more than **1,300 people** killed and thousands still believed to be trapped under rubble.

What makes Turkey a hotbed of seismic activity?

- ☉ Turkey is frequently shaken by earthquakes.
- ☉ Turkey’s proneness to earthquakes comes from its **tectonic location**.
- ☉ Turkey, a hotbed of seismic activity, sits on the **Anatolian Plate**, which borders two major faults as it grinds northeast against Eurasia.

Tectonic plates:

- ☉ The Earth’s outermost layer comprises some 15 major slabs, called **tectonic plates**.
- ☉ The boundaries between these plates are a system of **faults – fractures** between two blocks of rocks. Any sudden movement along these faults can cause earthquakes.
- ☉ The **North Anatolian fault** traverses the country from **west to east**, and the East Anatolian fault, rests in the country’s south-eastern region.

- ☉ The **North Anatolian fault (NAF) line**, the meeting point of the Eurasian and Anatolian tectonic plates — is known to be “**particularly devastating**”.
- ☉ The NAF, one of the best-understood fault systems in the world, stretches from the south of Istanbul to north-eastern Turkey and has caused catastrophic earthquakes in the past.



Significance of location for Turkey

- ☉ **Anatolian tectonic plate:**
 - Turkey is located on the **Anatolian tectonic plate**, which is wedged **between the Eurasian and African plates**.
 - On the north side, the **minor Arabian plate** further restricts movement.
- ☉ **North Anatolian fault (NAF) line:**
 - One fault line — the **North Anatolian fault (NAF) line**, the meeting point of the Eurasian and Anatolian tectonic plates — is known to be “**particularly devastating**”.
 - The NAF, one of the best-understood fault systems in the world, stretches from the south of Istanbul to northeastern Turkey, and has caused catastrophic earthquakes in the past.
- ☉ **East Anatolian fault line:**
 - Then there is the East Anatolian fault line, the tectonic boundary between the Anatolian Plate and the northward-moving Arabian Plate.
 - It runs 650 kilometers from eastern Turkey and into the Mediterranean.
- ☉ **Aegean Sea Plate:**
 - In addition to this, the Aegean Sea Plate, located in the eastern Mediterranean Sea under southern Greece and western Turkey, is also a source of seismic activity in the region.

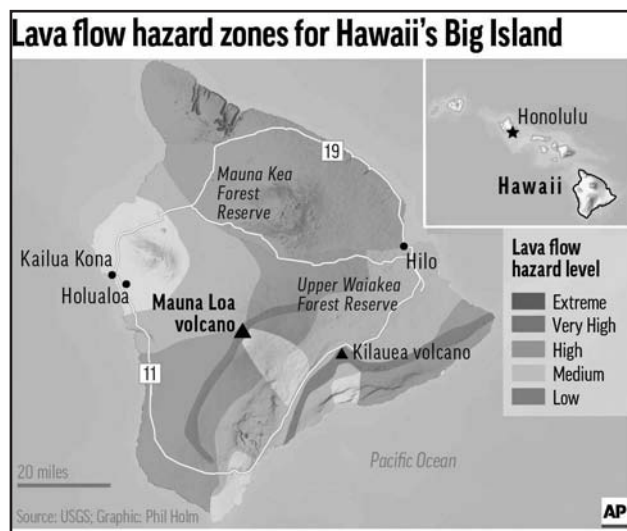
The Earthquake occurrence over the Turkey-Syria region has made a wake-up call for the countries over the world to develop technologies for early prediction and forecast of earthquakes so that region being affected will be prepared for disaster of such high magnitude and save life at such large scale.

5 Hawaii Volcanic Eruption

Scientists and researchers have alarmed the residents of Hawaii Island as the world's largest active volcano 'Mauna Loa' erupted in Dec 2022 after 38 years.

About Mauna Loa:

- It is the **World's largest active Volcano** in the Island of Hawaii in the U.S. state of Hawaii in the Pacific Ocean.
- The volcano makes up **51% of the Hawaii Island landmass**.
- It is an **active shield volcano** with relatively gentle slopes.
- Lava eruptions from Mauna Loa are **silica-poor and very fluid**, and they tend to be nonexplosive.



Significance:

- Its eruption remains important as the volcano covers a large area of the island.
- It gives the opportunity to the current scientist to study the volcanic phenomenon.

Mauna Loa Volcano Type:

- Shield Volcano:** A shield volcano is a broad

volcano with sloping sides that is formed mainly out of runny lava that flows out of its central summit vent.

- Examples of Shield Volcanoes:** are Mauna Loa on the Island of Hawaii, Wolf volcano on the Galapagos Islands, and Nyamuragira in the Democratic Republic of Congo.

The Mauna Loa volcanic eruption is an important geophysical event which is present in the Pacific ring of fire results in the change in landforms and also influences the regional climate by forming aerosols. Thus, their understanding helps in their early prediction and mitigating their harmful consequences.

6 Tonga Volcanic Eruption and Tsunami

Recently, the experts said that the Tonga volcano wave was 9 times taller than the tsunami in Japan.

90 metres high Tsunami

- The initial tsunami wave created by Tonga's underwater **Hunga Tonga volcano** eruption in 2022 was almost 90 metres high.
- It was nine times higher than the **tsunami recorded near Japan** in 2011.

Location

- The volcano is located approximately 70 km from the Tongan capital Nuku'alofa; this distance significantly minimized tsunami's destructive power.

Tsar Bomba

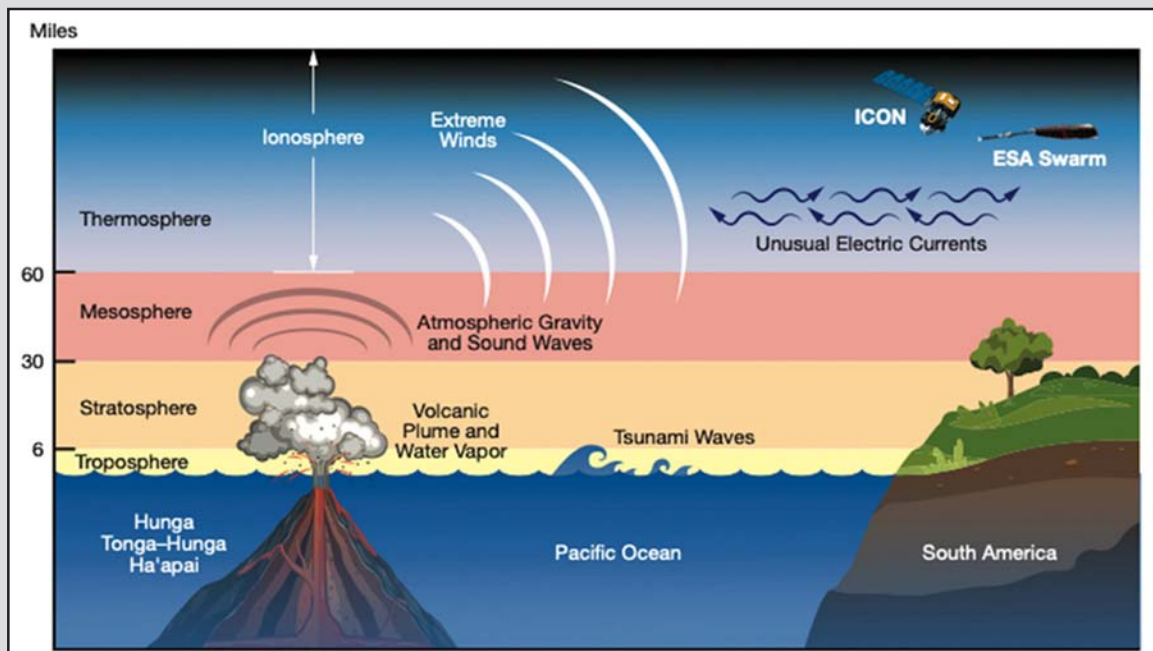
- The Tonga volcano eruption unleashed more energy than the Tsar Bomba, the most powerful nuclear device ever detonated.

Location of Tonga's Hunga-Tonga-Hunga-Ha'apai volcano?

- The Hunga-Tonga-Hunga-Ha'apai volcano, about 30 kilometers (20 miles) southeast of Tonga's Fonuafo'ou island, sits underwater between two small islands at about 2,000 meters (6,500 feet) high from the sea floor, with about 100 meters (328 feet) visible above sea level.

How do underwater volcanoes occur?

- ⦿ There is no specific difference in the formation of submarine (underwater) and subaerial (on land) volcanoes.
- ⦿ An undersea or submarine volcano is located below the ocean surface and mostly erupts underwater.
- ⦿ Volcanoes form when molten rock is produced in the second layer of the Earth's interior — the mostly solid upper mantle — and makes its way through the crust.
- ⦿ About “three-quarters of all volcanic activity on Earth actually occurs underwater”.
- ⦿ During an eruption, hot magma forces the oceanic crust open. This can lead to tsunamis – a series of ocean waves caused by the displacement of water.



Issues/ Challenges associated with the recent findings

- ⦿ **Technological barrier:** Detection and monitoring systems for volcano-based tsunamis are 30 years behind similar tools used to detect earthquake-based events.
- ⦿ **Catastrophic damage:** The massive volcanic eruption and tsunami in Tonga caused catastrophic damage with homes destroyed and many communities covered in thick ash.

Way Forward:

- ⦿ **Disaster management:** The eruption should serve as a wake-up call for organisations working to safeguard people from such disasters in the future.
- ⦿ **Monitoring of volcanic activity:** More high-quality research into volcanic eruptions is always a good idea.
- ⦿ **Efficient warning systems:** It should include both

real time warnings and education on what to do in case of a tsunami or warning such systems save lives.

Tonga volcano is a sub-marine volcano whose eruption caused destructive Tsunami in the Pacific Ocean and emission of gases forming aerosols resulting in the short-term cooling of the regional atmosphere of that region.

7

Sudden Stratospheric Warming and Polar Vortex

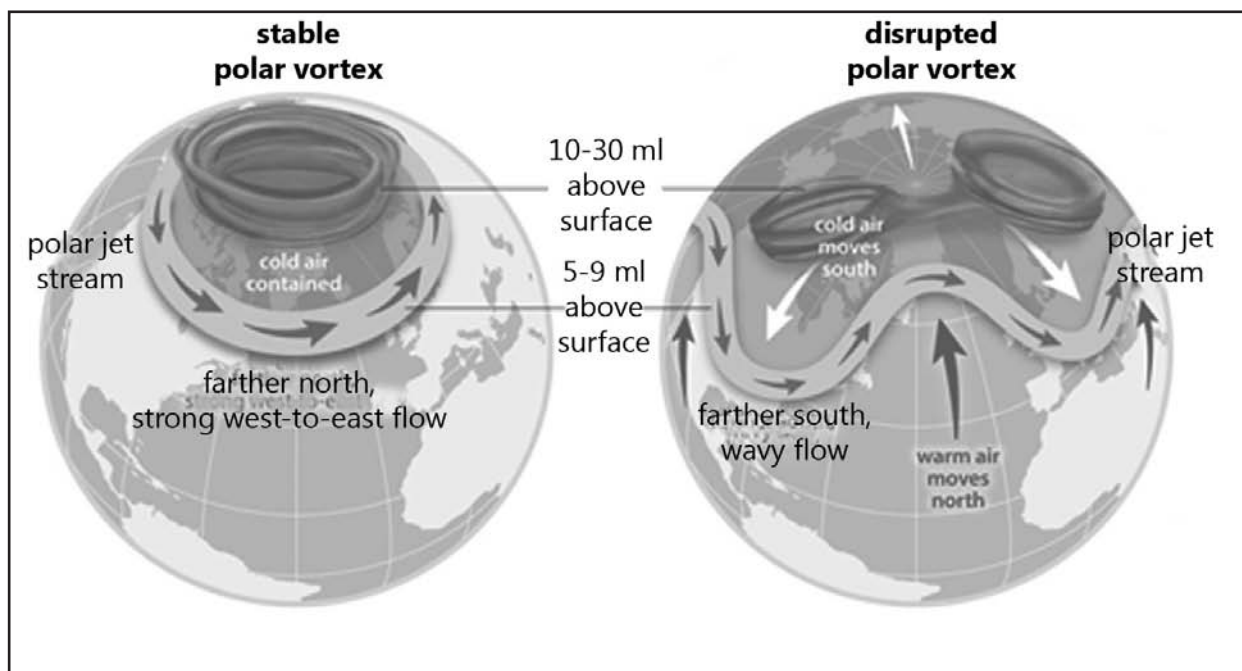
A Sudden Stratospheric warming occurred in the early 2023 due to the weakening of a polar vortex present in the Northern hemisphere causing intense cold wave flow in the Polar and Mid latitude region.

What is sudden stratospheric warming?

A sudden stratospheric warming (SSW) refers to a

rapid warming in the stratosphere between 10km to 50km above the Earth's surface and it is associated

with bringing in cold wave condition in the lower reaches of mid-latitude belt of the world.

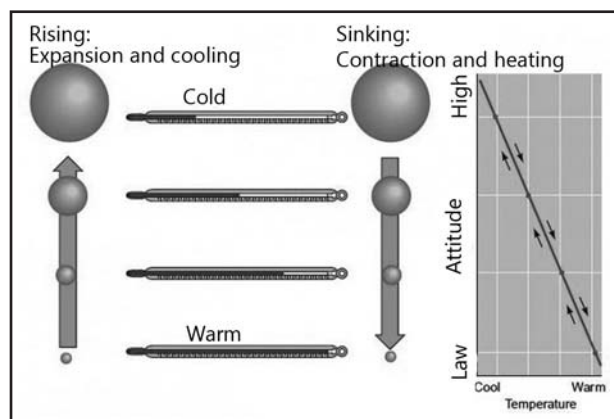


How Sudden

Stratospheric Warming occurs:

To understand the phenomena of SSW, it is important to understand polar vortex and its relation with polar jet stream.

- Polar Vortex:** The polar vortex is the high pressure phenomena occurring in the stratosphere, which gets strong during winters. But sometimes due to the weakening of the polar vortex, the winds start subsiding towards troposphere.
- Polar Jet Stream:** The Polar Jet stream remains at polar region when the polar vortex is strong. But when polar vortex gets weaker, the jet streams present here start pushing towards equator wards in a wavy pattern. The formation of wavy pattern also causes warm air from the mid and sub-tropical latitudes into the Polar Regions.
- Warming of Stratosphere:** Due to these phenomena, the air in polar vortex present in stratosphere starts descending into troposphere adiabatically, resulting in the compression of winds which also starts heating them.
- Rise in temperature:** This adiabatic compression results in overall increase in temperature of upto 50°C to 60°C , thus it results in the increase in temperature from -50°C to 0°C for few days in upper atmosphere of the Polar Regions.



Impact of Sudden Stratospheric Warming on weather system:

- Cold Wave Conditions:** The movement of polar winds into temperate regions causes sudden drop in temperature below 0°C in North and Central USA as in 2018, also it led to cold wave situation in UK and Northern Europe region.
- Increased Precipitation:** The movement of cold winds from Polar Regions into temperate regions brings moisture to these regions causing precipitation in the form of rainfall or snowfall. E.g. The UK, Northern Europe, Canada and Northern USA, etc.
- Anti-cyclonic condition:** Due to increase in colder conditions, there is formation of high pressure conditions over these regions causing

increase in anti-cyclones over the affected region of temperate latitude.

The Sudden Stratospheric Warming is an important phenomena causing warming in stratosphere and cooling in lower altitudes of troposphere over the affected region causing changes in regional weather. Thus, understanding the phenomena is important for the prediction and forecasting of weather and related phenomena to tackle the negative effects like loss of lives and crop failure.

8

Increased Sea Surface Temperature Affecting Indian Monsoon: Study

Global warming hiatus contributed to the weakening of the Mascarene High in the Southern Indian Ocean weakening south-west monsoon in India.

What is global warming hiatus?

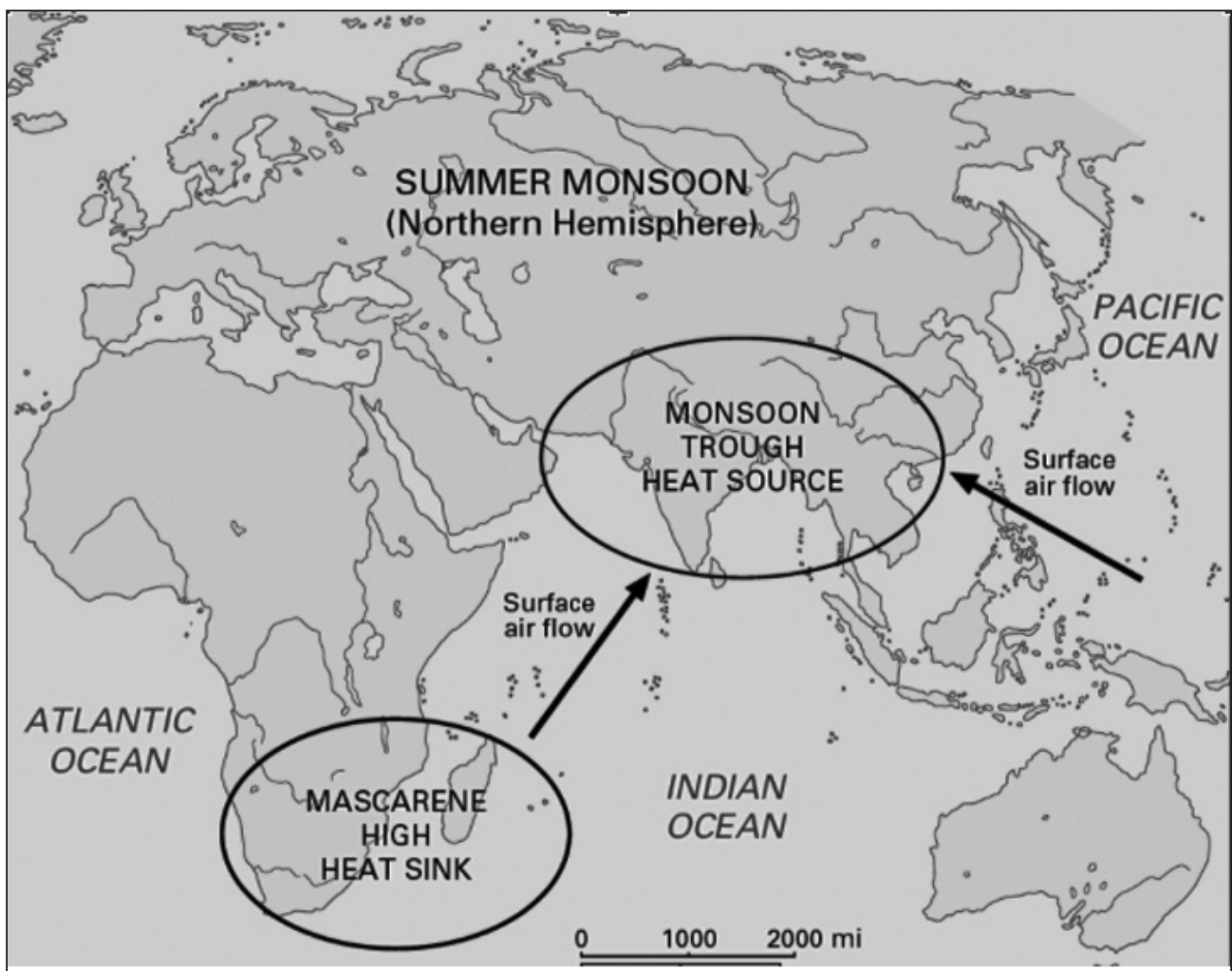
- A global warming hiatus is referred to a global

warming pause, or a global warming slowdown, which is a period of relatively little change in globally averaged surface temperatures.

- The hiatus, however, can result in an increase in the SST.

Mascarene high and rise in sea surface temperature:

- **Global warming:** Due to increase greenhouse gases (GHGs) in the atmosphere, there is an increase in temperature of atmosphere and ocean by about 1°C , resulting in increased sea surface temperature of oceans.
- **Weak Mascarene high:** Due to this increased SST of southern Indian Ocean, the Mascarene high has become weak.
- **Weakening of Indian Monsoon:** Due to the weakening of Mascarene High, the pressure gradient developed in the India Ocean will get disrupted resulting in the weak movement of cross-equatorial winds towards India.



Role of Mascarene High (MH):

- ⦿ The warming in SST due to global warming has resulted in a decrease in the pressure gradient between the MH and the Indian landmass.
- ⦿ This in turn suppressed the intensity of low-level cross-equatorial winds over the western Indian Ocean affecting the onset of the monsoon over the Indian subcontinent and rainfall over East Asia.

Impacts:

- ⦿ The weakening of the Mascarene High in the southern Indian Ocean during global warming hiatus may affect the strength of the upwelling along the coast of Somalia and Oman and thus, influence the Arabian Sea ecosystem.

Way Forward

- ⦿ India needs to **invest more resources in better prediction of Monsoon forecast** in order to achieve reliability and sustainability.
- ⦿ With a warming climate, more moisture will be held in the atmosphere, leading to heavier rainfall, consequently, inter-annual variability of the monsoon will increase in future. **The country needs to prepare for this change.**
- ⦿ Thus, to secure and bring sustainability to the climate pattern of India we need to **take effective and timely steps not just at the domestic front** (National Action Plan on Climate Change) but **also at the international front** (UN Framework Convention on Climate Change), as we live in a shared world with a shared future.

Mascare High is a high pressure region present in the Southern Indian Ocean, but its significance with regard to be the source region of supply of moisture laden air for monsoon is very important. Thus, the changes weakening this Mascarene High should be brought into light for making it strong for the better socio-economic conditions of farmers dependent on the monsoon winds in India.

9

More Frequent Heat Waves Linked to Changes in Jet Stream

According to **NASA's Earth Observatory**, the temperatures across the world have crossed 40°C

in places like **Europe, North Africa, the Middle East and Asia** in past few years. The reason for such increase in heat wave events is linked to the **Jet Stream**, which is affected by the global rise in temperature.

How Jet Stream is affected by Global Warming:

- ⦿ Due to global warming, the polar regions of the earth are getting warmer faster than the mid-latitude region and this is resulting into the decrease in difference of temperature between the high and mid-latitudes.
- ⦿ As the temperature difference is declining, there is a slight drop in zonal winds in the Jet Stream which is resulting in higher meandering of Jet Stream.
- ⦿ According to Nature Journal Study, the Arctic is heating seven times faster than the global average at around 2.7°C and 4°C a decade.

Jet Stream and Heat Wave:

- ⦿ **Omega Block:** Due to higher meandering of Jet Stream, there is **more convergence** of Jet Stream resulting into the **High Pressure formation in Upper atmosphere** which traps the warm winds in the same region with their accumulation over time. This convergence is also called as "Omega Blocks" resembling Greek letter omega, which is circling around the world.
- ⦿ **Heat Waves:** Due to this phenomena happening for several days, the region experiences increase in temperature resulting in increased heat wave events. This change in Jet Stream pattern is resulting in increased heat wave events across the globe like North America, Europe, South and South-East Asia, etc. by increasing temperature around 4°C to 7°C in the affected region.

The increased heat wave events which is linked with the change in Jet Stream pattern whose primary cause is global warming is affecting agricultural crops, increased energy use, health issues, loss of biodiversity, etc. affecting the human and environment in a negative way. Thus, limiting the Green House Gas emissions and making a global effort to stable increasing global temperature is indeed needed to control global warming and conserve Earth.

What is a 'heat dome'?

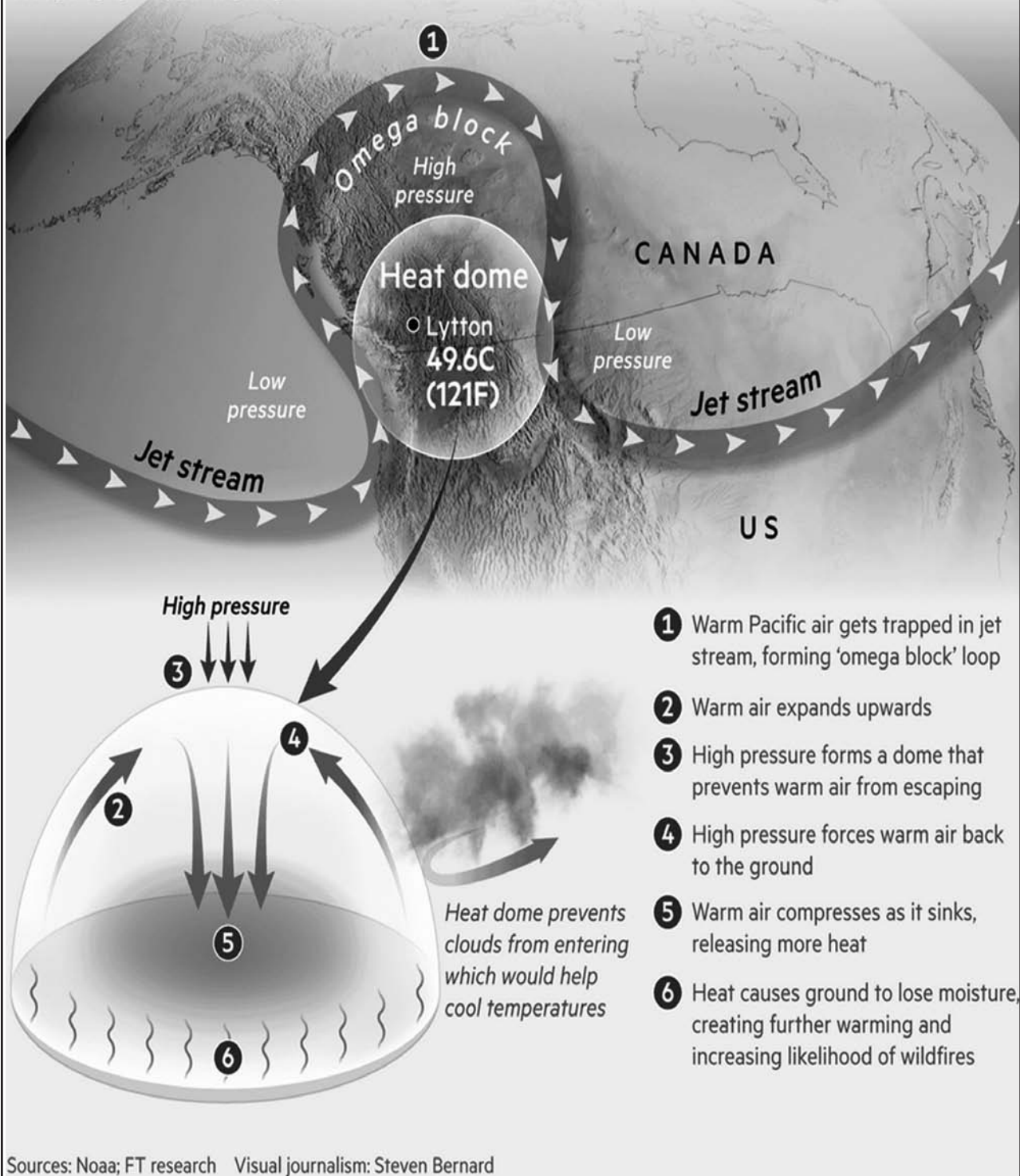


Fig: The Convergence in Jet Stream also called as Omega Block

10

Arctic Cyclones to Intensify as Climate Warms, NASA Study Predicts

Recently it was seen that the development of **fronts** and **cyclones** in the mid and high latitude region has

intensified due to increased extremity in temperatures in Arctic region.

What study says?

- **Intense cyclones:** The cyclones are becoming stronger in terms of pressure, wind speeds and precipitation due to climate change.

- Initially storms drop more snowfall, but as air temperatures continue to rise and cross above freezing temperatures, storms drop rainfall, which is a really big change for the **sea ice pack**.
- More intense storms will be a hazard to shipping activities, oil and gas drilling and extraction, fishing, and Arctic ecosystems and biodiversity — that's where maritime **weather forecasting** is important but still challenging and difficult

Future Predictions:

- By the end of the century, **cyclone wind speeds could increase up to 38 mph**, depending on storm characteristics and the environmental conditions of the region.
 - The peak intensity of such storms could be up to 30% longer, and precipitation will likely increase.
 - If cyclones start to bring rainfall in the spring, sea ice may begin melting sooner and less of it will survive the summer melt season.
- Such changes will enable the ocean to provide more energy to the atmosphere for deep convection, which increases the potential of storms to intensify and persist.
- Much like hurricanes in low and mid latitudes, Arctic cyclones use this energy like fuel in an engine. Storms in coming decades could travel farther north and reach areas of the Arctic typically left untouched.
- The changing weather could increase risks for Arctic ecosystems, communities, and commercial and industrial activities.

The battle between air masses

While air masses contain uniform temperature and moisture, where they meet is where weather systems take shape. The boundary separating two air masses is what Meteorologists call a “**front**”. These boundaries can have large gradients, or contrasts, in temperatures and dew points.

- A cold front is when a colder air mass is replacing a warmer air mass.
- A warm front is when the opposite occurs and warm air is replacing colder air.
- Stationary fronts form when the boundary between the air masses does not move.

When these air masses collide, you can bet the weather will likely turn unsettled. An example of colliding air masses is the developing storm system in the central United States this week. A maritime tropical air mass, with warm and humid conditions, is meeting up with a continental polar air mass, with cold and dry conditions to the north.

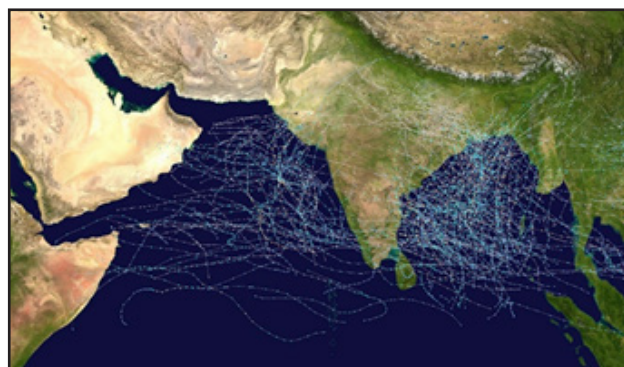
11

Fewer Cyclones in the Bay of Bengal but Frequency Increased in the Arabian Sea

Recently a report highlighted the events of occurrence of Cyclones in the **Arabian Sea** has increased as compared to the **Bay of Bengal** over several years due to Climate Change.

The Name Game

Cyclones are the local name of the **Indian Ocean and the South Pacific Ocean**, but in the Northwest Pacific Ocean they are known as **typhoons**, and in the Northeast Pacific Ocean and North Atlantic, they are known as **hurricanes**.



What is the general trend of cyclones?

- Generally, India gets **5 cyclones** on an average in a year.
- 4 in the Bay of Bengal
- 1 in the Arabian Sea

The changing trend of cyclone frequency:

- In recent years, the **frequency of cyclones has increased** and more than that, there has been a decrease in the length of the monsoon season as well in the post-monsoon season.

- ⦿ However, in the particular case of the Arabian Sea, in the last 30 years, from 1990 onwards, there is a significantly increasing trend of **extremely severe cyclones**. And as a result, the most intense cyclones in the region are causing a lot of devastation over the **western coast of India**.
- ⦿ Not only is the Arabian Sea, but the Bay of Bengal also witnessing many severe cyclones in recent times.

How climate change is contributing to the increased frequency of cyclones?

- ⦿ Climate change is increasing the damage that cyclones, cause in several ways like;
 - **Increasing sea surface temperatures** that can make cyclones more powerful
 - **Increasing the rainfall intensity** during the storm
 - **Rising sea levels**, which increase the distance in the interior of inland that storm surges can reach affecting coastal ecosystem.
- ⦿ The strongest cyclones have become more common across the world and scientists project that **climate change will continue to make the strongest cyclones more powerful**.
- ⦿ The **strength of cyclones** affecting the countries bordering the **North Indian Ocean has been increasing** as the planet has warmed.
- ⦿ Climate change is increasing the danger from cyclones in several ways like **cyclones are fuelled by available heat**.

The change in cyclone trend in the Arabian Sea is attributed to the climate change with rise in ocean and atmospheric temperature resulting in increase in their frequency. Thus, understanding this pattern will help in early preparedness and planning for hazards and disasters in these regions.

12

Climate Change's Influence on Hurricanes

Hurricane Fiona was the 2022 Atlantic season's **first major hurricane**.

How climate change is impacting hurricanes?

- ⦿ **Rising temperature:** Hurricanes feed off of heat

energy, so as Earth's global temperatures continue to rise.

- ⦿ **Intensification:** Climate change is making hurricanes **wetter, windier and altogether more intense**. There is also evidence that it is causing storms to travel more slowly, meaning they can dump more water in one place.
- ⦿ **Heavy rainfall:** Climate change can also boost the amount of rainfall delivered by a storm. Because a warmer atmosphere can also hold more moisture, water vapour builds up until clouds break, sending down heavy rain.
- ⦿ **Recent Study:** According to a recent study, during the 2020 Atlantic hurricane season (one of the most active on record), climate change boosted hourly rainfall rates in hurricane-force storms by 8%-11%.

Hurricanes are basically the tropical cyclones formed in the tropical latitudes, but their intensity and frequency is changing due to the rise in temperature attributed to the anthropogenic induced climate change resulting in their early intensification causing havoc in Atlantic region.

13

Climate Change: The Collapse of a Major Atlantic Current Would Cause Worldwide Disasters

New research published in *Nature Climate Change* found that planetary warming has placed a **critical Atlantic current**, called the **Atlantic Meridional Overturning Circulation (AMOC)**, at risk of collapse.

Why researchers are worried about AMOC?

- ⦿ The AMOC is at its weakest point in 14,500 years -- since the end of the last ice age when glaciers began melting and freshwater diluted the salinity of the ocean, slowing the current.
- ⦿ Once the AMOC fully collapsed, temperatures dropped across the entire Northern hemisphere for the next 3,000 years.
- ⦿ Scientists predict a present-day collapse would equate to a permanent La Niña state, where significant changes to wind, temperatures, and precipitation patterns would cause substantial

and unpredictable increases in extreme weather conditions, such as drought, monsoons, and hurricanes.

Why AMOC is important for global weather?

- ⦿ The collapse of a major ocean current is yet another example of how the climate crisis is chipping away at the world's natural systems.
- ⦿ Due to due to planetary warming, the AMOC is at a "major climate tipping point," with its flow declining by 15% since 1950.
- ⦿ At the same time, the world's glaciers are again melting, and many face the imminent risk of collapse.
- ⦿ Longer-lasting La Niña seasons are also exacerbating extreme weather conditions, including the record-breaking drought in the Western US and flood season in China.
- ⦿ Meanwhile, primarily human-caused carbon emissions are at a three million-year high, adding to the warming effect and its related impacts.

Implications of decline of AMOC:

- ⦿ Without a proper AMOC and Gulf Stream, Europe will be very cold.
- ⦿ Gulf Stream, a part of the AMOC, is a warm current responsible for mild climate at the Eastern coast of North America as well as Europe.
- ⦿ An AMOC shutdown would cool the northern hemisphere and decrease rainfall over Europe.
- ⦿ It can also have an effect on the El Nino.
- ⦿ El Nino is a climate pattern that describes the unusual warming of surface waters in the eastern tropical Pacific Ocean.
- ⦿ It can also shift monsoons in South America and Africa.

Causes of decline in AMOC:

- ⦿ Climate models have long predicted that global warming can cause a weakening of the major ocean systems of the world.
- ⦿ Freshwater inflow from the melting of the Greenland ice sheet.
- ⦿ In July 2021, researchers noted that a part of the Arctic's ice called "Last Ice Area" has also melted.

- ⦿ The freshwater from the melting ice reduces the salinity and density of the water.
- ⦿ Now, the water is unable to sink as it used to and weakens the AMOC flow.
- ⦿ Indian Ocean may also be helping the slowing down of AMOC.
- ⦿ Increasing precipitation and river run-off.

Because of the complexity of the AMOC, uncertainty remains around the potential outcomes of its slowdown. AMOC is slowing down, it is projected to slow further, and this might mean like a catastrophe for global climate if the current collapses altogether. Thus, a global effort is needed to tackle this scenario of global warming and its impact on the global conveyor belt.

14

Effect of Ocean Salinity on Climate and Its Implications for Earth's Habitability

According to study of NASA, the climate change is causing increased **salinity** in the **sub-tropical regions** and decline in salinity in tropical and high latitude regions due to variation in temperature and precipitation causing changes in hydrological cycle impacting regional climate of the world.

Role of Salinity in Oceans:

About 3.5% of seawater is dissolved salt, measured as salinity. At the sea surface — where the ocean exchanges water with Earth's atmosphere — salinity is an indicator of water cycle processes. Salinity also plays an active role in driving ocean circulation, helping to distribute heat around the globe and regulate climate.

Climate change causing variations in ocean salinity:

- ⦿ **Precipitation:** Due to climate change the certain regions of the world are experiencing increased precipitation resulting in adding of freshwater into the oceans causing decline in salinity. For e.g. Near the equator in the North Pacific Ocean, one of the wettest regions on the planet, heavy rainfall adds an abundance of water to the sea surface. This results in a band of low salinity water off the coast of Central America.

- ◎ **Evaporation:** Due to global warming, certain regions of the world are experiencing increased rate of evaporation resulting in increased salinity in these regions. For e.g. North Atlantic Ocean due to high evaporation has formed a salty patch of water.
- ◎ **River Runoff:** Rivers are one of the important agents that add freshwater to the sea or oceans resulting in the decline in the salinity of those regions.
 - **Low river water:** Due to climate change, many rivers are experiencing decline in river water flow which is altering the salinity of the sea into which river is confluencing. For e.g. Mississippi river in North America saw decline of water flow.
 - **High river flow:** Due to climate change the rivers originating from glaciers or increased precipitation are experiencing increased water flow resulting in increased water flow into the oceans or sea. For E.g. Rivers and their Tributaries originating from Himalayas, Alaska, Siberia, Alps, etc.
- ◎ **Ice Freezing and melting:** The ice in the form of glaciers, ice sheet, sea ice, etc. are melting and freezing at different seasons, but due to climate change, there is alteration in this freeze-thaw cycle resulting in high melting of ice and causing rise in fresh water while decline in salinity in the polar regions.

Impact of salinity variations in regional climate:

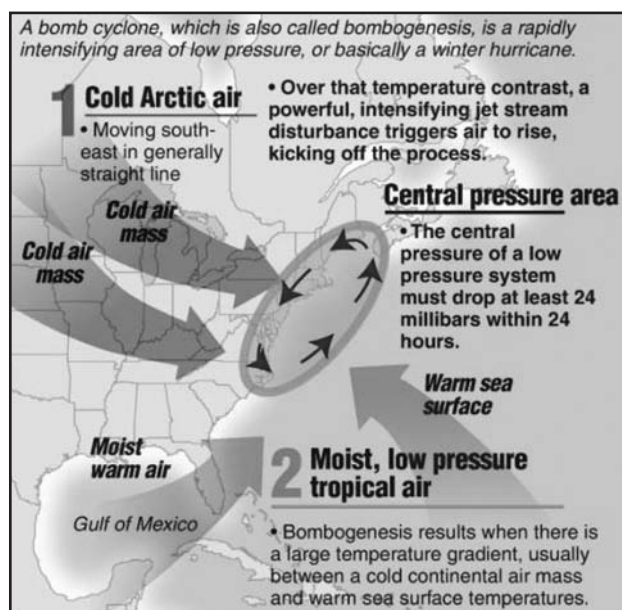
- ◎ **Ocean circulation:** This phenomena affects the circulation of oceans from poles to equator causing slowing of these currents and affecting the regional weather by increased temperature in equatorial belt and decline in temperature in polar and high latitudes.
- ◎ **Hydrological cycle:** The hydrological cycle is impacted resulting in variation in precipitation and rainfall. For e.g. High saline water has requires more heat for evaporation, thus resulting in decreased evaporation and low cloud formation with low precipitation.
- ◎ **Warming of high latitudes:** The water with high salinity has tendency to absorb more heat, hence resulting in rise in temperature in the countries of **Canada, North Europe, Japan**, etc. and resulting in extreme temperature in the region.

- ◎ **Cyclones:** The decline in salinity in tropical regions will result in lowering of the temperature of evaporation which in turn will create more moisture in the same levels of heat resulting in the forming of more number of cyclones and also help in their rapid intensification. For e.g. the increased frequency of high intensity cyclones in North Indian Ocean.

The salinity and temperature are two important factors controlling the balance of ocean and hydrological cycle, which is being disturbed due to climate change resulting in extreme weather phenomena like floods, droughts, cyclones, etc. creating socio-economic problems for the population residing in respective regions. Thus, understanding the inter-linkage between ocean and salinity is necessary to have planned strategy to mitigate the impacts arising due to them.

15 Bomb Cyclone

A bomb cyclone, a severe winter storm, had hit the United States and Canada in December 2022.



How is Bomb Cyclone different from Hurricanes?

- ◎ It essentially amounts to a rapidly developing storm system, distinct from a tropical hurricane because it occurs over mid latitudes where fronts of warm and cold air meet and collide, rather than relying on the balmy ocean waters of late summer as a catalyst.

- ◎ **Bomb cyclones have cold air and fronts:** Cold air rapidly weakens hurricanes, while it is an essential ingredient for bomb cyclones.
- ◎ **Bomb cyclones form during winter:** Hurricanes form from late spring to early fall, while bomb cyclones form from late fall to early spring.
- ◎ **Bomb cyclones form at higher latitudes:** Hurricanes form in tropical waters, while bomb cyclones form over the northwestern Atlantic, northwestern Pacific and sometimes the Mediterranean Sea.

Outcomes and Impact of the Cyclone:

- ◎ While this kind of storm is **not exceedingly rare**, this one is very strong, with high winds that are bringing **heavy snow or rain to many areas**.
- ◎ **Air pressure** dropped to at least 962 millibars, while elsewhere it was as high as 1,047 millibars which is a really sharp gradient.
- ◎ This has led to the development of **extreme storm conditions** near the core of the low-pressure system, with **particularly harsh conditions**.

The Bomb cyclone occurring in the eastern coast of USA is due to the increased sea surface temperature resulting in sudden drop in the pressure which is resulting in the rapid intensification and high destruction over the affected region. Thus, human induced global warming which is a primary reason for these phenomena is needed to be addressed on

the global platforms for taking decisions for its mitigations and early preparedness.

16

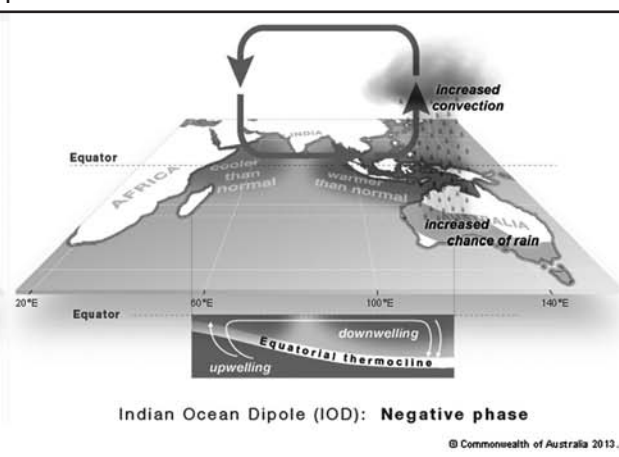
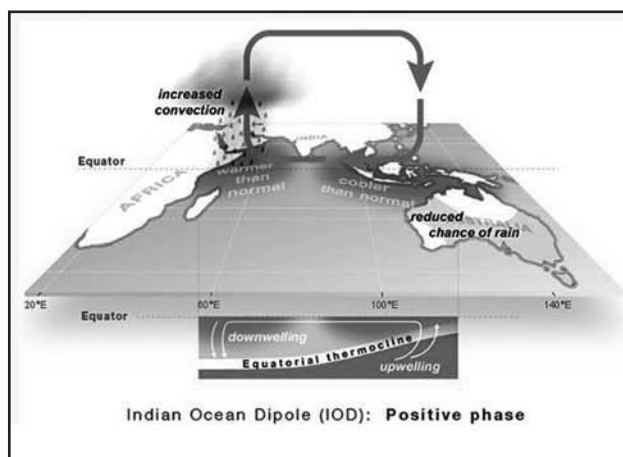
Impact of Indian Ocean Dipole on Indian Southwest Monsoon

According to IMD, a positive **Indian Ocean Dipole** condition is set to be formed over the Northern Indian Ocean which will impact Indian monsoon, which is already under the influence of El Nino.

Characteristics of IOD:

Three Phases: The IOD has three phases such as Neutral, Positive and Negative IOD.

- ◎ **Neutral Phase of IOD:** During this phase water flows from the Pacific between Indonesia's islands, keeping seas warm to the northwest of Australia. Air rises above this area and falls across the western half of the Indian Ocean basin, blowing westerly winds along the equator.
- ◎ **Positive Phase of IOD:** During this phase the Westerly winds weaken along the equator, allowing warm water to move to Africa. Changes in the winds also allow a rise of cool water from the deep ocean in the east. This creates a temperature difference across the tropical Indian Ocean with cooler than normal water in the east and warmer than normal water in the west. This event has been found to be beneficial for the monsoon.



- ◎ **Negative Phase of IOD:** During this phase westerly winds intensify along the equator, allowing the concentration of warmer waters near Australia. This creates a temperature difference across the tropical Indian Ocean, with warmer than normal water in the east and cooler than normal water in the west. This event obstructs the progression of monsoon over India.

How does it impact the southwest monsoon?

- ◎ **Increased rainfall due to positive IOD:** There is no established correlation between Indian summer monsoon rainfall and IOD. But, studies have shown that a positive IOD year sees more

than normal rainfall over central India. It was demonstrated that a positive IOD index often negated the effect of El Niño Southern Oscillation (ENSO), resulting in increased Monsoon rains in several ENSO years.

- ☉ **Droughts Due to negative IOD:** A negative IOD, on the other hand, complements El Niño leading to severe drought.
- ☉ **Cyclones:** At the same time, positive IOD results in more cyclones than usual in Arabian Sea. Negative IOD results in stronger than usual cyclogenesis (Formation of Tropical Cyclones) in the Bay of Bengal. Cyclogenesis in Arabian Sea is suppressed during this time.

Thus, an IOD can either aggravate or weaken the impact of El Niño on Indian monsoon. If there is a positive IOD, it can bring good rains to India despite an El Niño year. For example, positive IOD had facilitated normal or excess rainfall over India in 1983, 1994 and 1997 despite an El Niño in those years. Similarly, during years such as 1992, a negative IOD and El Niño had cooperatively produced deficient rainfall.

17

Arctic and Antarctic Saw Record Warmth and Ice Melt in 2022

The Arctic and Antarctic saw record warmth and ice melt in 2022, the sea ice around Antarctica shrank to the smallest area ever recorded in early 2022, and there were exceptionally high temperatures at both poles.

Highlights of UNEP 2019 Emission Gap report -

- ☉ The world will fail to meet the **1.5°C temperature goal of the Paris Agreement** unless global greenhouse gas **emissions fall by 7.6 per cent each year**.
- ☉ **Global temperatures are set to rise about 3.2 degrees C by 2100**, the report says, bringing catastrophic weather including hotter, deadlier heatwaves and more frequent floods and drought.
- ☉ The top four emitters (China, USA, EU and India) contributed to **over 55% of the total emissions**

over the last decade, excluding emissions from land-use change such as deforestation.

- ☉ The rankings would change if land-use change emissions were included, with Brazil likely to be the largest emitter.
- ☉ **India is the fourth-largest emitter** of Green House Gases (GHGs).

Consequences of melting of Sea ice and glaciers:

- ☉ **Electricity Production:** A lot of places all over the world depend exclusively on the constantly flowing water from glaciers that are melting in producing electricity. Reducing or stopping the flowing of water will mean stopping the production of electricity.
- ☉ **Heat Sink:** It has ramifications for the global climate. This region is a heat source in summer and a heat sink in winter.
- ☉ **Biodiversity Loss:** It could trigger a multitude of biophysical and socio-economic impacts, such as biodiversity loss, increased glacial melting, and less predictable water availability—all of which will impact livelihoods and well-being in the HKH.
- ☉ **Glacial Lake Outburst Floods:** Faster snow and glacier melting due to warming is already manifesting in formation of glacial lakes. Glacial lake outburst floods (GLOF) are becoming frequent and causing huge casualties and loss to local infrastructures.
- ☉ **New Trade Route Consequences:** With the growing impacts of climate change, along with new infrastructure development, trade routes and hydropower dams planned for the fragile region, the effects on the biodiversity is set to worsen further.
- ☉ **Impact on Environmental Services:** Along with species loss this will mean the loss of the key environmental services the region provides – such as water and carbon storage – to the rest of Asia.

The Arctic and Antarctic region of the world which in-houses the largest ice and glaciers of the world is witnessing its melting due to global warming, thus through bringing major GHG emitters on global platform and implementing binding protocols for maintaining the ice and glaciers over the two poles of earth.



Indian Geography

Topic of This Chapter

1.	Rare Triple Dip La Nina and its impact on India
2.	Micro-earthquakes in India Preventing Turkey Like Events
3.	ISRO to Boost NavIC, Widen User Base of Location System
4.	Discovery of 'Critical' Lithium & Its Impact on Environment
5.	Save Himalayan ecology: Learnings from Turkey-Syria quake & Joshimath crisis
6.	Zero Coal Import Remains Elusive as Centre Leans on Foreign Supplies Again
7.	Indus Waters Treaty: Demands for Its Renewal are not New, but What has Changed Now?
8.	Lack of Strong Western Disturbances behind Early Heat in North India: IMD
9.	Impact of Higher Temperature on Wheat Crops
10.	India Likely to get 'below normal' Monsoon Rains in 2023 Due to Onset of El Nino Conditions
11.	India and Water Sharing Treaties with Its Neighbours

1

Rare Triple Dip La Nina and its impact on India

Australia's Bureau of Meteorology (BOM) predicted that a third consecutive event of **La Niña** could be underway.

What does a *triple La Niña* mean?

- ⊙ A **triple La Niña** or a 'triple dip' La Niña is a rare occurrence, lasting for three years in a row. It has happened only twice since 1950.
- ⊙ On the contrary, the occurrence of two consecutive La Niña winters in the Northern Hemisphere is common.

Impact on India

- ⊙ **Monsoon:** India may experience an extended monsoon lasting up to October due to *La Niña*.
- ⊙ The **India Meteorological India (IMD)** has predicted that monsoon withdrawal may begin in the first week of September, but it is likely that some parts of India may continue to witness heavy rains.

Impact of El Nino and La Nina

- ⊙ **El Nino** is associated with drought or weak monsoons.
- ⊙ **La Nina** is associated with strong monsoons and above average rains and colder winters.
- ⊙ **Agriculture:** La Nina could have negative impacts on Indian agriculture.
- ⊙ Farmers will be at risk of losing their standing Kharif crops if it rains during this period.
- ⊙ The harvesting of the Kharif crops begins in September-end or early October. And any rain just before that would prove detrimental to the standing crops.

La Nina is attributed to increased rainfall in the Indian region causing increased precipitation and floods in the major parts of India. Thus understanding this phenomena helps in the better management and diversion of river water to avoid floods and better utilization of water resource.

2

Micro-earthquakes in India Preventing Turkey Like Events

Micro tremors have been helping release tectonic stress and protecting India from a devastating event, experts said and asserted that the country has seen a paradigm shift towards effective response and mitigation.

Should India be concerned?

- ⊙ India is witnessing micro tremors regularly which, in turn, is helping release tectonic stress and offering protection from the possibility of a devastating event.
- ⊙ The triple junction on India's western side near the border with Pakistan is continuously releasing stress due to the occurrence of micro-level earthquakes.
- ⊙ There are a few earthquakes of magnitude 4 and 5 as well.

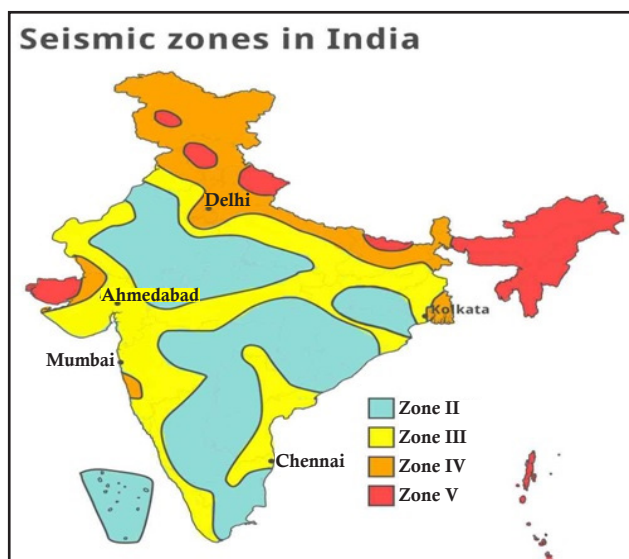
Triple Junction

- ⊙ A triple junction is a point where three tectonic plates meet and interact.
- ⊙ These are important areas of geological activity and can be sites of significant seismic and volcanic activity.
- ⊙ The movement of the plates can cause a significant build-up of stress and strain in the Earth's crust that is eventually released in the form of earthquakes.

How prone is India to earthquakes?

- ⊙ India is located in a **seismically active region**. India is divided into **four seismic zones** based on the potential for earthquake activity in each region.
- ⊙ According to the **Ministry of Earth Sciences**, 59 per cent of India's land mass is prone to earthquakes.
 - **Zone V** is seismically the most active region, while **Zone II** is the least.
 - Around 11 per cent of the country's area falls in **Zone V**, 18 per cent in **Zone IV** and 30 per cent in **Zone III** and the remaining in **Zone II**.

- The zones are used to guide building codes and construction practices.



Is India ready?

India is well-prepared to deal with the fallout of large-scale earthquakes as it has a dedicated, well-equipped and trained force in the form of the **National Disaster Response Force (NDRF)**.

The micro earthquakes play a very significant role in the adjustment of plates in the Himalayan region (between Eurasian and Indian Plate) for release of pressure and avoiding building up greater force. Thus, helping in overcoming high intensity earthquakes as happened in Turkey – Syria region in 2023.

3

ISRO to Boost NavIC, Widen User Base of Location System

On the side-lines of the India Space Congress, the Indian Space Research Organisation (ISRO) recently revealed its plans to expand the reach of NavIC (Navigation with Indian Constellation) beyond India and not to a limited territory around India.

NavIC (Navigation with Indian Constellation):

- ☉ NavIC, also known as the Indian Regional Navigation Satellite System (IRNSS), is an independent stand-alone indigenous navigation satellite system developed by the Indian Space Research Organisation (ISRO).
- ☉ NavIC, which consists of 7 satellites, covering the

whole of India's landmass and up to 1,500 km from its boundaries, is conceived with the aim of removing dependence on foreign satellite systems for navigation, particularly for "strategic sectors".

- ☉ Currently, NavIC's application in India is limited in -
 - Public vehicle tracking,
 - For providing emergency warning alerts to fishermen venturing into the deep sea where there is no terrestrial network connectivity and
 - For tracking and providing information related to natural disasters.
- ☉ The next step India is pushing for is to include it in smartphones.
- ☉ According to India's draft satellite navigation policy 2021, the government will work toward "expanding the coverage from regional to global" to ensure the availability of NavIC signals in any part of the world.

The NavIC will undergo following significant changes in the near future:

- ☉ **Adding the L1 band into NavIC:** Currently NavIC is only compatible with the L5 and S bands and hasn't easily penetrated into the civilian sector.
 - L1 bandwidth is part of the GPS and is the most used for civilian navigational use.
- ☉ **Increasing the safety of the signals:** There are two types of codes - Long Code and Short Code. NavIC currently only offers short codes. This must become Long Code for the strategic sector's use, to prevent the signal from being compromised.
- ☉ **5 new satellites to replace decommissioned NavIC satellites:** To be launched in the coming months, the new launches (medium earth orbit (MEO) satellites) will make NavIC truly "global" like GPS.
 - Currently, NavIC satellites orbit earth in a geostationary or geosynchronous (GEO) orbit, about 36,000 km from earth.
 - MEO orbits occupy a space between GEO and Low Earth Orbit (LEO).

Significance of NavIC:

- ☉ **Real Time Information:** It give real time information for 2 services i.e standard positioning service open for civilian use and Restricted service which may be encrypted for authorised user like

for military. Currently we use GPS system of USA for navigation.

- ◎ **Dependency on other countries:** India became one of the 5 countries having their own navigation system like GPS of USA, GLONASS of Russia, Galileo of Europe and BeiDu of China. So India dependence on other countries for navigation purposes reduces.
- ◎ **Technological Development:** It will help in scientific & technological advancement of India.
- ◎ **Strong Defense:** It will make Indian Armed Forces self-reliant. While advanced nations like US and Russia are having GPS and GLONASS, countries like China, European Union and Japan are trying to have their own full-fledged or partial constellations.
- ◎ **Helping Neighboring Countries:** Further with an extensive coverage, one of the stated future use of the project includes sharing of the project with the SAARC nations. This will help in integrating the regional navigation system further and a diplomatic goodwill gesture from India towards countries of the region.

The development of NavIC system is an important achievement of India for traffic management, disaster prediction, response and management, thus making India one of an important country with its own constellation of satellite for regional navigation.

4 Discovery of 'Critical' Lithium & Its Impact on Environment

Months after India's first lithium reserves were discovered in Jammu and Kashmir (5.9 million tonnes), the **Geological Survey of India (GSI)** has found another reserve of the crucial mineral in Degana in Rajasthan's Nagaur district. It is believed that these reserves are much bigger in quantity than the one found in the Union Territory and can meet 80% of the total country's demand.

Why is the finding a big deal?

- ◎ **Usage:** The soft, shiny gray metal is an extremely important one in today's world. It is used, among other things, to build the batteries that electric vehicles cannot do without. Hence the name 'white gold'.

- ◎ **Self-reliance in the LIB [lithium-ion battery]:** If India has its own sources of lithium, it would not have to rely too much on imports for its lithium needs, as it currently does.
- ◎ In 2020-21, India imported Rs 173 crore worth of lithium and Rs 8,811 crore worth of lithium ions. India's lithium needs are also likely to rise, given the push for electric vehicles.
- ◎ **Rare:** Lithium reserves are also rare.
- ◎ There are 98 million tonnes of lithium globally. Now India has found 5.5% of these resources

How critical is lithium for India?

The lithium deposits are critical for India as the country puts its focus on electric mobility for both public and private transport, especially in the country's prime cities such as **New Delhi, Mumbai, Bangalore, Kolkata, and Chennai.**

- ◎ These metals are strategic in nature and have a wide range of applications in nuclear and other high-tech industries, including electronics, telecommunications, information technology, space, and military.
- ◎ India's Ministry of Mines further stated that 51 mineral blocks including Lithium and Gold were handed over to respective state governments.
- ◎ Out of the 51 mineral blocks, 5 blocks are of gold.
- ◎ Other blocks pertain to commodities like potash, molybdenum, and base metals.

India's lithium reserves

- ◎ According to the Indian Mines Ministry, the government agencies made small discovery of lithium resource at a site in Mandya, Karnataka.
- ◎ It is the country's first lithium reserve.

Lithium Production in the world

- ◎ According to the US Geological Survey (USGS), global lithium production in 2019 stood at 77,000 tonnes.
- ◎ Australia, Chile, China and Argentina are the world's top four lithium-producing countries.
- ◎ Australia is by far the world's top producer of lithium, with an output of 42,000 tonnes in 2019.

IN LITHIUM SEARCH



Lithium as a rare earth mineral has gained a very important place in the contemporary times of transition of the economies from fossil based to renewable energy based and its discovery in India will increase India's geostrategic importance in the World.

5

Save Himalayan ecology: Learnings from Turkey-Syria quake & Joshimath crisis

Joshimath, the ancient Uttarakhand town has become a cause of concern. Though the town of Joshimath has been witnessing cracks emerging for the past two decades, things have escalated over a few days when the area was declared a disaster prone region.

Reasons for Vulnerability of region:

- ⦿ Joshimath is built on the deposits of an **old landslide**, which means the slopes can be destabilised even by slight triggers.
- ⦿ The town is also in **Zone V**, denoting highest risk, in India's seismic zonation scheme.
- ⦿ It lies between two thrusts, the **Main Central Thrust (MCT)** and the **Vaikrita Thrust (VT)**, and thus occupies a seismically active terrain.

The M.C. Mishra committee's report of 1976 warned against heavy and unscientific construction in the town mentioning that, "Joshimath is a deposit of sand and stone, hence was not a suitable place for the coming up of a township. Vibrations produced by blasting and heavy traffic will also lead disequilibrium in natural factors."



Contributing factors for disasters in the region:

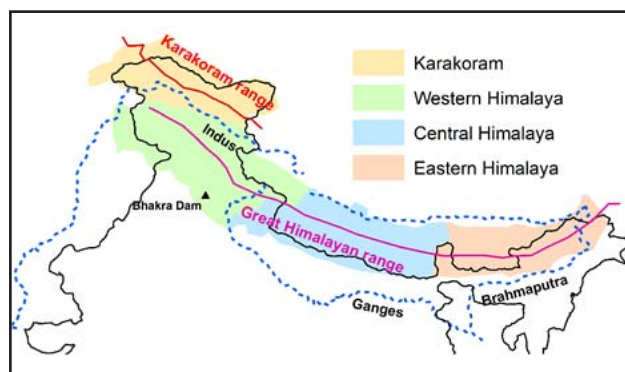
- ⦿ **Role of NTPC:** Locals have blamed the NTPC's 520-MW Tapovan Vishnugad hydropower project, under construction in the area, for exacerbating the Joshimath land subsidence.
- ⦿ Recently, NTPC has punctured a tunnel to connect Auli, near Joshimath for supply of water.
- ⦿ **Char Dham project:** The 6-km Helang-Marwari bypass, being built by the Border Roads Organisation (BRO), is also under scrutiny for weakening slopes and further destabilising the local topography.
- ⦿ The bypass is part of the 825-km Char Dham highway expansion project in Uttarakhand, which experts have already questioned for unscientific slope-cutting, which resulted in several landslides.
- ⦿ **Inadequate drainage and wastewater disposal:** The 2022 USDMA report pointed to a lack of drainage and wastewater disposal systems as being part of the subsidence problem.
- ⦿ About **85% of buildings** in the town, including those owned by the army aren't connected to a sewerage system and have soak pits instead.

The Himalayan ecosystem:

- ⦿ **Fragile Himalayan Ecosystem:** The Himalayas are ecologically **fragile** and **economically**

underdeveloped, with geo-environmental constraints imposing severe limitations on the level of resource productivity.

- ⦿ **Agriculture:** Consequently, subsistence agriculture constitutes the main source of livelihood in the region.
- ⦿ **Tourism:** The rapid growth of tourists in the region has brought about extensive land-use changes in the region, mainly through the extension of cultivation and large-scale deforestation.
- ⦿ **Ecological balance:** This irrational land transformation process has not only disrupted the ecological balance of the Himalayan watersheds through reduced groundwater recharge, increased run-off and soil erosion, but has also adversely affected the ecology and economy of the adjoining Indo-Gangetic plains by recurrent floods and decreased irrigation potential.



Recent disasters in the region:

- ⦿ In last ten years, two major earthquakes have occurred in Uttarakhand namely the **Uttarkashi earthquake (1991)** and the **Chamoli earthquake (1999)**.
- ⦿ 380 people were killed when massive landslides washed away the whole village Malpa, Uttarakhand (then Uttar Pradesh) in 1998.
- ⦿ In **1999, forest-fires** in the hills of Uttarakhand destroyed more than 3, 75,000 hectares of forest. The same year, more than 450 cases of forest fire were reported in Himachal Pradesh and by May 1999, more than 80,000 hectares of forests were turned to ashes.
- ⦿ The **Kedarnath floods in 2013**, had took lives of several innocent people and disaster in the region

The Himalayan region is susceptible to various mass movement phenomena like avalanche, debris movement, soil creep, etc. which is needed to be well understood for better management and conservation of Himalayan ecosystem.

6

Zero Coal Import Remains Elusive as Centre Leans on Foreign Supplies Again

According to World Economic forum, India has become the third largest emitter of greenhouse gases with one of the highest coal imports in the world with 209 million tonnes in 2022 (Ministry of Coal).

Recent trend of coal imports in India:

- ◎ The coal imports in India have a declining trend with 234.35 million tonnes in 2018-19 to 209 tonnes in 2021-22.
- ◎ But the coal imports have increased in the year 2022-23 due to the increased energy demand and supply chain disruption due to Russia-Ukraine war in early 2022.
- ◎ Secondly, the import of coal is substituted by the increase in domestic production which can be seen as 716 million tonnes in 2019-20 and increased to 778 million tonnes in 2021-22.

What is the current status of coal stocks?

- ◎ India is the 2nd largest producer and consumer of coal in the world after China. Coal stocks at power plants across the country are down in comparison to their normal levels.
- ◎ The insufficient stocks of coal are reflected in data released regularly by the **National Power Portal (NPP)**, which tracks the coal stocks at thermal power plants across the country.
- ◎ As of April 21, the thermal power plants across the country had a **total stock of 21.9 million tonnes (MT) of coal**. The daily usage of coal at these plants stood at 2.7MT.

Trend of renewable energy production in India:

India ranks fourth in renewable energy production and have highest growth of renewable energy

production in the world which can be seen with 76.37 GW productions in 2014 and reaching to 167.75 GW in 2022.

Challenges India facing to achieve zero coal import:

- ◎ **Rising Energy Demand:** With India becoming largest populated country by mid-2023, it will witness an increase in energy demand due to increasing population, urbanization and industrialization.
- ◎ **Lower renewable capacity development:** Due to various reasons India achieved only 119 GW energy target out of 175 GW by 2022, thus it can be seen that the lower pace of renewable energy development is one of an important reason for rise in coal demand for energy production.
- ◎ **HEP projects:** The hydroelectric projects proposed in the Himalayan and peninsular regions are facing issues in completion due to environmental factors and resistance from local population. For e.g. small HEP are stalled in the states of Arunachal Pradesh, Uttarakhand, Himachal Pradesh, Jammu and Kashmir, etc.
- ◎ **Lack of Infrastructure and technology:** India lacks appropriate infrastructure for the development of renewable and other sources of energy which is needed to be developed for making energy infrastructure and use more sustainable in India.

Measures taken for achieving zero coal import:

- ◎ **Development of Renewable energy capacity:** Increasing the share of renewable energy capacity of India which can also be seen in the 500 GW target by 2030, will help in achieving the zero coal import of India.
- ◎ **Enhancement of indigenous coal production:** The coal production in India has seen rise since last 5 years and helped in reducing coal import but, the minimizing coal use should be the paramount aim for sustainable development.
- ◎ **Investment in R&D:** The current share of GDP in the innovation and R&D is just 0.7%, much lower than world average of 1.8% resulting in low R&D and innovation related to renewable energy share in India.

- ⦿ **Technological development:** Enhancing the technological development with respect to renewable and other sources of energy such as bio-fuel and biotechnology should be enhanced for lowering coal import in India.

Zero coal import is an important target for India not only for reducing coal usage for energy production but also to achieve the sustainability in the path of sustainable development. Thus, through technological innovation and developing other sources of sustainable energy twin goal of SDG 7 of clean energy security and SDG 12 of responsible consumption and production can be achieved.

7

Indus Waters Treaty: Demands for Its Renewal are not New, but What has Changed Now?

India has issued a notice to Pakistan for modification to the treaty as per Article XII (3) of the Indus Water Treaty (IWT) due to Pakistan's refusal to implement the treaty.

Indus water treaty and ongoing issues:

- ⦿ Under the notice, India has called on Pakistan to enter into intergovernmental negotiations within 90 days.
- ⦿ According to India, the treaty requires that disputes be resolved through bilateral negotiations and consultations between the two countries, rather than through international arbitration.

Dispute Resolution between India and Pakistan

- ⦿ According to Article IX of the treaty that deals with the "Settlement of Differences and Disputes", there are three possible steps to decide on objections raised by either side.
 - Working within the "**Permanent Indus Commission**" (PIC) of the Indian and Pakistani delegation of water experts that meet regularly.
 - Consulting a World Bank-appointed **neutral expert**.
 - Setting up a court process to adjudicate the case through the World Bank and the **Permanent Court of Arbitration (PCA)**.

Importance of Indus river basin in development of Hydro-electric power projects in India:

- ⦿ **Perennial River system:** The Indus rivers have their origin in the Himalayas where melting of glaciers and springs provide water to maintain the perennial flow of rivers in the Indus river basin, the waters of such rivers can be utilized for the development of hydro-electric power project in the region.
- ⦿ **High potential of rivers:** The potential of Indus river system to produce hydro-electricity is quite high which is still untapped. For e.g. Jammu and Kashmir has a potential to produce 16,475 MW of hydro power, however a total capacity of 3236 MW have been harnessed yet on the rivers of Jhelum, Chenab and Indus.
- ⦿ **Geographical terrain:** The major part of the Indus river basin is situated over the Himalayan region and at high altitude which helps in the formation of natural potential for the electricity development in the mountainous regions. For e.g. the Indus River originates at 4255 m above mean sea level.
- ⦿ **Run-off the rivers:** The Run off the river projects are developed on the rivers having high altitude, substantial flow rate and enough tilt to speed the river flow. various run off the river projects developed on Indus river basin are Kiru hydroelectric project on Chenab river.

The consequences of hydro-electric power projects on environment.

- ⦿ **Deforestation:** The development of large and small hydro-electric power projects requires large scale land which causes deforestation on extensive scale for e.g. the **Ujh multi-purpose project envisages 680 hectares of forest land and clearance of 214502 trees in Kathua region of J&K.**
- ⦿ **Biodiversity Loss:** The Biodiversity such as various wildlife species living in forest and aquatic ecosystem like **Indian fox, Jungle cat, leopard, tiger, snow leopard, hangul and various fishes, dolphins and other organisms** face habitat loss resulting in biodiversity loss.
- ⦿ **Soil erosion and degradation:** Due to the construction of dam and reservoirs, the soil present surrounding the region gets removed also sometimes it gets washed away due to flooding, causing degradation of soil.

☉ **Earthquake and land subsidence:** When a dam or a reservoir is constructed, it leads to the formation of immense pressure over the under lying mountains. It results in the isostatic adjustment of mountains and plates resulting in their displacement causing earthquake and land subsidence. E.g. **construction of Tehri dam resulting in land subsidence in Joshimath in Uttarakhand** and such earthquakes can also occur on the Indus river system.

☉ **Rehabilitation and displacement:** The dam construction not only results in the loss of habitat of wildlife animals but it also results in the loss of habitat of local people and tribals making them vulnerable. E.g. Ujh project resulted in the displacement of 28000 people living in 52 villages of which Dharalta and Dungara – are going to get fully submerged.

The Indus river basin is very strategic to India for the energy security which is being consistently opposed by Pakistan under Indus water treaty of 1960, thus India needs to develop its untapped potential for the development of hydro-electric energy and achievement of SDG 7 of clean energy and SDG 14 and SDG 15 of environment and biodiversity conservation.

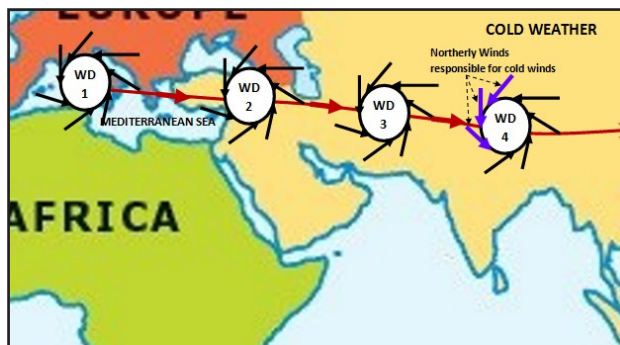
8

Lack of Strong Western Disturbances behind Early Heat in North India: IMD

The India Meteorological Department (IMD) issued a forecast for a fresh spell of rainfall along with thunderstorms and hailstorms over northwest, east and northeast India from **March 30 to April 1, 2023**.

The changing weather scenario in Northern India:

- ☉ Rainfall this month has also brought with it a drop in temperatures.
- ☉ In Delhi, for instance, the maximum temperature dropped to a low of **3 degrees Celsius** on March 19.
- ☉ Last year, when Delhi recorded no rainfall at all in March, the national capital saw higher maximum temperatures of **38 and 39 degrees Celsius** after **March 20**.



Reasons for Weak Western Disturbances:

- ☉ This winter season, the country has received only three intense Western Disturbances: two in January and one in March. December and February passed without a single intense Western Disturbance.
- ☉ Clouds formed by the Western Disturbances have a moderating effect on the maximum temperatures during the winter season. As they were missing this winter season, the north Indian plains experienced severe cold waves and cold days in December and most of January due to the cold northern winds flowing down from the Himalayas.
- ☉ One of the reasons for the abnormally hot February was the formation of a high pressure area near the land surface, which caused the air to descend, compress and heat up.
- ☉ Increased temperature in recent times due to global warming and climate change has led to an increase in temperature causing weakening of western disturbances.

Implications of weak Western Disturbances on India:

- ☉ The higher day temperature has led to **adverse effect on wheat approaching reproductive growth period**, which is sensitive to temperature. High temperature during flowering and maturing period leads to loss in yield.
- ☉ With high temperatures in March due to weakening of Western Disturbances **damaged 30-40 per cent wheat crop** in Punjab, Haryana, Himachal Pradesh, Uttar Pradesh and Madhya Pradesh.
- ☉ This had a **rippling effect** i.e. the domestic wheat prices skyrocketed and forced the Centre to take

several difficult decisions, from banning wheat exports to selling its wheat reserves at low prices.

- ⦿ The glaciers and snowfall are crucial for the water security of the region. As permafrost melts because of the warming, **replenishment of glaciers will not happen.**

The weakening of western disturbances induced by climate change is a warning to restrict the global temperature rise to be limited to 1.5 C and adhering back to the Paris agreement for reduction in emission of GHGs for sustainable earth.

9

Impact of Higher Temperature on Wheat Crops

India has set up a panel of officials to assess the impact of rising temperatures on the wheat crop, as the weather office warned that **above normal temperatures** would prevail in key producing states.

Why higher temperature is a concern for the crop?

- ⦿ The optimum temperature range for ideal germination of wheat seed is 20-25 C though the seeds can germinate in the temperature range 3.5 to 35 c.
- ⦿ Areas with a warm and damp climate are not suited for wheat growing.
- ⦿ This higher day temperature might lead to **adverse effects** on wheat approaching the reproductive growth period, which is sensitive to temperature.
- ⦿ High temperature during flowering and maturing periods leads to loss in yield.
- ⦿ The country grows only one wheat crop in a year, with planting in October and November, and harvesting from March.

The Rising temperature in the form of heat wave, which is attributed to the climate change is impacting the yield of wheat in the Northern Region of India. Thus, effective policies and management of wheat crop production is needed on urgent basis as wheat forms a major share of the food security in India and also supporting other countries like of Africa to meet their food requirements.

10

India Likely to get 'below normal' Monsoon Rains in 2023 Due to Onset of El Nino Conditions

As per the information by private weather forecasting agency **Skymet**, India is likely to get **"below normal"** monsoon rains in 2023 with an increasing likelihood of El-Nino, which typically brings dry weather to Asia.

Measurement of Normal to average rainfall:

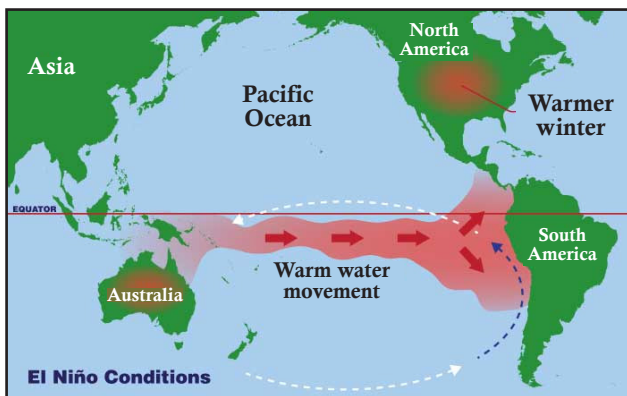
- ⦿ India defines **average, or normal, rainfall** as **between 96% and 104%** of a 50-year average of 88 centimetres (35 inches) for the **four-month season** beginning June.
- ⦿ Monsoon rains in India are expected to be **94% of the long-term average**, retaining its previous view of **sub-par monsoon.**
- ⦿ Skymet expects **northern and central parts** of the country to be at **risk of being rain deficit.**
- ⦿ **Punjab, Haryana, Rajasthan and Uttar Pradesh**, are likely to observe less than normal rains during the **second half of the season.**
- ⦿ The **Indian Meteorological Department (IMD)** also agreed to the news and is expected to announce its annual monsoon forecast soon.

The upcoming El Nino:

- ⦿ The change in sea surface temperature associated with **El Nino Southern Oscillation (ENSO)** might seem marginal but is enough to **disrupt weather patterns globally.**

Concerns for India:

- ⦿ **Monsoon dependency:** Nearly half of India's farmland, which has no irrigation cover, depends on **annual June-September rains** to grow crops such as **rice, corn, cane, cotton and soybeans.**
- ⦿ **Risk of Food Inflation:** Unseasonal rains and hailstorms have damaged ripening, winter-planted crops such as wheat in India's fertile **northern, central and western plains**, exposing thousands of farmers to losses and raising the risk of further food price inflation.



The El Niño plays a major influencing factor in influencing monsoon winds by weakening the intensity of the winds which affects the agricultural crop production throughout India. Thus, understanding the phenomena and preparing well in advance is essential for the food security of India and socio-economic wellbeing of the farmers.

11 India and Water Sharing Treaties with Its Neighbours

As India falls under a strategic location between the Mountains to the North and Ocean in the South, it tends to hold the flow of several Rivers from its territory to other neighboring countries. Let us trace important rivers shared by India with its Neighbour countries.

India's Water sharing

India- Bangladesh:

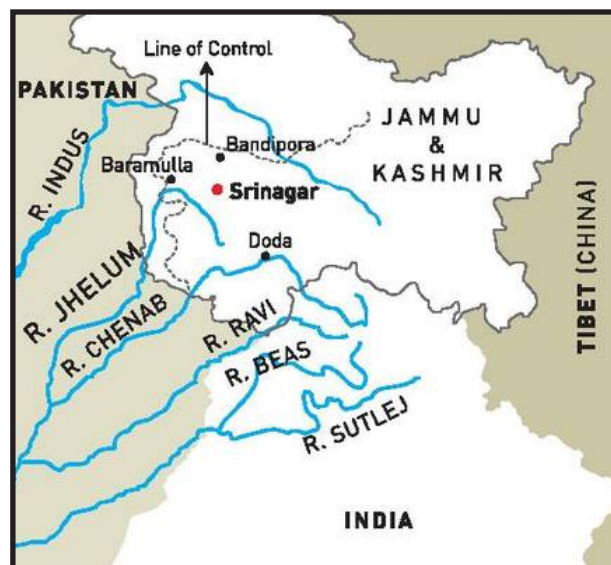
- ☉ India and Bangladesh share **54 rivers**.
- ☉ India holds the **highest number of rivers** flowing from India to the Bay of Bengal region via Bangladesh.
- ☉ **The Ganga:** The Ganges in (**Bangladesh: Padma**) is a trans-boundary river of Asia that flows through India and Bangladesh.
 - It flows south and east through the Gangetic plain of North India, receiving the right-bank tributary, the Yamuna, which also rises in the western Indian Himalayas, and several left-bank tributaries from Nepal that account for the bulk of its flow.
- ☉ **Teesta** begins its journey in Sikkim and flows through north Bengal before entering Bangladesh.

- ☉ **Feni** flows 135 km south of Tripura capital Agartala. In a total catchment area of 1,147 square km of the river, 535 square km falls in India and the rest in Bangladesh.
- ☉ The other major rivers include **Brahmaputra, Meghna, Surma, Jamuna, Kushiya, Barak**, etc.

Kushiya River

- ☉ The Kushiya River is a distributary river in Bangladesh and Assam, India.
- ☉ It forms on the **India-Bangladesh border** as a branch of the Barak River when the Barak separates into the Kushiya and Surma.
- ☉ **Origin:** The waters that eventually form the Kushiya originate in the uplands of the state of **Assam** and pick up tributaries from **Nagaland and Manipur**.
- ☉ From its origin at the mouth of the Barak, also known as the '**Amlshid bifurcation point**'.

India-Pakistan:



- ☉ The water of River Indus and other west-flowing rivers from India were the issues between India and Pakistan since Independence.
- ☉ Indus is a Trans-boundary river of Asia and a trans-Himalayan river of South and Central Asia.
- ☉ The river rises in **Western Tibet**, flows northwest through the disputed region of Kashmir, and flows south-by-southwest through Pakistan, before emptying into the Arabian Sea near the port city of Karachi.
- ☉ Other major rivers are **Sutlej, Chenab, Jhelum, Beas, Ravi**, etc.

India- Nepal:

- ◎ The **Kosi and Gandak** are one of the major rivers from Nepal entering India.
- ◎ Other Rivers include Rapti, Narayani, kali, etc.
- ◎ The Rivers entering India via Nepal are mostly originated from the Tibetan plateau and Himalayan ranges.



India-China:

- ◎ The most disputed river in India-China region is the Brahmaputra, which is also known as the **Yarlung Tsangpo** in Tibet.
- ◎ It gets originated in the **Manasarovar Lake region**, near Mount Kailash, on the northern side of the Himalayas in Burang County of Tibet.
- ◎ India and Nepal signed treaties in 1954, 1959, and 1996 for water-sharing and project-development concerning the Kosi, Gandaki, and Mahakali rivers respectively.
- ◎ The river drains the Himalayas east of the **Indo-Nepal border**, a south-central portion of the Tibetan plateau above the Ganga basin, the south-eastern portion of Tibet, the Patkai hills, the northern slopes of the Meghalaya hills, the Assam plains, and the northern portion of Bangladesh.

Important Treaties

- ◎ **The Indus Water Treaty (1960)** specifies the terms of sharing the water of six transboundary rivers between India and Pakistan.
- ◎ **The Ganges Treaty (1996)** between India and Bangladesh brought an end to their longstanding bilateral dispute.

The river water treaties form a peaceful accord between the water sharing countries for their use and development of infrastructures like dams, Hydro-electric power plants, Multi-purpose projects, etc. Thus, it helps in resolving bilateral and multi-lateral issues between the India and river sharing countries in Trans-boundary Himalayan region of Asia.



Climate Change

Topic of This Chapter

- | | |
|----|---|
| 1. | Marine Heat Waves |
| 2. | Urban Greening |
| 3. | Desertification: 'Droughts reduced India's GDP by up to 5% in 20 Years |
| 4. | Budget 2023-24: Centre's Mangrove Restoration Scheme Stresses on its Scientific Implementation |
| 5. | Enhanced Phytoplankton Bloom Triggered by Atmospheric High-pressure Systems Over the Northern Arabian Sea |
| 6. | Heat Waves in India: Causes and Impact |

1 Marine Heat Waves

A new study has suggested that warm subsurface waters in the Bay of Bengal likely helped fuel the 2020 Amphan super cyclone.

Recent Data on Marine Heat Waves

- According to a study, **marine heatwaves**, or those that form on oceans, are on the rise in the waters around India.
- Emerging studies have reported their occurrence and impacts throughout the global oceans, but their impact in the tropical Indian Ocean is little understood.
- Furthermore, according to the **Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report**, sea surface temperature across the Indian Ocean is likely to rise by 1 to 2 °C if global warming is 1.5°C to 2°C.

Impact on the Monsoon

- The marine heatwaves in the western Indian Ocean and the Bay of Bengal are found to result in dry conditions over the central Indian subcontinent.
- There is an increase in rainfall over south peninsular India in response to the heatwaves in the Bay.

What causes marine heatwaves?

- Marine heatwaves can be caused by a whole range of factors, and not all factors are important for each event.
- The most common drivers of marine heatwaves include ocean currents which can build up areas of warm water and air-sea heat flux, or warming through the ocean surface from the atmosphere.
- Winds can enhance or suppress the warming in a marine heatwave, and climate models like El Niño can change the likelihood of events occurring in certain regions.

Trends of Marine heat wave in Indian Ocean:

- Bay of Bengal recorded surface temperatures of 32-34°C, before Cyclone Amphan.

- 93% of the heat from global warming goes into the oceans.
- Warm waters are an energy source for cyclones.
- As the Arabian Sea warms, the number and intensity of cyclones and heavy rains increase.
- Over the Arabian Sea, 150% rise in the number of very severe cyclones
- 80% rise in the total duration of cyclones
- 20%-40% rise in the intensity of cyclones Over the Bay of Bengal, rapid intensification may be occurring more.

Key findings about Marine heatwave and Cyclone:

- The heat content in the subsurface ranged between 135 and 150 kilojoules per square centimetre before the cyclone.
- Warm subsurface waters could intensify cyclones by allowing heat to flow between the sea and atmosphere. Warmer waters fuel cyclones.
- The subsurface water may have warmed because of the high sea level anomaly, which is the difference between the total and average sea level.
- An increase in sea level is brought about by anticyclonic eddies, which is a circular movement of water.

Marine heat waves have increased in recent times due to increased global warming and sea surface temperature impacting marine and coastal biodiversity in the ocean and seas all over the earth. Thus, their management is needed to keep hydrosphere healthy and the biodiversity thriving to achieve SDG 14 i.e. life below water.

2 Urban Greening

During the novel coronavirus pandemic, momentarily we do have witnessed an outflow of people from the bigger cities to suburban and rural areas. **But now this trend is reversing and urban occupancy is rebounding.** The need for housing with adequate amenities in the cities is growing fast. The government and the industry are struggling in keeping up the pace to fulfil the **increasing demand for sustainable urban housing.**

Background: New job opportunities and natural population increase is making people move to the cities, thereby **putting enormous stress on the shared resources** which are getting translated into an additional burden on the cities. To name a few, it has resulted in the **concretisation of cities, increases in greenhouse gas emissions, declining water table**, etc.

Analysis: Climate change, urban emissions and declining green spaces in the cities is throwing challenges on cities infrastructure and is asking for immediate remedial action and timely course

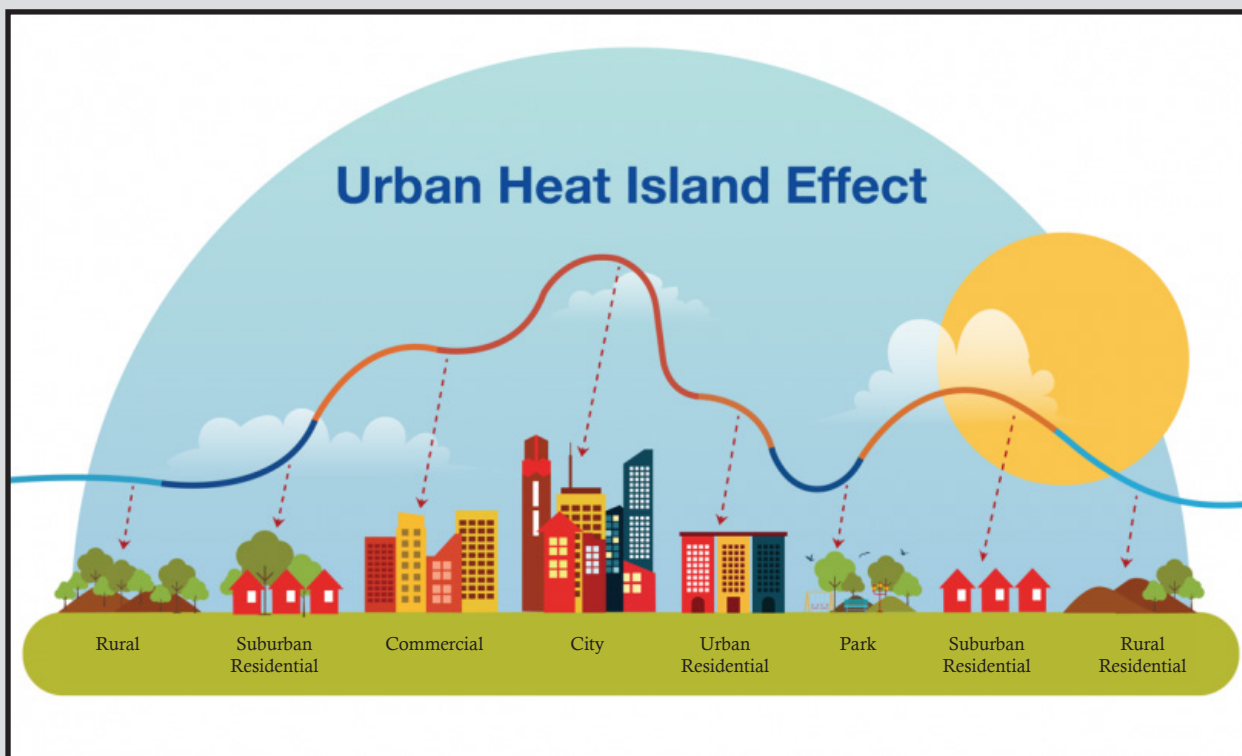
correction to avoid the situation from getting out of hand.

Why do we need green spaces in the cities?

- ☉ **To mitigate the effect of Pollution:** It can help to reduce a phenomenon known as the urban heat island effect, which refers to heat trapped in built-up areas. Increased temperatures in summer lead to an increased demand for cooling.

The urban heat island effect:

It appears in towns and cities as a result of human activity. The heat generated by people, transport, shops and industry is trapped in the narrow roads and concrete structures, unable to escape to the atmosphere. This can bring the temperature in urban areas up 3-4°C higher than the surrounding countryside.



- ☉ **Crucial for Community Health:** Green spaces are good for human health and they are crucial for community health. Research shows that cities with healthy community forests are more resilient. Cities gain from the environmental, social and economic benefits of urban trees and green spaces when it is part of overall planning and infrastructure.

Avoid Flooding & Degradation of Water Quality:

- ☉ The impermeable materials used for roads and

pavements mean that rain is not absorbed and remains on the surface, which results in flooding.

- ☉ High levels of surface water run-off are that rainwater washes pollutants away from the surfaces it falls onto, transporting them into watercourses.
- ☉ **Wildlife and Habitats:** Cities are considered to host a less diverse range of plants, animals and birds than nearby rural areas. However, green spaces within an urban area can be home to many of the same species that are more commonly associated with rural settings.

The urbanization is being witnessed in every corner of India which is needed to be planned according to the principles of environment for sustainable planning and management of urban cities. Thus, following urban Greening guidelines is important by various authorities at different levels for effective urban expansion.

Need for Urban Greening Guidelines

It is imperative to prepare Urban Greening Guidelines which will act as a model for States and cities particularly the state town planning departments, Urban Development Authorities and Urban local bodies who are responsible for managing them.

3

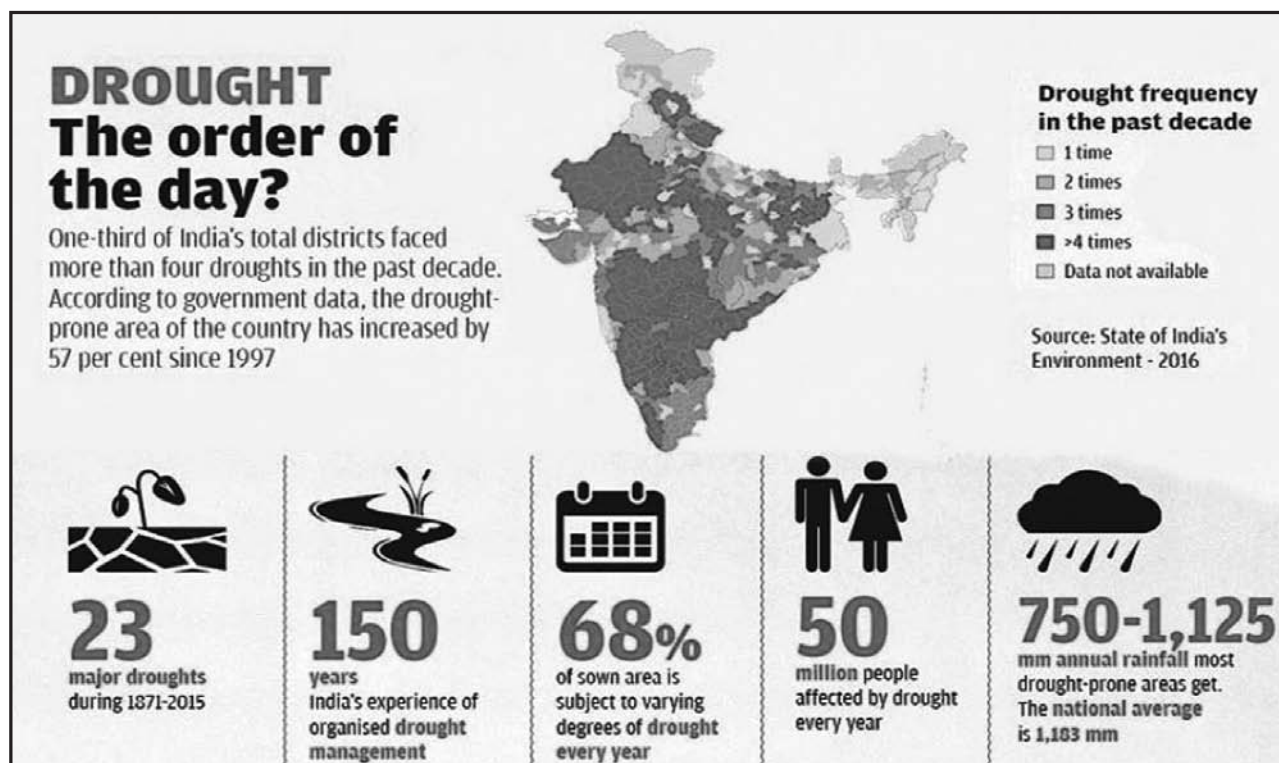
Desertification: 'Droughts reduced India's GDP by up to 5% in 20 Years

According to the **Drought in Numbers, 2022** report released at the **15th Conference of Parties (CoP15)**

to the **United Nations Convention to Combat Desertification (UNCCD)**, the frequency and duration of drought is increasing at an alarming rate across the world since the onset of the 21st century.

Background

- According to **Desertification and Land Degradation Atlas of India**, released by the **Space Applications Centre of the Indian Space Research Organisation**, some 97.85 million hectares (mha) — nearly 30 per cent of India's total geographical area (TGA) — underwent land degradation during 2018-19.
- In 2003-05, 94.53 mha (28.76% of the TGA) underwent land degradation. This number increased to 96.40 mha (29.32% of the TGA) in 2011-13.
- Some 83.69 mha underwent desertification in 2018-19.
- The level of desertification increased in 28 of 31 states and Union territories between 2011-13 and 2018-19.



- In eight states—Rajasthan, Delhi, Goa, Maharashtra, Jharkhand, Nagaland, Tripura, and Himachal Pradesh—around 40 to 70 per cent of land has undergone desertification.
- Around 23.79% of the area undergoing

desertification/land degradation in the country was contributed by **Rajasthan, Maharashtra, Gujarat, Karnataka, Ladakh, Jharkhand, Odisha, Madhya Pradesh and Telangana.**

What are the concerns for India?

- ◎ The assessment has featured India as one of the severely drought-impacted countries. Nearly two-thirds of the country suffered drought during 2020-2022.
- ◎ Geographically, India's drought vulnerability compares with that of sub-Saharan Africa.
- ◎ The effect of severe droughts was estimated to have reduced India's gross domestic product by 2-5 per cent over the 20 years from 1998 to 2017.
- ◎ India's drought-prone area has increased by 57 per cent since 1997.
- ◎ One-third of India's districts have faced more than four droughts over the past decade and 50 million people are affected by drought every year.
- ◎ Some 97.85 million hectares — nearly 30 per cent of the country's land — underwent land degradation during 2018-19.
- ◎ Drought impacts India's dominantly rainfed agriculture which accounts for 60 per cent of the sown area on average.

Steps Taken by Government of India to combat desertification

- ◎ **Integrated Watershed Management Programme:** It aims to restore ecological balance by harnessing, conserving, and developing degraded natural resources with the creation of Rural Employment. It is subsumed under **Pradhan Mantri Krishi Sinchai Yojana**.
- ◎ **UNCCD:** India became a signatory to the United Nations Convention to Combat Desertification (UNCCD) in 1994 and ratified in 1996.
- ◎ **National Afforestation Programme:** Implemented since 2000 for the afforestation of degraded forest lands.
- ◎ **National Action Programme to Combat Desertification:** It was prepared in 2001 to address issues of increasing desertification and to take appropriate actions.
- ◎ **Fodder and Feed Development Scheme:** Launched in 2010 to improve degraded grassland and also the vegetation cover of problematic soils like saline, acidic and heavy soil.

- ◎ **National Mission on Green India:** It is a part of the National Action Plan on Climate Change (NAPCC). It was approved in 2014 to protect, restore and enhance India's diminishing forest cover with a deadline of 10 years.

Land degradation and desertification is one of the major effects of climate change and in India it is being witnessed in its overall spatial extent. Thus, to combat desertification and land degradation, suitable policies and measures for protection and conservation is needed.

4

Budget 2023-24: Centre's Mangrove Restoration Scheme Stresses on its Scientific Implementation

Recently, the Budget 2023 announced a new program for mangrove plantations along the coastline and on saltpan lands called Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI) which experts have called an essential step in the fight against the climate crisis.

What is MISHTI?

- ◎ **Mangrove Initiative for Shoreline Habitats and Tangible Incomes:** It has been launched to protect India's mangroves along the coast and saltpan lands.
- ◎ **Mangrove Alliance for Climate:** The initiative follows India's steps of joining the Mangrove Alliance for Climate that was launched during COP 27 in Sharm-el-Sheikh in 2022.
- ◎ **Convergence of funds:** The scheme involves a convergence of funds available under the MNREGS, CAMPA funds and other sources.
- ◎ **Plantation of mangroves:** The scheme is expected to boost large scale plantation of mangroves and carbon and biodiversity offsets while attracting private resources towards mangrove conservation.
- ◎ **Livelihoods:** According to WWF-India, MISHTI has potential to generate and improve livelihood conditions through engagement of plantations, tourism and improved marine catch.
- ◎ **Climate change:** Experts have hailed the scheme as step towards combating the climate crisis

but have cautioned of the need for scientific implementation.

- **Budgetary allocation:** The Budget did not mention any specific allocations for the scheme although the Ministry of Forests, Environment and Climate Change was assigned ₹3079.40 crores.

Status of Mangroves in India

- According to the **Forest Survey Report 2021**, India has a total mangrove cover of 4,992 square kilometres and recorded an increase of 17 square km in mangrove cover relative to the previous assessment in 2019 with **Odisha, Maharashtra and Karnataka** having the most.
- Mangroves in India are home to **Royal Bengal tigers, Gangetic dolphins, estuarine crocodiles**, and numerous other aquatic bird and reptile species.

What is the status of mangrove restoration projects?

- **Low success rate:** Mangrove restoration initiatives, however, have had mixed results. Efforts in Sri Lanka to restore 1,000–1,200 acres of mangroves were only successful in 200–220 ha.
- **Low survival rate:** According to a 2017 study, the survival rate of the restoration project sites ranged from 0–78%.
- **Faulty selection of variety:** The failure of mangrove restoration operations was mostly due to the selection of the incorrect species for the incorrect site.
- **Unscientific farming:** Another reason for failure was the prevalence of unscientific farming practices.
- **Soil conditions:** According to a study on the Sri Lankan restoration project, mangrove seedlings should be planted at specific soil conditions or the results would be unfavourable.

Mangroves form an important part of coastal ecosystem which also helps in acting as a barrier during storm surge and cyclonic activities, thus their restoration through convergence of various funds will help in employment generation and conservation of coastal environment in India.

5

Enhanced Phytoplankton Bloom Triggered by Atmospheric High-pressure Systems Over the Northern Arabian Sea

A new study, entitled Ecosystem state change in the Arabian Sea shows that Algal Blooms in the Arabian sea will threaten the food chain system present over the region.

More on the news:

- According to the data from NASA's ocean color satellite, productivity of Noctiluca during the winter monsoon was also rising, contrary to what we expected.
- In 2009, with the help of NASA and the US government, the Indian Space Research Organization and India's Ministry of Earth Sciences, began examining the physiology of this organism more closely, and discovered that it was **thriving because the Arabian Sea was losing oxygen**.
- And since they are not a preferred food for higher trophic organisms, they mostly attract only salps, jellyfish and turtles, thereby **short-circuiting the food chain** in the Arabian Sea.
- At least 120 million people along these coasts are now at risk.

Climatic Conditions over Arabian Sea:

- **Conditions during winter:** During winter, the dry, cool air brought by prevailing northeasterly trade winds leads to surface ocean heat loss and convective mixing in the northern Arabian Sea.
- **Convective mixing:** The convective mixing process leads to the injection of nutrients up into the surface waters and exert a dominant control on winter productivity.
- **Role of Atmospheric High Pressure system:** Our findings suggest that the atmospheric high-pressure systems that traverse the northern Arabian Sea every winter and spring disrupt winter convective mixing and create an array of environmental conditions conducive to trigger phytoplankton blooms.

- ◎ **Stratification of Sea layers:** The arrival of an atmospheric high with the anti-cyclonic flow in the northern Arabia Sea sets the stage for a sequence of events culminating in intermittent mixed-layer re-stratification due to buoyancy gain aided by increased specific humidity, supplemented with abundant sunlight due to clear skies, and suppressed turbulent mixing owing to weak winds.
- ◎ **Significance of Euphotic zone:** These combined with the mixed layer that is shallower than the euphotic zone and the influx of nutrients into the euphotic zone brought by convective mixing between the calm periods, caused unprecedented high concentrations of chlorophyll in the northern Arabian Sea.

Linkage between global warming and algal blooms:

- ◎ **Increase in temperature:** According to the study, global warming has exerted a disproportionately strong influence on the Eurasian land surface, causing a steady decline in snow cover [in the Himalayas].
- ◎ **Winter convective mixing:** This has disrupted “winter convective mixing” which occurs when cold winter winds blow over the Arabian Sea, driving the surface waters down, which are in turn replaced by nutrient rich waters from below.
- ◎ **Covering of large area of sea:** That process allows photosynthetic phytoplankton - the basic building block of our ocean food chain to thrive, along with all the fish species that eventually result in the seafood bounty so many of us rely on.

General reason behind the phytoplankton boom

- ◎ **Increase in nutrient availability:** The primary cause of phytoplankton blooms is an increase in nutrient availability, particularly nitrogen and phosphorus.
- ◎ These nutrients can come from a variety of sources, including agricultural runoff, wastewater discharge, and atmospheric deposition. When there is an abundance of nutrients in the water, phytoplankton can grow and reproduce rapidly, resulting in a bloom.
- ◎ **Warmer sea surface temperatures:** Warm water temperatures, high light levels, and calm water

conditions can all contribute to phytoplankton blooms by allowing phytoplankton to stay near the surface and access the light they need for photosynthesis.

- ◎ **Climate change:** It can also disrupt ocean circulation, affecting mixing between ocean layers and how nutrients move around the ocean.
- ◎ **Human development** also plays a role. Fertilizer runoff from agriculture can increase nutrient loads in the ocean, leading to blooms.

Impacts of Phytoplankton bloom:

- ◎ Phytoplankton blooms can have both positive and negative impacts on the environment.
- ◎ In some cases, they can **support the growth of other organisms in the food chain and improve water quality** by absorbing excess nutrients.
- ◎ However, in other cases, blooms **can deplete oxygen levels in the water**, leading to **fish kills** and other negative impacts on aquatic life.
- ◎ Some phytoplankton species can also **produce toxins that can harm human health and the health of other animals** that consume them.

Phytoplankton forms a basic part of the food chain present at lowest trophic levels but very important in sustaining the other fauna present in higher trophic levels, thus algal bloom occurring in the Arabian sea region will not only impact the regional biodiversity but the marine economic system present in the region.

6

Heat Waves in India: Causes and Impact

There is an ongoing heatwave in India that has forced millions of people indoors to look out for possible solution to overcome the effect of rising temperature. The driving up temperatures beyond normal in **north, west, central and east India** in the month of **March and April** is a cause of concern for India.

- ◎ IMD has said that **April was the hottest** in northwest India in 122 years.

Understanding the geographical aspect of heatwave

- ◎ One of the causes of these extreme heat waves has been the unusual **north-westerly winds**.

- ⦿ These anomalous north-westerlies overpowered the moist southerly winds that typically come off the water and kept pre-monsoon showers offshore.
- ⦿ This deviation from normal wind trends allows hot air from desert areas to the northwest to spread over much of the country.
- ⦿ Heat waves form when high pressure aloft in around 3,000–7,600 metres above the region and remains over a region **for several days** up or
- ⦿ This is common in summer, both in **Northern and Southern** Hemisphere as the jet stream **‘follows the sun’**. On the equator side of the jet stream, in the upper layers of the atmosphere, is the high pressure area.
- ⦿ During summer, weather patterns are generally slower to change than in winter. As a result, this upper level high pressure also moves slowly.
- ⦿ Under high pressure, the air subsides (sinks) toward the surface, warming and drying adiabatically, inhibiting convection and preventing the formation of clouds.
- ⦿ Reduction of clouds increases shortwave radiation reaching the surface.
- ⦿ A low pressure at the surface leads to surface wind from lower latitudes that bring warm air, enhancing the warming.

- ⦿ Alternatively, the surface winds could blow from the hot continental interior towards the coastal zone, leading to heat waves there causing adiabatic warming.

What are the favourable conditions of heat wave formation?

- ⦿ **Transportation / Prevalence of hot dry air over a region:** There should be a region of warm dry air and appropriate flow pattern for transporting hot air over the region.
- ⦿ **Absence of moisture in the upper atmosphere:** As the presence of moisture restricts the temperature rise.
- ⦿ **The sky should be practically cloudless:** To allow maximum insulation over the region.
- ⦿ **Large amplitude anti-cyclonic flow** over the area.

India is experiencing the increased intensity of heat waves in the spatial extent and having various impacts detrimental to human health, agricultural crop, biodiversity, increase in power consumption, etc. Thus, management of heatwave conditions in the times of climate change through incorporation of Bio-house methods, climate smart housings, etc. to overcome its effects in a sustainable manner.



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INDIAN SOCIETY

Role of Women and RPH □ UDL DNR

Topic of This Chapter

1	Increasing Cases of Gender based Violence in India
2	Hybrid Work Model and Women Empowerment
3	Legal Marriage Age for Women in India
4	Marital rape
5	Call for Gender-Transformative Policies in Water Domain
6	Policy Blind Spot: Issues of Women Migrants
7	Need to End the Evil of Dowry
8	Political Participation of Women
9	Indian Women and Innovation
10	Women Constitute One-third of Internet Users in India
11	Women's Right to Property
12	Lives of Indian Women Prisoners
13	SC Bans 'Two-finger Test' of Rape Victims
14	The Ripple Effect of Gender Inclusivity on India's Economy
15	Analysing Indian Inequality from a Gender Lens
16	Medical Termination of Pregnancy Act, 2021
17	Menstrual Hygiene: A Challenging Development Issue
18	Gender Discrimination in the Corporate Sector

1

Increasing Cases of Gender based Violence in India

Cases of violence against women are on the rise in India. Spine-chilling incidents of heinous violence against women (Shraddha Walkar, Nikki Yadav) make the entire nation reflect on its deep-rooted belief systems.

The Numbers:

- ◎ The **National Crime Records Bureau** in its *Crimes in India Report 2019* has recorded a 7.3% increase in crimes against women when compared to 2018.
- ◎ Under the report 30.9% cases recorded were of **domestic violence** and 7.9% were of **rape**.
- ◎ It indicates that amongst the crime rate per lakh of women population, **33.2%** of women have faced by **physical/sexual intimate and non-intimate partner violence**.
- ◎ **1 in every 3 women** is a victim of Gender-based violence (GBV).

What are the factors contributing to GBV?

- ◎ **Patriarchy:** A patriarchal social structure emphasizes male dominance and control over women and perpetuates gender stereotypes.
- ◎ **Societal Stereotypes:** Cultural norms promote that men are dominant and aggressive in nature, while women are docile, subservient, and are dependent on men.
- ◎ **Low socioeconomic status:** Less financial independence makes women vulnerable to violence.
- ◎ **Psychiatric Morbidity:** Regular consumption of alcohol by the husband is key factor for GBV.
- ◎ **Lack of Education and Awareness**
- ◎ **Judicial Barriers:** Indian judiciary is overburden with plethora of cases. Consequently, Judiciary cannot act swiftly on the gender based violence cases.

Measures to stop gender-based violence

- ◎ **Empowering Women** through education,

economic opportunities, and leadership positions can help to address gender inequality and prevent violence.

- ◎ **Challenging patriarchal social norms** that contribute to violence can help to change the broader culture.
- ◎ **Capacity building of law enforcement Agency** to handle cases of violence.
- ◎ **Providing Support Services** such as counseling, legal assistance, and safe shelter for victims of violence.

2

Hybrid Work Model and Women Empowerment

The Covid pandemic has ushered in wide-ranging changes to the workplace, including hybrid work culture (a combination of 'remote' and 'in-person' working). While this concept is still at a nascent stage, a new study has revealed the impact of the hybrid working model on the lives of working women.

Opportunities for women empowerment:

- ◎ **Flexibility:** Hybrid model offers women the ability to be close to their homes and families without losing their professional career.
- ◎ **Greater opportunities:** It dilutes the barriers of location and geography thus empowering women with more choices and opportunities than before.
- ◎ **Safety and security:** Staying in home does away with the need to commute thus making women safer.
- ◎ **Diluting the gender division of labour:** Traditionally there has been a division of labour based on gender with women taking greater role in the household activities and men assuming the role of breadwinner.

Challenges:

- ◎ **Increased domestic responsibilities**
- ◎ **Gaps in technological skills**
- ◎ **Reduced recognition** of women at workplaces potentially thus reducing their career progression and empowerment.

Legal Marriage Age for Women in India

There are rising voices to raise the legal age of marriage for women from 18 to 21 years — the same as men.

What are the reasons for early age marriages?

- ⊙ **Socio-cultural factors:** The custom of under-age marriage originates from socio-cultural practices with patrilineal households desiring to assimilate women from other families into their households. Early marriage seems preferable due to:
 - **Religious affair:** Religious scriptures like **Dharmasutras and Smritis** warned of the consequences for parents who failed to marry their daughters soon after menarche.
 - **Sexual and physiological development:** Patriarchal societies reflect the social roles expected of girls, and also the timing of sexual and physiological development.
- ⊙ **Economic factor**

UN Report

- ⊙ According to a **2017 United Nations report**, as many as 27 percent of Indian girls were married before they turned 18.

Status and Decadal Trends of Child Marriage in India (2020)

- ⊙ There are 17.26 million married children and adolescents within the age group of 10-19 years in India.
- ⊙ Girls between 10-19 years of age account for 75 per cent of all the married children in India.

Impact

- ⊙ **Mortality:** These vulnerabilities also result in higher risks of mortality among the children of younger mothers. Many of these pregnancy- and childbirth-related morbidities carry a risk of death.
- ⊙ **Childhood stunting and underweight**

- ⊙ **Impact on overall childhood of girls**
- ⊙ **Lack of education and empowerment**
- ⊙ **Low Social Status**
- ⊙ **Less awareness about rights**

4 Marital rape

The topic of marital rape continues to spark debates in the Indian society.

Why it is an issue?

- ⊙ **Colonial legacy:** Non-criminalising status of marital rape emanates from British rule.
- ⊙ **Violation of Right to Equality:** Article 14 of the constitution provides Right to equality, but the exception **2 to the section 375 of the IPC** creates two different classes of women on the basis of marital status of the women.
- ⊙ **Violation of Article 21:** Protection of life and personal liberty includes right to life with dignity, right to health, right to privacy and right to safe environment etc., which gets violated.

Judicial interpretations

- ⊙ **State of Kerala v/s Krishnappa:** Under this verdict Supreme Court held that sexual violence apart from being a dehumanizing act is unlawful intrusion of the right to privacy and sanctity of a female.
- ⊙ **Suchita Srivastava v/s Chandigarh Administration:** SC under this verdict equated **right to make choices related to sexual activity with the right to privacy, liberty, dignity and bodily integrity under Article 21.**
- ⊙ **Justice Puttuswami v/s Union of India:** SC recognized **right to privacy as the fundamental right to all the citizen.** Right to Privacy includes decisional privacy of intimate relations.
- ⊙ **Justice Verma Committee** recommended to **include marital rape under IPC**, in light of India's obligations under the Convention on the Elimination of All Forms of Discrimination Against Women.

How is Marital Rape treated around the World?

- ⦿ Countries that have Criminalised Marital Rape: United States and United Kingdom
- ⦿ Countries that have not Criminalised Marital Rape: Ghana, India, Indonesia, Jordan, Lesotho, Nigeria, Oman, Singapore, Sri Lanka and Tanzania haven't expressly criminalised marital.

5

Call for Gender-Transformative Policies in Water Domain

Achieving gender equality in the water sector would be essential to reaching both the fifth Sustainable Development Goal on gender equality and the sixth one on water and sanitation.

The issue: Women play a central part in the provision, management and safeguarding of water, yet they make up less than 17% of the total paid workforce in the water sector and an even smaller minority in research and decision-making positions.

Link between Gender and Water:

- ⦿ Gender defines the roles, responsibilities and opportunities of people in society, and very often, determines the potential they can achieve.
- ⦿ Women and girls are disproportionately affected by the lack of access to essential water, sanitation and hygiene facilities and are largely responsible for household water, sanitation and hygiene management.
- ⦿ Women and girls are responsible for fetching water in most households where a drinking water source is off-premises.

6

Policy Blind Spot: Issues of Women Migrants

An estimated one billion people around the world are migrants – one in every seven people.

But as policymakers scramble to understand how these mass movements affect societies, economies, security and sustainability, the needs of women and girls are falling through the cracks.

What issues are faced by women migrants?

- ⦿ Loss of jobs and resources
- ⦿ Burden of Unpaid labour
- ⦿ Non-inclusion in Governmental schemes
- ⦿ Alarming low and unfavourable sex ratios
- ⦿ Sexual Harassment at Workplace

Recognizing that women migrants have a right to equal access to employment, adequate income and social protection is primarily needed. We need to enhance vocational training programs to improve employability of women migrants and their access to support services.

7

Need to End the Evil of Dowry

Dowry is a malevolent practice which continues to mar Indian society years after the implementation of the Dowry Prohibition Act (1961).

The year 2021 saw a 31% increase in the cases of the Dowry Prohibition Act as opposed to the year 2020, as recorded by the **National Crime Records Bureau (NCRB)**.

Challenges in ending dowry system

- ⦿ **Socio-Economic challenges-**
 - Subordinate status of women vis-à-vis men
 - Social and Economic dependency of women on men.
 - Peer pressure on bride's family to spend higher to marry a better educated groom.
- ⦿ **Legal challenges-**
 - Delayed and denied justice
 - Poor conviction rate
 - Misuse of anti-dowry laws by women

8

Political Participation of Women

Despite the share of women legislators in the Lok Sabha peaking at 15.03% as of April 2022, India is

still worse than 140 countries in the representation of women in Parliament.

Case studies:

- ⊙ The global average for the share of women parliamentarians stood at 24.6%.
- ⊙ Rwanda has the highest proportion of women in Parliament (over 60%).
- ⊙ South Asia has had the largest number of women heads of state — including **Sirimavo Bandaranaike, Chandrika Kumaratunga, Indira Gandhi, Khaleda Zia, Sheikh Hasina, and Benazir Bhutto** — of any region in the world till recently.

Why we need more women in politics?

- ⊙ **Reflecting the overall sex ratio-** For a country whose sex ratio is tilted towards women (NFHS-5), it cannot cater to the majority of its population if the ratio in Parliament is not the same.
- ⊙ **Women centric policies-** More women in Parliament would mean more women-centric issues could be raised.
- ⊙ **Doing away with the discriminatory laws-** A broad representation of women in politics would allow the reformation of discriminatory laws against the gender too.
- ⊙ **Increased reporting of crimes-** It is observed that women are willing to report crime in villages with female representation in the council.

9

Indian Women and Innovation

The recent appointment of a woman scientist (Dr. N Kalaiselvi) as the director general of the **Council of Scientific and Industrial Research (CSIR)** for the first time in the history of the 80-year-old R&D organization brings to the fore the continuing challenges in getting more women into the country's science and research endeavours.

Women in Science:

- ⊙ **28% of participants in Research & Development projects in 2018-19** were women, up from 13%

in 2000-01, as per Department of Science and Technology (DST)

- ⊙ Nearly **43 percent of the total graduates in Science, Technology, Engineering, and Mathematics (STEM)** are women, which is considerably higher than in developed nations like the US (34 percent), UK (38 percent), Germany (27 percent), and France (32 percent).
- ⊙ According to the **All-India Survey on Higher Education (AISHE)** 2019, 53% participation of women in science education at the Bachelor's and 55% at the Master's levels respectively.

Government Initiatives Taken for Women in Science:

- ⊙ **Gender Advancement for Transforming Institutions (GATI)**
- ⊙ **Vigyan Jyoti Scheme**
- ⊙ **Indo-US Fellowship for Women in STEMM (WISTEMM) program**
- ⊙ **Consolidation of University Research for Innovation and Excellence in Women Universities (CURIE) Programme**
- ⊙ **Knowledge Involvement in Research Advancement through Nurturing (KIRAN)**

10

Women Constitute One-third of Internet Users in India

In a report "India Inequality Report 2022: Digital Divide", released by an NGO called Oxfam India, it has been found that **Women constitute one-third of Internet users in India.**

India ranked 105 out of 193 nations in the **UN's e-participation index (2022).**

Why women has poor access to mobile phones and internet:

- ⊙ **Poverty:** Women, particularly those from low-income households, may face financial constraints that make it difficult for them to afford mobile phones and the associated costs of data plans and services.

- ⦿ **Gender norms and cultural barriers:** In some cultures, women may be discouraged or prevented from owning mobile phones due to traditional gender roles, patriarchal norms, or concerns about perceived impropriety or loss of control.
- ⦿ **Digital literacy and skills gap:** Women may face a digital literacy gap. Unequal access to education, limited exposure to technology, and societal biases that discourage girls' engagement with technology can contribute to this gap.
- ⦿ **Technical barriers:** Physical access to mobile phones can be limited in certain regions, particularly in rural areas with inadequate infrastructure and connectivity.
- ⦿ **Safety concerns:** Women may face safety and security concerns when using mobile phones, particularly in contexts where harassment, stalking, and privacy violations are prevalent.

Emancipation of Women- Digital India Initiatives:

- ⦿ **Wireless Women for Entrepreneurship and Empowerment (W2E2):**
- ⦿ **Internet Saathi:**
- ⦿ **National e-Governance Plan:**
- ⦿ **Sanchar Kranti Yojna (SKY)-Chhattisgarh:**

11 Women's Right to Property

A close analysis of India's land laws and their implementation reveals the gaps that must be addressed in order to ensure women's land rights.

Women's property rights in India

A woman's property rights in the country vary as per the religion she follows.

- ⦿ **Hindu Succession Act:** The Hindu Succession Act, 1956 includes the succession and inheritance rights for **Hindus, Jains, Sikhs, Buddhists and Jains**. The act was amended in the year 2005 to remove gender discrimination from the **Hindu Succession Act, 1956**. Under this amendment, **daughters have the same rights as that of the son**.
- ⦿ Muslim women are entitled to 1/8th share of her husband and 1/4th if the couple has children.

What's the issue?

In India, land ownership is highly skewed in favour of men, with women constituting **barely 14 per cent of all landowners in India**.

Why secure land rights are important?

Secure land rights for women and girls are linked to

- ⦿ increased women's leadership and autonomy
- ⦿ enhanced economic opportunities
- ⦿ better social security, safety and dignified societal standing
- ⦿ thriving and resilient households and communities with improved incomes
- ⦿ better child nutrition, greater educational attainment for girls, enhanced women's agency
- ⦿ more sustainable use of natural resources

12

Lives of Indian Women Prisoners

Issues faced by women prisoners

Women prisoners in India face various issues and challenges within the prison system. Some of the key issues include:

Lack of sensitivity towards women

Of the 1,350 prisons in India, just 31 are reserved for women, and only 15 states and union territories have separate women's jails.

- ⦿ **Overcrowding and poor living conditions** exacerbates issues related to hygiene, health, and personal safety.
- ⦿ **Lack of gender-sensitive facilities:** This includes insufficient sanitary facilities, limited access to reproductive healthcare, and a lack of separate accommodation for women with children.
- ⦿ **Violence and abuse** from both prison staff and fellow inmates. Instances of sexual harassment, physical abuse, and exploitation have been reported.
- ⦿ **Limited access to legal aid**
- ⦿ **Inadequate healthcare services**

- ⦿ **Separation from families and children** leads to emotional distress and long-term psychological effects on both the women and their children.
- ⦿ **Reintegration and stigma:** After serving their sentences, women prisoners face difficulties in reintegrating into society due to the social stigma associated with incarceration.

Provisions for women

- ⦿ **Family Courts Act (1984)** provides for establishment of Family Courts for speedy settlement of family disputes.
- ⦿ **Indian Penal Code (1860)** contains provisions to protect Indian women from dowry death, rape, kidnapping, cruelty and other offences.
- ⦿ **Code of Criminal Procedure (1973)** has safeguards for women like obligation of a person to maintain his wife, arrest of woman by female police and so on.

Ways to help women prisoners

- ⦿ **Liberal Bail regime:** Bail is granted as it protects the right to life and liberty enshrined under Article 21 of the Indian Constitution. SC in various judgements have claimed the bail as right of the citizen.
- ⦿ **Special Fast track court** to resolve the women cases on the faster note.
- ⦿ **Open prisons for women** to reduce the psychological pressure.

13

SC Bans 'Two-finger Test' of Rape Victims

The Supreme Court imposed a ban on the two-finger test in a rape case, a move that will change the historical trajectory of rape convictions in India.

Patriarchal norms in the society for medical examinations of Rape Victims:

- ⦿ **The Indian Evidence Act:** In terms of **Section 53A** in the **Indian Evidence Act**, the evidence of a victim's character or her previous sexual experience with any person shall not be relevant to the issue of consent or the quality of consent in the prosecution of sexual offenses.

- ⦿ **Determining the Virginity of a Woman:** Determining a women's virginity as evidence against the character of the woman is a patriarchal norm and a societal barrier for Women.

Union Health Ministry's Guidelines on 'two-finger test'

- ⦿ The **Union Health Ministry** released a document titled 'GUIDELINES & PROTOCOLS Medico-legal care for survivors/victims of sexual violence' in 2014.
- ⦿ On the two-finger test, the guideline states, "**Per-Vaginum examination commonly referred to by lay persons as 'two-finger test', must not be conducted for establishing rape/sexual violence and the size of the vaginal introitus [opening] has no bearing on a case of sexual violence. Per vaginum examination can be done only in adult women when medically indicated.**"
- ⦿ However, these guidelines are not legally binding.

14

The Ripple Effect of Gender Inclusivity on India's Economy

Archaic age-old practices that promote gender segregation at an early age make it increasingly difficult for women to enter the workforce.

Understanding inclusive growth and gender equality

- ⦿ **Inclusive growth** means economic growth that creates jobs and helps reduce poverty.
- ⦿ **Gender equality** demands the empowerment of women, with a focus on identifying and redressing power imbalances and giving women more autonomy to manage their own lives.

When women are empowered, the whole family benefit, thus benefiting the society as a whole and these benefits often have a ripple effect on future generations.

Impact of gender diversity on employee productivity

- ⦿ 30% of the employees did not interact with the opposite gender outside of their family, while in school.

- More than 30% of the surveyed call centre employees were from rural areas.
- It was not expensive for firms to integrate women into all-male workplaces.

How to bring women into the paid workforce?

- Increase reach of employment:** There is need to increase reach of employment and providing special incentives to firms to hire women.
- Fiscal stimulus:** There is need to provide fiscal stimulus to boost labour demand in India's economy to promote inclusion of women.
- Incentivizing firm to hire women:** Policies which incentivise firms to hire women can bring them into the paid workforce.
- Gender-positive recovery policies**

15

Analysing Indian Inequality from a Gender Lens

World Inequality Report 2022 highlighted the grave gender inequality in India, which is further accelerated by the COVID-19 pandemic.

Inequality Report 2022 (Findings)

- Women represent about 50 percent of the

population, they earn only about one-third of the labour income for it.

- WEF's Global Gender Gap Report 2021** placed India amongst countries with the largest Gender Gaps in Economic participation and opportunity. **Female Labour Force Participation Rate (LFPR)** has declined from 27 % in 2010 to 22 % in 2020.

Gender inequality is the presence of inequality between male and females in the economic sector which is caused by various economic and non-economic factors.

Recent Findings regarding gender inequality-

- More time spent on unpaid work:** As per reports, women spend almost twice as much time providing unpaid care work such as cleaning, cooking, providing care to the elderly, fetching water, childcare, etc.
- Labour Market scarring-** It is a concept used by 'Global Gender Gap Report 2021' in which temporary limitation of in-person work has caused permanent and long-lasting effects on women's chances at decent employment in future.
- "State of Working India" report-** According to the report, the imposition of lockdowns has disproportionately affected the feminised sectors, such as the care economy and the gig economy.

CHALLENGES IN BRIDGING GENDER INEQUALITY

SOCIAL CHALLENGES	ECONOMIC CHALLENGES	POLITICAL REASONS
<ul style="list-style-type: none"> Gendered differentiation of labour makes it harder for women to enter and remain in the labour market. The conundrum of unpaid care work is only increasing, resulting time poverty Women are, thus, under the "double burden" of performing paid and unpaid labour. 	<ul style="list-style-type: none"> Most women are offered work in the informal sector, which categorically provides no protection of labour laws, or social benefits like pension, paid sick leave, maternity leave. Harassment and violence at public spaces 	<ul style="list-style-type: none"> Lack of political intention in bridging gender inequality. Lack of regular evaluation of laws, rules and schemes. Less awareness among women about government schemes and measures.

Though various steps have been taken and some progress has been made, many more steps are needed in this direction. Few steps can be-

- Social security mechanism-** There is a need to enhance the social security mechanisms for informal workers with a special focus on women.

- ◎ **Skilling and reskilling-** for 'hard professions' and adopting a 'care lens' is essential for defeminising care work and would contribute to redistributing it equally amongst family members irrespective of their gender.
- ◎ **Political steps-** It is also important to create gender sensitive fiscal policies and educate the masses about the criticality of rising inequalities and formulate a framework of labour laws to sustain in the neoliberal world.
- ◎ **Increasing awareness** about laws, regulations and government schemes so that effective utilisation of policies can be done.

16

Medical Termination of Pregnancy Act, 2021

Women in India are still unaware of abortion as a '**medical right**'. In a recent study to understand the level of awareness of the **Medical Termination of Pregnancy (MTP) Act, 2021**, it has been revealed that 95.5% of women are unaware of the MTP Act 2021, which opens the window for safe abortion services.

Assessing the cases of 'abortions' in India

- ◎ Around 15.6 million **abortions** take place in **India** every year, but most of these are expected to be unsafe.
- ◎ As per the **National Health and Family Survey (2015-16)**, only 53% of abortions are performed by a registered medical doctor and the balance is conducted by a nurse, auxiliary nurse midwife (ANMs), dai, family member, or self.
- ◎ **Unsafe abortion** is the third largest cause of maternal mortality in India.
- ◎ Debate around Abortion laws in India rely essentially on
 - Deciding after what point of pregnancy does life begins in the foetus?
 - At what point does the foetus' life become important and it becomes the state's responsibility for its protection?

17

Menstrual Hygiene: A Challenging Development Issue

A woman's menstrual health is crucial to her well-being and also to the well-being of her family and community. But too often especially in the developing world mind-sets, customs and institutional biases prevent women from getting the menstrual health care they need. Menstrual hygiene continues to be amongst the most challenging development issues today.

Impacts due to inadequate menstrual hygiene management (MHM)

- ◎ **Low status:** A recent World Bank Group (WBG) study illustrated how a disregard of menstrual hygiene **needs serves to entrench the lower status of women and girls.**
- ◎ **Restrictions on their self-expressions:** It brings with it rules, restrictions, isolation and changed expectations from the girls by the society.
- ◎ **Economic cost:** A growing body of evidence shows that girls' inability to manage their menstrual hygiene in schools, **results in school absenteeism**, which in turn, has **severe economic costs on their lives and on the country.**

Steps taken by government and civil society to address the problem

- ◎ Ministry of Drinking Water and Sanitation issued the **Menstrual Hygiene Management Guideline** to support all adolescent girls and women.
- ◎ **Menstrual Hygiene for Adolescent girls Schemes** is supported by Government of India under which, **funds are provided to States/UTs through National Health Mission** for decentralized procurement of sanitary napkins packs.

18

Gender Discrimination in the Corporate Sector

The persistent **gender pay-gap** is one of the harsh realities of the 21st century and has been a grave concern worldwide for over a century now. Although industrialised nations have this problem too, but, in

case of countries like India, the gender wage disparity is far more worrisome.

Data on gender disparity:

- ⦿ India was at the 135th position globally (among 146 countries) as per the **gender parity ranking** put out by the **World Economic Forum (WEF)**. India was only 11 ranks above Taliban-ruled Afghanistan, where women are prohibited from attending schools.
- ⦿ **Economic Participation and Opportunity:**
 - The Periodic Labour Force Survey's 2020-21 annual report says that labour force participation rate among Indian women is just 23.15 per cent, in contrast to 57.75 per cent in men.
 - According to **NFHS 2019-21**, 25.2 per cent of the women surveyed were employed, while 74.8 per cent of the surveyed men had a job at that point.

Reasons for the discrimination:

- ⦿ **General factors:** Most of the women (about 94%) work in unorganized sector where the wages tend to be very low. Lack of knowledge, awareness and illiteracy among the rural women who make the majority of the female workforce.
- ⦿ **Societal factors:** Patriarchal mindset and deep-seated patriarchy which seeks to confine women

to the domestic sphere and the four walls of the household only.

- ⦿ **Other factors:** Religion, history, media, socialisation process, etc. are also responsible for perpetuation of discriminating mindset against women.

How to improve the situation?

Policy intervention:

- ⦿ Better implementation of **Companies Act, 2013** to bring in more independent women corporates on board and increasing their strength with time to 35%.
- ⦿ Better implementation of laws like **Sexual Harassment at Workplace (prevention, prohibition and redressal) Act, 2013** for maintaining a safe environment for women to work in.

By Challenging social attitude:

- ⦿ The attitudinal issue associated with patriarchy can only be tackled with the socialisation process in which education plays a major role.
- ⦿ Increasing participation levels of women in the various arenas, like paid labour market activities which bridges the hiatus in the crucial sphere of economic involvement, is important for improving the overall status of women in society.



Social Empowerment

Topic of This Chapter

1	Symbolism of Inter Caste Marriages
2	Child Labour
3	Same-Sex Marriage
4	Paternity Leave
5	Internal Migrants
6	Elderly in India: Asset or Liability?
7	Manual Scavenging
8	Human Trafficking in India
9	Digital Divide in Education Sector
10	Drug abuse in India
11	Fight against Untouchability
12	Landslides in Pettimudi: Social Inequalities in Disasters
13	Begging in India: A Menace to the Society
14	Mental Health
15	Deaths by Suicide in India-An Emerging Societal Issue

1

Symbolism of Inter Caste Marriages

Dr Ambedkar's famous quote from **Annihilation of Caste**, wherein he stated that inter-caste marriages were "**the real remedy for breaking caste**", is often cited.

Consequences of inter-caste marriage on society

- ⊙ **Constant struggle:** The Dalit person marrying outside caste, say to an upper caste, finds himself or herself duelling between the struggle of their community, and the culture of their spouses and in-laws.
- ⊙ **Honour killing:** Rising incidences of 'honour killing' paint a stark picture of the present times.
- ⊙ **Continued suffering by children:** The **children of mixed-caste parents** also grow up amidst profound misunderstanding of their complicated backgrounds. They are often subjected to suffering from social elements.

How the society is changing?

- ⊙ **Modern education, industrialization, urbanization, Indian Constitution** has led Indian multi-cultural society to start giving less consideration to the 'caste'.
- ⊙ Growth of **dissociation between caste and hereditary occupations**.
- ⊙ All castes have been given importance in the socio-political field.
- ⊙ Indian society is inching towards tolerance.

2

Child Labour

As the world moves from global to more one-on-one trade deals, India's patchy record on child labour is likely to become an issue.

Factors for Child labour

- ⊙ **Poverty:** When families struggle to meet their basic needs and lack adequate income, children may be forced to work to supplement family income.

- ⊙ **Lack of Access to Education:** When children are denied to attend school or face barriers (high costs, long distances), they are more likely to engage in labor-intensive work.
- ⊙ **Poor Enforcement of Labor Laws:** When laws protecting children from exploitative work poorly enforced, employers may take advantage of vulnerable children, which leads to child labour.
- ⊙ **Demand for Cheap Labour:** There demand for cheap labour in various industries (agriculture, manufacturing, and informal sectors), creates opportunities for child labour.
- ⊙ **Lack of awareness** of the negative consequences of child labor on children's health, education, and overall well-being.

Data

Child labour in 5-17 age group is highest in India (5.8 million) - **ILO report titled 'Child Labour in South Asia'**.

Impact

- ⊙ Child labour not only **violates the rights of children** but also remains among the **worst forms of violence against them**.
- ⊙ It leads to **slavery and bondage, depriving millions of children of laughter, happy childhood and education**.

Way forward

- ⊙ **New Policy for Child Labour:** A lot of changes have been done since the child labour policy in 1986. But a further relook of all the laws and policies is urgently needed.
- ⊙ **Social Mobilisation:** Given that eradication of child labour is not an easy task, preventive strategies are more sustainable in the long run. The role of social mobilization and community participation is crucial.
- ⊙ **Role of Panchayats:** The panchayats can play a significant role in mitigating in child labour.
- ⊙ The government must act fast as only three years are remained to achieve the **Sustainable Development Goal 8.7** of eliminating all forms of **child labour by 2025**.

3 Same-Sex Marriage

Recently, the Supreme Court of India began hearing a series of petitions seeking solemnisation of same-sex marriage under the **Special Marriage Act**.

Supreme Court Judgements

- **In Navtej Singh Johar (2018) case:** In this landmark case SC decriminalised homosexuality by reading down Section 377 of the IPC. The SC held that the community is entitled to the benefit of equal citizenship and to the equal protection of the law.
- **K.S. Puttaswamy's (2017) case:** In this case, SC ruled that the fundamental right to privacy (including bodily autonomy, and sexual orientation) is intrinsic to life and liberty and thus integral to Article 21.

The **right to marry** is a component of right to life under art 21 of Constitution of India which says, "No person shall be deprived of his life and personal liberty except according to procedure established by law".

Way Forward

- **Awareness:** Large scale awareness campaigns are required to o promote acceptance and understanding of heterosexuality in the society.
- **Fulfilling international commitment:** India is a signatory to various international human rights treaties and conventions, which directs India to safeguard the right of every individual including the LGBTQ+ community.
- **Legal changes:** The **Special Marriage Act** should be amended to grant same-sex couples the same legal rights and privileges as opposite-sex couples, including the ability to legally marry.

4 Paternity Leave

Companies including **Meesho**, **Twilio**, **Flipkart**, **Razorpay** and **Okcredit** have been taking the lead in terms of giving more time off to new fathers, sometimes as much as **30 weeks**.

Why Paternity Leave is Important?

- **For reducing Gender Gap in Labour Laws:** Gender defined roles in the society will be reduced and gender equality will be seen in labour laws in offices and workplaces.
- **Patriarchal Society:** Indian society continues to see men as the 'breadwinner' and women as the 'homemaker'. Hence, the culture of toxic masculinity that prevails in Indian society results in hesitancy and some amount of ridicule in doing what Indian men think is '**women's work**'.

Paternity Leave Policy Associated Benefits

- **Debunk the Patriarchy** – A proper rule or law for Paternity leaves will be the first steps towards achieving a more egalitarian view in society and debunking patriarchy.
- **Improve father's role in child's life:** Paternity leave can promote parent-child bonding, improve outcomes for children, and even increase gender equity at home.
- **Reducing burden on men:** The paternity benefit bill will bring great comfort to male employees across all sectors, the organised sector, the unorganized sector as well as the self-employed, reducing the percentile of unemployment.

Consequences

- **Dual Burden on Women:** The indirect implications are that women are supposed to not only juggle both work and home life but also return to home life for fulfilling the '**nurturing**' role.
- **Can lead to family conflicts:** Indian society is based on patriarchal norms and hence working fathers at home is seen as a bad thing for men.

5 Internal Migrants

India has the highest level of disaster displacement in South Asia in absolute terms and one of the World's highest.

Facts

- Around **3.6 million people a year** were displaced between **2008 and 2019**, most during monsoons.

- A recent study by **Action Aid and Climate Action Network South Asia** projects that even if the global community acts on their greenhouse gas (GHG) mitigation pledges and targets, about 37.5 million people will still be displaced by 2030 and an estimated 62.9 million by 2050 within the five South Asian countries.

CASE STUDIES:

The Joshimath landslide:

- Though the town of Joshimath has been witnessing cracks emerging for the past two decades, things have escalated over the last few days.
- There is always a **risk of landslide** in Joshimath. Due to this, every year, people of Joshimath notice cracks in their buildings and fields.

Issues faced by migrant workers:

- **Economic Challenges:** Internal migrants may face difficulties in finding employment opportunities that match their skills and qualifications in their new location.
- **Housing and Living Conditions:** Internal migrants often encounter challenges in securing affordable and adequate housing in their destination cities or regions. They may have to live in informal settlements, slums, or overcrowded accommodations with inadequate sanitation
- **Education and Healthcare:** Internal migrant children often face challenges in accessing quality education due to administrative barriers, lack of proper documentation, language barriers, and a disrupted academic journey.
- **Exploitation of workers: Illiterate and Under-skilled Migrants** are not only unfit for most jobs, because of a lack of basic knowledge and life skills but are also prone to the victimization of **exploitation, trafficking, psychological abuse.**
- **Political exclusion:** The political class ignores them because they don't count as votes, especially in the case of inter-state migrants.

Impact

- **Demographic Profile:** Migration in large numbers can alter demographic profiles of communities, as most of the young men move out, leaving only the women and elderly to work on the land.
- **Pressure on Natural resources: Population Explosion and the Influx** of workers in the place of destination increases competition for the job, houses, school facilities etc. and a large population puts too much pressure on natural resources, amenities, and services.
- **Increased Slum:** Mass Migration results into an increase in slum areas, compromising quality of infrastructure and life at the destination, which further translates into many other problems such as unhygienic conditions, crime, pollution, etc.

Way forward

- **Access to Basic Services:** Efforts should be made to improve access to essential services like education and healthcare for internal migrants by establishing migrant-friendly schools and ensuring healthcare facilities are accessible and affordable.
- **Skill Development:** Governments and organizations should invest in skill development programs tailored to the needs of internal migrants.
- **Data Collection:** Collecting comprehensive data on internal migration patterns, socio-economic conditions, and challenges faced by migrants is crucial for evidence-based policymaking.

6

Elderly in India: Asset or Liability?

The data from the **NFHS-5** shows that **Life expectancy in India** has increased from **50 (1970-75) to 70 years (2014-18)**. Thus, there is a need to **relook at problems** of the elderly, and their contribution to the society.

Challenges in utilising the full potential of elderly

- **Economic problems-** It includes problems such as loss of employment, income deficiency and economic insecurity.

- ⦿ **Psychological problems-** It includes problems related with their psychological and social maladjustment as well as the problem of elder abuse.
- ⦿ **Physical and physiological problems-** It includes health and medical problems, nutritional deficiency, and the problem of adequate housing etc.
- ⦿ **Poor Health infrastructure-** The challenge is to provide a quality, affordable and accessible health care facility. They need at home services like tele or home counselling, physiotherapy and rehabilitation services as well as mental health counselling.
- ⦿ **Change in social value system-** The changing institution of family, rise in nuclear families has made them more vulnerable, dependent on themselves and government.

Suggestive measures

- ⦿ **Strengthened pension system** through better funding and coverage.
- ⦿ **Holistic health infrastructure-** Affordable and accessible health care with special health facilities for elderly at district level.
- ⦿ **Inclusion in economic development-** There can be increase in retirement age based of performance and willingness can make them economically dependent and productive.
- ⦿ **Social inclusion:** Social inclusion through recognising their contribution in their respective fields and the society in general, can result in moral boosting and psychological **benefits to** the elderly.
- ⦿ **Awareness:** Increasing awareness about laws, regulations and government schemes.

7 Manual Scavenging

As per data, there were **1,870 sewer deaths reported in India from 1993- 2019** with maximum sewer death occurring in Tamil Nadu.

Civil Society/other Initiatives

- ⦿ **Safai Karmachari Andolan (SKA), 1995**, currently spearheaded by **Wilson Bezwada**, is a nationwide movement to completely eradicate

the caste-based occupation, and rallies for the rehabilitation of scavengers towards dignified livelihoods.

- ⦿ In 2002, **Rashtriya Garima Abhiyan**—a coalition of 30 community based organizations from 13 states—started a campaign to encourage manual scavengers to voluntarily leave the practice.

Key Recommendations of NHRC

- ⦿ **Broaden the definition of manual scavenging** to cover other types of hazardous cleaning or enact a new law for it. A penal section may be put in law to prevent the discrimination and harassment faced by the children of manual scavengers and women manual scavengers.
- ⦿ **Compensation:** The amount of compensation paid as one-time financial assistance for renewal of equipment suppliers can be added to Rs. 40,000 /- to Rs. 1 Lakh.
- ⦿ **Be sure to remove the role of intermediaries** by making arrangements such as direct transfer of benefits or in collaboration with NGOs.
- ⦿ **The Union Treasury may set up a National Bank** so that each State can take the responsibility of extending the loan to Manual Scavengers and their sponsors up to Rs.10.00 lakhs to do business.
- ⦿ **Any individual or group insurance** must be provided to Manual Scavengers and the advance payment will be paid by the Local Bodies concerned.
- ⦿ **The National Safai Karamcharis Finance and Development Corporation (NSKFDC)** can provide financial assistance to hand guards to help them get started in the field of sanitation and training for them.

8 Human Trafficking in India

Human trafficking is one of the most distressing problems faced by many countries in the world. Currently, India is facing a huge challenge in curbing the menace of trafficking.

Gravity of the problem across the globe

- ⦿ The United Nations Office on Drugs and Crime (UNODC) report, 2019 shows that 60% of the trafficking occurs internally in a country. As per the UNODC report,

- 90% of the sexual victims are women and girls.
- In the South Asia region, 85% of the victims are exploited for forced labor.

Human Trafficking in India:

- ◎ It is considered as the **second largest organised crime** in India. Human trafficking is a major issue in India, despite the fact that it is banned under the Indian law.
- ◎ As per the **National Crime Records Bureau's** 2016 crime statistics, there were 1,100 cases of trafficking. These numbers stood at 2278 in 2018. There were 2208 cases in 2019 and 1714 in 2020.

Causes of trafficking

- ◎ **Poverty:** People living in impoverished conditions may be more vulnerable to exploitation and coerced into trafficking due to the promise of better living conditions or economic prospects.
- ◎ **Unemployment and Joblessness:** Lack of job opportunities can lead individuals to seek employment elsewhere, making them susceptible to false promises and deceptive recruitment tactics used by traffickers.
- ◎ **Gender Inequality and Discrimination:** Discrimination, limited access to education, and lack of economic opportunities can make women and girls more vulnerable to trafficking for purposes such as sexual exploitation and forced labor.
- ◎ **Globalization and Migration:** Migrants, particularly undocumented or irregular migrants, may face a higher risk of exploitation and trafficking due to their precarious legal status, limited support systems, and lack of awareness about their rights.
- ◎ **Corruption and Organized Crime:** Corruption within law enforcement agencies, judiciary systems, or immigration authorities can facilitate human trafficking by allowing traffickers to operate with impunity.

Constitutional provisions

- ◎ Article 23 **prohibits human trafficking and beggar** (forced labor without payment).

- ◎ Article 24 **forbids the employment of children** below the age of 14 years in dangerous jobs like factories and mines.

Legal Provisions

- ◎ **Immoral Traffic Prevention Act, 1986:** The purpose of this Act is to give effect to the Trafficking Convention and to prohibit immoral human trafficking.
- ◎ **Criminal Law (Amendment) Act 2013:** It has come into force wherein Section 370 of the Indian Penal Code has been substituted with Section 370 and 370A IPC which provide for comprehensive measures to counter the menace of human trafficking.

Way Forward

Foresight and preparedness amid the current lockdown can save the lives of crores of women, men, and children and avoid an impending humanitarian crisis

- ◎ **Collaboration is key:** A lot of work needs to be done collaboratively, between key stakeholders such as the government and civil society organizations.
- ◎ **Review of legal framework:** The central government must assess the existing criminal law on trafficking and its ability to counter the crime and meet the needs of the victim.
- ◎ **Curbing the rise of online Child Sexual Abuse material:** The upsurge of child sexual abuse material and its easy access can only be controlled by placing greater accountability on Internet Service Providers and digital platforms that host this content.

9

Digital Divide in Education Sector

The Supreme Court has flagged the consequences of **growing digital divide**. It observed that the digital divide caused by online classes is affecting the fundamental right of **every child to education**.

Impacts of digital divide

- ◎ **Low female representation:** Due to huge digital divide in gender, thousands of Indian girls in these far-flung areas are refused access to Information

and Communications Technology (ICTs), which is a primary cause of low female representation in jobs.

- ◎ **Denial to information/knowledge:** This lack of equal opportunities to access online services and information deprive people of higher/quality education and skill training that could help them contribute to the economy and become leaders on a global level.
- ◎ **Non delivery of welfare schemes:** As many schemes have started using ICT in their delivery, at the same time due to digital divide it will create more problems.

Challenges

- ◎ **Lack of Infrastructure:** Being a densely populated country, India needs well established infrastructure to deliver e-services. But still there are some rural disconnected regions which are not connected to Internet.
- ◎ **Population:** It is a challenge for a developing country to serve a population of 1.30 billion uniformly.
- ◎ **Geographical Diversity:** Rural India is still deprived of the facilities of urban India because of its geographical location. It is poorly connected in terms of roads and infrastructural facilities.
- ◎ **Illiteracy & Poverty:** A large part of population is fighting for its daily basic needs. They do not bother about high speed devices and digitization. They are more worried about food and shelter.
- ◎ **Gender Discrimination:** In India, there is huge discrimination among male and female.
- ◎ **Corruption:** Corruption is a termite for government. At each tier of government structure, politicians and stakeholders try to draw illegal benefits for themselves.
- ◎ **Lack of Participation:** The rural people are often not very much attracted towards the web-based E-Governance services for various reasons.

Suggestive measures

- ◎ The government must employ strong measures to arrange for free and affordable internet to maximize participation in digital India.
- ◎ What India needs is a contextually relevant digital education system that integrates the knowledge of digital into all aspects of life.

- ◎ For education, last-mile connectivity is the need of the hour in rural India.
- ◎ India needs a public institution system that leverages the opportunities provided by digital technology.

10 Drug abuse in India

The rising incidence of **drug abuse** in India has come to the limelight. A recent Punjab government forensic lab report revealed that the number of deaths caused by drug overdose is rising.

Background

- ◎ India is sandwiched between the **golden triangle** (Thailand, Laos, and Myanmar) and **golden crescent** (Afghanistan, Iran, and Pakistan), which makes India vulnerable to the **drugs menace**.
- ◎ An **AIIMS study** in February 2019 found that around **5 crore Indians** reported to have used cannabis and opioids at the time of the survey.

Why drug is a social issue?

There are many other adverse effects of drug abuse on families:

- ◎ **Long-term health issues:** Liver damage, cardiovascular problems, respiratory issues, and increased risk of infectious diseases.
- ◎ **Impaired Cognitive and Mental Functioning:** Drug abuse can have detrimental effects on cognitive abilities, memory, attention, and decision-making.
- ◎ **Increased Crime and Violence:** Individuals struggling with addiction may resort to illegal activities such as theft, drug trafficking, or prostitution to fund their habits.

Government steps

- ◎ **The Narcotic Drugs and Psychotropic Substances Act, (NDPS) 1985:** It prohibits a person from producing, possessing, selling, purchasing, transporting, storing, and/or consuming any narcotic drug or psychotropic substance.
- ◎ **‘Nasha Mukht Bharat’:** Government has launched the **Nasha Mukht Bharat** or **Drug-Free India** Campaign which focuses on community outreach programs.

- ◎ **International Treaties and Conventions to Combat Drug Menace:** India is signatory of the following International treaties and conventions to combat the menace of Drug Abuse:

- United Nations (UN) Convention on Narcotic Drugs (1961)
- UN Convention on Psychotropic Substances (1971).
- UN Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (1988)
- UN Convention against Transnational Organized Crime (UNTOC) 2000

Way forward

- ◎ **Society based Solutions:** Prevention programmes involving entities such as families, schools and the immediate communities are important in this regard.
- ◎ **Role of Media:** Media also needs to understand its role and should stop glorification of consumption of drug.
- ◎ **Effective implementation of laws** like The Narcotic Drugs and Psychotropic Substances Act, 1985, is critical for the prevention of drugs abuse in India.

11

Fight against Untouchability

Though the Indian constitution envisages the abolition of 'untouchability' and an end to discrimination, untouchability continues to even after the 75 years of independence.

The issue

- ◎ Untouchability has been a social evil in India for centuries and it still prevails.
- ◎ According to **National Crime Records Bureau (NCRB) data**, over 130,000 anti-Dalit crimes were registered between 2018 and 2020.
 - The highest number of anti-Dalit crimes was reported from Uttar Pradesh (36,467), followed by Bihar (20,973), Rajasthan (18,418), and Madhya Pradesh (16,952).

How to eradicate untouchability?

Education and Awareness: Promote education and awareness about the inherent dignity and equality of all individuals, irrespective of their caste or social background.

- ◎ **Strict enforcement of laws** that prohibit discrimination based on caste or social status.
- ◎ **Encourage social and cultural reform** by promoting fostering inclusive social gatherings, and challenging discriminatory practices within communities.
- ◎ **Support economic empowerment** initiatives that provide equal opportunities for marginalized communities.

12

Landslides in Pettimudi: Social Inequalities in Disasters

The study of a landslide that hit Pettimudi highlights the discrimination shown to victims of the Pettimudi landslide when compared to victims of the Kozhikode Air India Express crash.

Discrimination:

- ◎ For the incidents that occurred, the government had announced a solatium of Rs.5 lakhs for victims of the Pettimudi landslide whereas the solatium for the airplane crash was Rs.10 lakhs. Both announcements were made on the same day.
- ◎ The **spatial inequality** that impacted the disaster vulnerability of the community due to their social position was ignored.

Space and vulnerability:

- ◎ Social theorists have theorized how "space" becomes a **social product** and a **place for practicing discrimination**.
- ◎ The **land is symbolic of the economic vulnerability of the labourer** which has its roots in the history of slave labour. This vulnerability forces them to continue living and working in such deplorable conditions.
- ◎ It was the '**space**' of **Pettimudi** and the air crash which determined the different treatments it received.

- These victims had **no say** in their rehabilitation process and were forced to accept government funds.

13

Begging in India: A Menace to the Society

The Supreme Court has asked the Centre and four States to file their response on a plea seeking a direction to repeal the provisions criminalising begging.

Factors promoting Begging

The act of begging can be influenced by various factors, including individual circumstances, societal factors, and systemic issues. Here are some factors that can contribute to begging:

- Poverty:** One of the most common reasons people resort to begging is extreme poverty. Lack of basic necessities such as food, shelter, and healthcare can push individuals to beg in order to survive.
- Unemployment:** The absence of employment opportunities or the inability to find stable work can lead individuals to resort to begging as a means of generating income.
- Lack of education:** Limited access to education or a lack of skills can contribute to unemployment and make it harder for individuals to find sustainable sources of income.
- Homelessness:** People experiencing homelessness often resort to begging as a way to meet their basic needs.
- Substance abuse:** Drug addiction or substance abuse problems can lead individuals to beg in order to finance their addiction and acquire drugs.

Ram Lakhan v State (Case dealing with anti-Begging law)

One significant aspect of Ram Lakhan is that it addresses the issue of begging from the touchstone of Article 19(1)(a), read with Article 21 of the Constitution, and asserts that unreasonable prohibitions on begging are unconstitutional in that they invariably deprive beggars of two fundamental rights.

Government Interventions

- The Criminal Law (Amendment) Act, 2013** provides for an imprisonment for a convict of beggary (10 years). The Act prescribes following provision:
 - If any beggar detained in a certified institution, found to be of unsound mind or a leper, he/she can be removed to a mental hospital or leper asylum as per provisions of the Indian Lunacy Act, 1912 and of the Lepers Act, 1898.
- SMILE:** Government formulated 'Support for Marginalised Individuals for Livelihood and Enterprise (SMILE)' - a comprehensive scheme meant for beggars.

14

Mental Health

The purpose of which is to spread awareness about mental health issues around the world and mobilize efforts in support of mental health.

The issue

- As per WHO data, every 40 seconds, someone loses their life to suicide. In fact, suicide is the principal cause of death among people in the age group of 15 to 29.
- In India, according to **NIMHANS data**, more than **80 per cent of people do not access care services** for a multitude of reasons, ranging from lack of knowledge, stigma and high cost of care.

Reasons for increasing cases of mental health:

- Changing lifestyle patterns:** Due to changes in lifestyle, there have been advances in information technology; the global virtual mobility has become much easier.
- Social stigma and discrimination:** People do not accept the fact that they are suffering from mental illness. This mind set helps aggravate the health issues related to mental distress.
- Career driven mindset of parents:** Parents see unfulfilled dreams of them into the eyes of their children. Hence they push children to achieve the desired goals of them without taking in to the consideration the will of their children.

- ☉ **Demographic Determinants:** Gender inequality, racial, regional and ethnic discrimination etc. could lead to the mental health problems.
- ☉ **Environmental Determinants:** Natural hazards, industrial disasters, armed conflict, displacement, and disasters triggered by ecosystem hazards due to climate change or increased population.

Government initiatives to tackle mental health problem:

- ☉ **National Mental Health Programme:** The Government of India launched the National Mental Health Programme (NMHP) in 1982, keeping in view the heavy burden of mental illness in the community.
- ☉ **District Mental Health Program:** It envisages provision of basic mental health care services at the community level.
- ☉ **The Mental Health Care Act 2017:** It is an act to provide for mental healthcare and services for persons with mental illness and to protect, promote and fulfil the rights of such persons during delivery of mental healthcare and services.
- ☉ **The National Institute of Mental Health (NIMH):** It is the lead federal agency for research on mental disorders.

15

Deaths by Suicide in India- An Emerging Societal Issue

According to the NCRB report for 2021, **an increase of 7.2% from the previous year has been reported in the number of people who died by suicide.**

The issue: Around 64 lakh persons in India died by suicide, an increase of 7.2% from the year 2021. This makes suicides a major concern in India.

Challenges

- ☉ **Under-reporting:** Under-reporting of suicide

cases due to fear of social stigma and sometimes to rescue from judicial procedures.

- ☉ **Fear of legal action:** Section 309 of the Indian Penal Code (IPC) makes suicide a punishable offense. The fear of punitive action and added hassle of having to deal with police and courts often results in a refusal to seek help.
- ☉ **Social stigma:** The social stigma associated with suicide results in the NCRB grossly under-reporting the true numbers of suicide.

Government steps

- ☉ **Mental Healthcare Act, 2017:** It aims to provide mental healthcare services for persons with mental illness.
- ☉ **KIRAN:** The Ministry of Social Justice and Empowerment has launched a 24/7 toll-free helpline to provide support to people facing anxiety, stress, depression, suicidal thoughts, and other mental health concerns.
- ☉ **Manodarpan Initiative:** It is an initiative of the Ministry of Education under Atmanirbhar Bharat Abhiyan.
- ☉ **Tele Mental Health Assistance and Networking Across States (Tele-MANAS) initiative** is a comprehensive mental health care service.

Way forward

- ☉ **Mental Health Awareness and Education:** Promote mental health awareness and education at all levels of society, including schools, colleges, workplaces, and community settings.
- ☉ **Improve Access to Mental Healthcare:** Increase the availability, affordability, and accessibility of mental healthcare services, particularly in rural and underserved areas.
- ☉ **Implement mental health programs in schools** that promote emotional well-being, build resilience, and provide early identification and intervention for students at risk.



Population and Associated Issues

Topic of This Chapter

- | | |
|---|-----------------------|
| 1 | Indian Overpopulation |
| 2 | Demographic Dividend |

1 Indian Overpopulation

In the recent past, States have proposed to implement a two-child norm as a pre-condition for getting government jobs or to get nominated or elected to Panchayat elections.

The issue: India is second most populous country with over 1.35 billion people. Approximately 17.85% of the world's population are Indians, which means 1 in every 6 people on Earth live in India.

Cause of Overpopulation

- ☉ **Decline in the Death Rate:** At the root of overpopulation is the difference between the overall birth rate and death rate in populations.
- ☉ **More Hands to Overcome Poverty:** In the absence of educational resources, coupled with high death rates, which resulted in higher birth rates, that is why impoverished areas are seeing large booms in population.
- ☉ **Child Labour:** The children being seen as a source of income by impoverished families begin work too young and also lose the educational opportunities reflected, particularly when it comes to birth control.
- ☉ **Technological Advancement in Fertility Treatment:** Today there are effective medicines that can increase the chance of conception and lead to a rise in the birth rate.
- ☉ **Poor Contraceptives Use:** A study by the World Health Organization (WHO) shows that women aged between 16 and 49 used at least one form of contraceptive are 43% in underdeveloped countries, which leads to higher birth rates.

Effects of Overpopulation

- ☉ **Conflicts and Wars:** Overpopulation in developing countries puts a major strain on the resources it should be utilizing for development.
- ☉ **Rise in Unemployment:** When a country becomes overpopulated, it gives rise to unemployment as there are fewer jobs to support a large number of people.
- ☉ **Water Shortage:** Roughly 1% of the world's water is fresh and accessible.
- ☉ **Extinction:** The impact of overpopulation on the world's wildlife is severe.

Way forward

- ☉ Promote education about family planning and reproductive health rights.
- ☉ Awareness campaigns to promote smaller family sizes and responsible parenthood.
- ☉ **Promote women's empowerment**, to have a positive impact on reducing fertility rates.

2 Demographic Dividend

International Labour Organisation (ILO) says on average in 46% of the working age population of India is either working or wants to work.

About Demographic Dividend

- ☉ **Economic Survey 2018–19** predicts that India's Demographic Dividend would reach its peak around 2041, when the proportion of the population that is working-age, or 20–59 years, is anticipated to reach 59%.

Advantages Associated with Demographic Dividend

- ☉ **Large and productive workforce:** India's surplus of workers can lead to increased productivity, innovation, and competitiveness across various sectors, including manufacturing, services, and technology.
- ☉ **Increased savings and investments:** With a larger working-age population, there is possibility for more disposable income available for savings and investment, which can drive economic growth and development.
- ☉ **Boost to economic growth:** A demographic dividend can fuel economic growth as the working-age population contributes to increased productivity, higher output, and expanded market opportunities.
- ☉ **Greater consumption and domestic market expansion:** Larger working-age population will lead to increased domestic consumption.
- ☉ **Technological advancements and innovation:** The demographic dividend can foster an environment that encourages research, technological advancements, and entrepreneurship.

- ◎ **Global competitiveness:** With a young and dynamic workforce, India can attract foreign investment, collaborate with international companies, and participate actively in the global economy.

Challenges in achieving Demographic Dividend

- ◎ **Unemployment and underemployment:** India's growing working-age population presents a challenge in terms of generating sufficient employment opportunities.
- ◎ **Skills gap:** The mismatch between the skills

possessed by job seekers and the skills required by employers hinders employment prospects and impedes productivity growth.

- ◎ **Gender disparities:** Cultural norms, social biases, and lack of access to education and employment opportunities limiting the participation of women in the workforce.
- ◎ **Inadequate healthcare infrastructure:** India faces challenges related to inadequate healthcare infrastructure, particularly in rural areas, which can hinder the demographic dividend.
- ◎ **Population aging:** As life expectancy increases and fertility rates decline, the proportion of the elderly population will rise.



Salient Features of Indian Society

Topic of This Chapter

- | | |
|---|--|
| 1 | Caste Census in the Times of Changing Social Equations |
| 2 | Casteism in India's Society |

1 Caste Census in the Times of Changing Social Equations

The growing demands for a **caste census** from various **sections of society** have once again surfaced the issue. The 2021 Census of India, the **16th Indian Census**, will be taken.

Arguments in favour	Arguments against
<ul style="list-style-type: none"> Bringing the marginalized to the table Data for Policymaking Backing by the judiciary Caste does not marginalize further 	<ul style="list-style-type: none"> It is the only way to make a case to breach the 50% cap on the reservation. It can lead to friction amongst various classes and can result in an increased caste enmity. Partial benefits: The way reservation is practised in the country; it has invariably led to elites among castes and communities.

The most important thing is improving existing databases and accurate and timely data is central to India's effort to tackle poverty. Poor data diminishes the efforts to design welfare programmes.

2 Casteism in India's Society

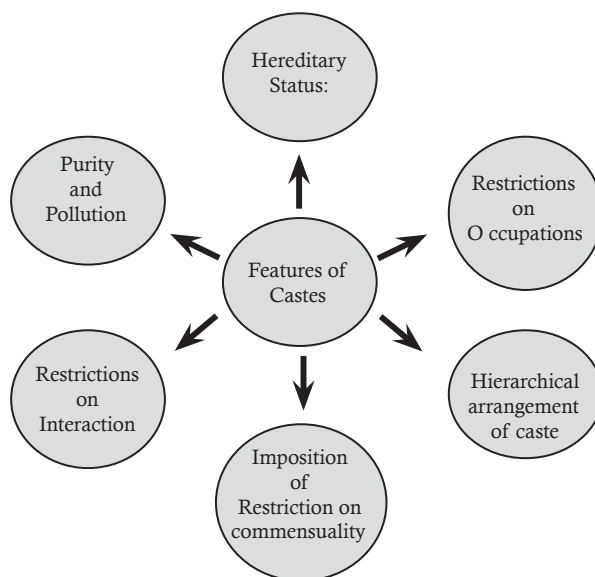
Despite attempts to create an egalitarian and modern society, the caste system remains a prominent feature of Indian society.

The issue

- Historically, castes were arranged in a hierarchy, with some castes considered superior to others and thus accorded more power and privileges than others.
- This system of social stratification and power relations has been a major problem in India as it has led to discrimination and inequality for those

belonging to lower castes.

- In a recent case, a Dalit student was mercilessly beaten by a teacher for drinking water from a pot meant for people from the upper caste.



SIGNIFICANCE OF CASTES SYSTEM	LIMITATIONS OF CASTE SYSTEM
<ul style="list-style-type: none"> Job security: Caste system set hierarchy and fixed hereditary based occupation. This ensures security of jobs 	<ul style="list-style-type: none"> Against meritocracy: This can limit social and economic progress, as those who are most qualified may not be given the opportunities they deserve.
<ul style="list-style-type: none"> Social recognition: It gives social recognition to the individual indicating their utility in society. 	<ul style="list-style-type: none"> Against the idea of equality: Caste is responsible for evolution of untouchability.
<ul style="list-style-type: none"> Socialization tool: It imparts the societal culture and values to the individual. 	<ul style="list-style-type: none"> Restricts social mobility: Caste system restricts the social mobility in the society. Caste System discourages social change due to rigid caste rules.

<ul style="list-style-type: none"> ◎ Work Specialization: It ensures specialization in occupations as occupations are inherited by their respective caste. 	<ul style="list-style-type: none"> ◎ Disrupts the progress of development: The tension created by caste hatred or caste appeasement by political parties hinders the progress of the nation.
<ul style="list-style-type: none"> ◎ Interdependent interaction: It creates sense of fraternity and cooperation within the society. 	
<ul style="list-style-type: none"> ◎ Pressure group: It raises the voice against the exploitation by the upper castes. 	



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Indian Society

Topic of This Chapter

- | | |
|---|--|
| 1 | Globalization 4.0 and Emerging Technologies |
| 2 | Persistent Indian Challenges of Indian Society |

1 Globalization 4.0 and Emerging Technologies

With the ups and downs in the global economy after the Ukraine war, the importance of Globalization 4.0 has become more relevant

Assessing the social impacts of Globalization

POSITIVE SOCIO-ECONOMIC IMPACT	NEGATIVE SOCIO-ECONOMIC IMPLICATION
<ul style="list-style-type: none"> ◎ Economic Growth: Globalization 4.0 have boosted productivity, innovation, and competitiveness across various industries. ◎ Education: Emerging Technologies like AI can be personalised for specific age groups, regional areas, tribal or for persons with disabilities. ◎ Agricultural development: Emerging Technologies can help develop smart agricultural prediction models like which pests are affecting the crops, when to irrigate the field, which crops to sow in a certain time by integrating soil health cards data, weather data from IMD, past agricultural records, etc. ◎ Healthcare: Globalization 4.0 and emerging technologies like AI can help in early detection and prevention of disease. 	<ul style="list-style-type: none"> ◎ Income Inequality: Emerging technologies have further amplified this gap, as those who possess the necessary skills and knowledge have benefitted the most. ◎ Digital Divide: The rapid adoption of emerging technologies has led to a digital divide in India, with urban areas having better access to technology and internet connectivity compared to rural areas. ◎ Echo chambers: The algorithms reduce the exposure to varied viewpoints and thus reducing the tolerance in the society. The recent rise of Mob lynching is result of same echo chambers. ◎ Climate change: Emerging technologies requires massive computational capacity which means more power hungry data centers and more carbon footprint.

2 Persistent Indian Challenges of Indian Society

India materialised itself as an independent nation-state, after a long freedom struggle against the British colonial rule and gave itself a constitution which made India a Sovereign, Socialist, Secular, the Democratic Republic with a parliamentary system of government. Since then, the Indian society has earned monumental growth in all spheres, yet there are numerous challenges that India faces today in its everyday social life, which are intertwined in a way.

Here are some key persistent challenges faced by Indian society:

- ◎ **Gender Inequality:** Women face discrimination, limited access to education and healthcare, restricted opportunities for economic participation, and pervasive gender-based violence. **The NFHS-5 shows** that married women, between the ages

of 18-49, who have ever experienced spousal violence, has more than doubled from 20.6 in 2014-15 to 44.5%.

- ◎ **Caste System:** The caste system, a hierarchical social structure based on birth, continues to influence social interactions and opportunities in India. Discrimination, exclusion, and prejudice against lower castes and marginalized communities persist.
- ◎ **Poverty:** Poverty remains a significant challenge in India, with a large population living below the poverty line. Limited access to basic services, inadequate healthcare, and disparities in education opportunities contribute to the persistence of poverty and inequality.
- ◎ **Malnutrition:** Malnutrition has been the major challenge for Indian society. **Over 33 lakh children in India are malnourished** and more than half of them fall in the severely malnourished category.
- ◎ **Unemployment:** Unemployment is high and the informal sector is in a shambles state. The global downturn of the last two or three years,

aggravated by the pandemic, has added to the existing problem of unemployment.



Way forward

- ◎ **Gender Equality:** Efforts must be made by every stake holder to promote Gender equality in India. Government should Implement and enforce gender equality laws and policies effectively on the ground.
- ◎ **Caste Equality:** Government should Implement policies and programs to promote social inclusion and uplift marginalized communities. Also,


awareness campagins about the negative impact of the caste system and promote inter-caste harmony should organised.

- ◎ **Social equality:** Efforts must be made to promote inclusive economic growth by providing skill training, microfinance, and entrepreneurial support to marginalized groups. Enhance access to quality education and healthcare for marginalized communities.
- ◎ **Religious Amity:** Foster interfaith dialogue and promote communal harmony through community engagement and awareness campaigns.







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Poverty and Developmental Issues

Topic of This Chapter

- | | |
|---|---------------------------------|
| 1 | Malnutrition Challenge in India |
| 2 | Poverty in India |

Malnutrition Challenge in India

Under Malnutrition, the body becomes deficient in **vitamins, minerals, and other nutrients required** to maintain healthy tissues and organs.

Status of Malnutrition

- As per NFHS-5, Stunting has reduced from 38.4% to 35.5%, wasting from 21.0% to 19.3% and underweight prevalence is down from 35.8% to 32.1%.
- Women (15-49 years) whose BMI (Body Mass Index) is below normal has reduced from 22.9% in NFHS-4 to 18.7% in NFHS-5.
- Meghalaya has the highest number of stunted children (46.5%), followed by Bihar (42.9%).

Issues in tackling Malnutrition in India

- Access to Nutritious Food:** One of the primary issues is the lack of access to nutritious food, especially among vulnerable populations. Poverty, income inequality, and limited availability of diverse and nutritious food options contribute to inadequate diets.
- Child Feeding Practices:** Inadequate breastfeeding practices and inappropriate complementary feeding contribute to malnutrition among infants and young children.
- Micronutrient Deficiencies:** Micronutrient deficiencies, such as iron, vitamin A, zinc, and iodine deficiencies, are widespread in many populations. These deficiencies can lead to a range of health issues, including impaired cognitive development, weakened immune systems, and increased susceptibility to diseases. Strategies like food fortification, micronutrient supplementation, and biofortification can help combat these deficiencies.
- Sanitation and Hygiene:** Lack of access to clean water, inadequate sanitation facilities, and improper hygiene practices increase the risk of diarrheal diseases and other infections contribute to malnutrition.
- Socioeconomic Factors:** Malnutrition is often linked to socio-economic factors such as poverty, inadequate healthcare, lack of education, and gender inequalities.

- Agricultural and Food Systems:** Agricultural practices, food production, and food processing play a significant role in determining the availability and quality of nutritious food.

Government Steps

- National Nutrition Mission (NNM):** The government of India has launched the National Nutrition Mission (NNM), also known as **POSHAN Abhiyaan**, to **eradicate malnutrition by the year 2022**.
- Anemia Mukt Bharat Abhiyan:** The mission was launched in 2018 with the **aim of accelerating anemia decline by one to three percentage points annually**.
- Mid-day Meal (MDM) scheme:** It aims to **improve nutrition levels among school children** in addition to increasing **enrolment, retention, and attendance**.
- The National Food Security Act (NFSA), 2013:** Assuring **food and nutrition security** for the most vulnerable is the aim of this law, which makes **access to food a legal entitlement**.
- Integrated Child Development Services (ICDS) Scheme:** It was launched in 1975 and the programme aims to provide food, preschool education, primary healthcare, immunization, health checkups and referral services to **children under 6 years old and their mothers**.

Poverty in India

National Council of Educational Research and Training (NCERT) has removed the issues like, Poverty, Inequality Topics from the NCERT Textbooks.

According to World Bank, Poverty is pronounced deprivation in well-being, and comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. In India, **21.9% of the population lives below the national poverty line** in 2011.

Factors

- Lack of Education:** Limited access to quality education and educational opportunities can hinder individuals' ability to acquire the necessary skills for employment and economic mobility.

- ◎ **Unemployment and Underemployment:** Unemployment and underemployment mean individuals and families struggle to meet their basic needs and lack the means to improve their living conditions.
- ◎ **Low Wages:** Inadequate wages, particularly in the informal sector, can keep individuals and households trapped in poverty.
- ◎ **Income Inequality:** Income inequality, where a small portion of the population holds a significant share of wealth, can exacerbate poverty rates by limiting access to resources and opportunities for marginalized groups.
- ◎ **Discrimination and Social Exclusion:** Social discrimination based on factors such as gender, caste, ethnicity, or religion can restrict individuals' access to education, employment, and public services and often face higher poverty rates.
- ◎ **Environmental Factors:** Loss of livelihoods, reduced crop yields, and increased vulnerability to Environmental disasters can contribute to poverty.
- ◎ **Inadequate Healthcare and Sanitation:** Lack of access to quality healthcare services, sanitation facilities can lead to poor health outcomes,

increased medical expenses, and can push individuals and families into poverty.

Government steps

- ◎ **Integrated Rural Development Programme (IRDP):** It was aimed at providing assistance to the rural poor in the form of subsidy and bank credit for productive employment opportunities through successive plan periods.
- ◎ **Annapurna Scheme:** Scheme aimed to provide food to senior citizens who cannot take care of themselves and are not under the National Old Age Pension Scheme (NOAPS), and who have no one to take care of them in their village.
- ◎ **National Old Age Pension Scheme (NOAPS):** The amount of old age pension is ₹200 per month for applicants aged 60–79. This pension is given by the central government.
- ◎ **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) 2005:** The Act provides 100 days assured employment every year to every rural household. One-third of the proposed jobs would be reserved for women.



UNIT 7

Topic of This Chapter

1 Urbanisation

As the world is becoming more Urban than ever, it is crucial to place cities at the centre of the development agenda to try to enhance their liveability and mobility.

Negative Socio-economic implications of urbanization

- ⦿ **Urban sprawl** - It refers to **expansion of cities**, both in population a geographical area, massive irrigation from rural to urban area and inclusion of new area into urban area is cause of urban sprawl.
- ⦿ **Overcrowding** - It is situation in which too many people live in too little space. This is logical consequence of over population. E.g. **Delhi has a Population density = 11, 297 person/ km²** while that of **Mumbai** is 20000 person/ km²
- ⦿ **Housing** - Overcrowding lead to chronic shortage of houses in urban areas. The major reason for this shortage are inadequate expansion of public utilities into sub-urban area, rising real estate prices etc.
- ⦿ **Unemployment** - urban unemployment in India is estimated to very high (15 - 25% of labour force). Lack of employability, rising populations, lower wages, corruption etc. are some of the causes.
- ⦿ **Slum of Squatter settlements** - Due to rising rent and real estate prices with shortage of housing, there is proliferation of slums.
- ⦿ **Urban crimes** - Urban areas register higher rate of crime. Growing materialism, socioeconomic disparities, rising unemployment and competition in every day (killing on parking issue) are some

of the primary causes responsible for urban crime.

- ⦿ **Problem of urban pollution** - with rapid growth of industries and transport system, urban pollution is also rising.
- ⦿ **URBANISATION OF PANDEMICS:** COVID-19 dominantly is urban-centric. Urban centres like Mumbai, Delhi were its 1st victim. They further dominated the virus to the rural areas.

How to make resilient cities?

- ⦿ **Strengthening Municipalities:** urban local bodies (ULB) should be strengthened. Well-run ULBs should have the power to raise financial resources including through municipal bonds.
- ⦿ **Sub-Regional development:** small town should be given attention and link them to bigger cities using transport (no need for amalgamation). This will prevent the migration to urban areas and prevent the problems of slums and urban sprawl.
- ⦿ **Creation of Waste to Energy plants:** NITI Aayog suggests the creation of an authority at the Centre to spread the use of Waste to Energy plants. This will address the problem of trash and create new surplus energy.
- ⦿ **Better physical infrastructure:** Government should invest heavily in the physical infrastructure like road, rail connectivity with in the city. Increased use of public transport will reduce the issue of pollution and congestion.

Use of Technology: Technology should be leveraged for making a resilient cities. New technique of construction like 3D printing, pre-fabricated sandwich panel system, monolithic concrete technology should be utilised for better quality and speedy construction.



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ART & CULTURE

Indian Art Forms

Topic of This Chapter

	PAINTINGS
1	Mandala Art- A Century Old Motif and Art Form
2	Sanjhi Painting
3	Gond Painting
4	Basholi (Basoli) Painting
5	Depiction of Krishna in Art Forms
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8	Traditional Indian Textiles
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10	Preservation of Ancient Art forms in India
11	Promoting Cultural Tourism in India
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12	Chariot Festivals in India
13	Attukal Pongala

PAINTINGS

Culture

- ◎ **Culture** denotes a way of life. It means cultivating and refining a thing to such an extent that its end product evokes our admiration and respect.
- ◎ Art is an important part of our life which gives meaning and form to our imagination, thoughts and denotes our way of life.
- ◎ A huge portion of Indian artworks are influenced by different religions and culture of the nation.

1

Mandala Art- A Century Old Motif and Art Form

Context: Mandala art has gained significant attention and popularity in recent times.

What is mandala art form?

- ◎ **Motifs** used to depict the **cosmos**.
- ◎ Rooted in Hinduism and Buddhism
 - **Hinduism:** In Vedas (c. 1500-500 BC) and a yantra in philosophical systems.
 - **Buddhism:** A traditional mandala is a circular painting meant to help its creator discover their true self.

Literally meaning the “circle” or the “centre” in Sanskrit, mandala is defined by a **geometric configuration**.



- ◎ **Spread:** By sixth century, mandalas were recorded in China, Korea, Japan, Indonesia and Tibet.
- ◎ **Significance:** A mandala is a symbol of the universe in its ideal form, and its creation signifies the transformation of a universe of suffering into one of joy.
- ◎ The art continues to appear in **Buddhist Thangka paintings**, mainstream artists associated with tantric and neo-tantric spiritual movements.
- ◎ In yoga and ancient ideals; signifying a sacred space to shut away external influences.
- ◎ Similarly, mandala art is used in healing circles. The circles are often associated with the restoration of the body, mind, and heart.

2

Sanjhi Painting

Context: Sanjhi Painting has been gifted by Indian PM to US President during quad meeting.

About

- ◎ Sanjhi art is the **traditional art of stenciling** (method of transferring a design by painting through shapes cut in a thin sheet of metal, paper or similar material).

According to folks, Radha and her friends prepared beautiful patterns to welcome Krishna as he returned from grazing his cows at dusk. Dusk, which is sandhya in Hindi.

- ◎ **Origin:** Mathura/vrindavan region in the 16th and 17th centuries.

◎ **Significance:** Known for its inherent spiritual implications that reach beyond immediate aesthetic appeal,

- The art depicts Indian mythological stories in numerous forms, with predominant focus on Krishna's Leela.

◎ **Important Features:**



- **Evening practice:** Done in evening (dusk). Used extensively for decoration and propagating bhakti ideas during medieval times.
- **Geometrical outline:** An octagon, a square, or a pentagon, is first drawn with dry colours, after which intricate designs of creepers, flowers, etc., are filled out.

◎ **Issues:** This ancient art is in danger of disappearing.

- **Solution:** For its conservation and wider dissemination it need to be commercialised like **madhubani painting**. Use Sanjhi patterns on clothes, linen, etc., it will give the practitioners some income.

3 Gond Painting

Context: The famed Gond painting of Madhya Pradesh has received the prestigious Geographical Indication (GI) tag. Gonds are largest tribe in MP.

About

◎ **Famous folk art** of the **Gond tribal community** of central India. Practiced by one of the largest tribes in India – the **Gond** – from **Madhya Pradesh**, also be found in pockets of **Andhra Pradesh**, **Maharashtra**, **Chhattisgarh**, and **Odisha**.

◎ **Origin:** 1400 years.

◎ **Inspiration:** reflection of man's close connection with his natural surroundings.

◎ Blended with mystery, pattern, blend of colours and humour, these art pieces depict a modern psyche.

◎ **Features:**

- Vibrant colors like orange, yellow, blue and red, and are created with drawn lines and dots as the method to bring it to life.



- **Natural colors** from various sources like flowers, stones, etc.

- The painting reflects about nature, trees, plants, animals, moon, sun, river, drains, God and Goddesses, how the king used to fight, how the powers of tantra mantra (Black magic) worked.

◎ **Issue:** Artists from rural and backward tribal areas are facing difficulties to sustain their practice as they have to venture out outside of their practicing art for income generation.

◎ **Significance of GI Award:** Enable the people of tribal and Gond dominant communities to get direct benefits.

4 Basholi (Basoli) Painting

Context: Recently, the Basholi (Basoli) paintings received the Geographical Indication (GI) tag following approval of the National Bank for Agriculture and Rural Development, Jammu.

About

- From school of **miniature paintings**. The Basohli painting of Kathua, **first independent GI-tagged product** from Jammu region.
- Origin: Pahari miniature painting in Indian hill states** during 17th and the 18th centuries. Known for evocative colours, bold lines, and deep-set facial patterns. Founded by **Raja Bhupat Pal** in the 16th century.
- Considered as the **first school of Pahari paintings**, many of which have evolved into the much more detailed and widespread **style of Kangra painting school**.

Miniature Indian Paintings

- Indian contact with the Islamic civilization and During Mughal artworks like manuscripts, book miniatures, portraiture, celebratory or genre

scenes. Miniature are characterized by small and detailed paintings.

Significance and need for preservation

- The art is a social expression of the community.** Vital to livelihoods and binding force. The cultures and traditions have been passed on from generation to generation. Increasing urbanization, traditions and cultures are fast eroding.
- The art forms and paintings like Gond** mentioned above is not just a leisure but a medium of employment identity, respect and symbol.
- New threats** like Increasing living costs and urban aspirations for a convenient life. In the process of migration, the ancient practices are looked down upon as 'backward' and forgotten.
- Thus preserving them by way of promotion at highest level draws attention to their plight and need for conservation.

Initiatives to preserve and promote languages, folk dance, Art and culture of tribals:

- Young Talented Artists:** to encourage and recognize the young talents especially in the field of rare art forms. Talented youngsters of the age group of 18-30 years are selected and given a onetime cash award of Rs. 10,000/-.
- Guru Shishya Parampara:** transmitting our valued traditions to the coming generations.
- Disciples are trained under veterans in art forms which are rare and vanishing. Carry out the training programmes in '**Gurukula**' tradition.
- Institutional & Academic:** The National Gallery of Modern Art and the Lalit Kala Akademi recognises and patronizes artists in all fields.
- Inclusion in UNESCO's Heritage list-** Some of the famous site paintings like Ajanta have been included in the list for protection and preserving arts.
- G.I tags** are an excellent way for protection and preservation as it also provides a distinct recognition to arts and their forms.
- Others:**
 - Scheme for Conservation of Wall Painting (1996-97)
 - Tribal haats
 - Ek Bharat Shresth Bharat program

5

Depiction of Krishna in Art Forms

Context: A new book features 60 miniature works from the Nathdwara Painting.

Nathdwara Paintings

- A painting tradition and school of artists emerged in Nathdwara, a town of Udaipur city. The Nathdwara School is a subset of the **Mewar School of painting**.
 - Mewar Painting** in the 17th and 18th century miniature paintings.

- The sub-styles of Mewar painting include **Udaigarh, Devgarh and Nathdwara** as important centers of miniature production.
- ⊙ Nathdwara paintings are of different sub-styles of which **Pichhwai paintings** are the most popular.
- ⊙ The central figure- **Shrinathji Lord Krishna** as a seven-year-old boy with crescent-shaped eyes, a

garland of lotus buds around his neck. He is seen symbolically raising **Giri Govardhan** in his left hand while his right hand rests on his waist. A diamond shines on his chin.

- ⊙ Nathdwara also pilgrim centre for the **Vaishnavites** who belong to the 'Pushti Marg' sect (founded by Shree Vallabacharya). **Shrinathji** is considered a reincarnation of Krishna.

DANCE

6

Dance is Meditation for the Mind and Body

Context: International dance day observance on 29th April.

Origin of dance in India's culture

- ⊙ Dance in India has a rich and vital tradition dating back to ancient times.
- ⊙ Excavations, inscriptions, chronicles, genealogies of kings and artists, literary sources, sculpture and painting of different periods provide extensive evidence on dance.
- ⊙ The earliest treatise on dance available to us is **Bharat Muni's Natyashastra**, the source book of the art of drama, dance and music.

Classical dances

- ⊙ As per the **ancient treatises**, dance is considered as having three aspects:
 - Natya
 - Nritya
 - Nritta
- ⊙ A dancer communicates the **navarasas**. These are: love (shringaara), mirth (haasya), compassion (karuna), valour (veera), anger (raudra), fear (bhayanak), disgust (bibhatsa), wonder (adbhuta) and peace (shaanta).
- ⊙ An ancient classification followed in all styles is of Tandava and Lasya.
 - Tandava the masculine, is heroic bold and vigorous.
 - Lasya the feminine is soft, lyrical and graceful.

- ⊙ Abhinaya, broadly means expression. This is achieved through angika, the body and limbs, vachikasong and speech and aharya, costume and adornment; and satvika, moods and emotions.
- ⊙ There are dance forms in classical and regional dances like- **BharatNatyam, Kathakali, Kathak, Manipuri, Sattariya/Odissi, Mohiniattam and kuchipudi**.

7

Legend Pt Birju Maharaj

Context: Kathak legend Pt Birju Maharaj passed away recently.

About

- ⊙ **Brij Mohan Nath Mishra**, popularly known as **Pandit Birju Maharaj** (1938-2022) was an exponent of the **Kalka-Bindadin gharana of Lucknow** and recipient of India's second highest civilian honour **Padma Vibushan**.
- ⊙ He trained under his father and **Guru Acchan Maharaj** and Uncles **Shambhu Maharaj and Lachhu Maharaj**.

Contributions of Pt Birju Maharaj

- ⊙ dance underlined the Lucknow **Kalka-Bindadin gharana features**
 - *ang* (physical beauty)
 - *layakari* (lyrical melody)
 - *abhinaya* (mime)
- ⊙ Complex rhythmic structures, lightning-fast spins and poetic expressions were his greatest contributions.

- He has established a style that has restored the traditional glory of Kathak, yet established a **strong connect with the contemporary world.**

- The style is now followed by dancers across gharanas. A style that has put Kathak on the global map.

VISUAL ART

8 Traditional Indian Textiles

Context: UNESCO has released list of 50 exclusive and iconic heritage textile crafts of the country under report titled '*Handmade for the 21st century: Safeguarding Traditional Indian Textiles*'.

Key-highlights

- one of the major challenges to the safeguarding of Intangible Cultural Heritage in South Asia is the **lack of proper inventory and documentation.**
- The origin of textiles to **Indus valley civilisation** where **people** were using cotton and various colours like indigo were used on the fabric.
- There is clear evidence of the variety of textiles and embroidery in the **Ajanta murals** and miniature paintings, temple murals. **The art of weaving and dyeing cotton had been** well developed
- The art was practiced from the 1st century and by the 4th and 5th centuries, **woven silk formed a major portion of exports.**
- Textiles were the major attraction** that formed the bulk of the trade with Western and Eastern countries. Roman documents mention the export of silk from **India to Europe around the sixth century A.D.**
- Masulipatnam on the western coast** was an important port, with traders coming in from China, Arabia, and European countries like **Portugal, France, and England.** Textile trade was carried on in the North, with caravan loads of woven textiles reaching Moscow. The Mughal Emperors brought in new skills which mingled with the existing art, resulting in fine artworks.

Steps and initiatives taken:

- National handicraft development program:** to increase the knowledge of the entire handicrafts

sector about the new design trends & color forecasts so as to increase the exports from the country by increasing the new design led product.

- Comprehensive handicraft cluster development scheme:** to assist the artisans & entrepreneurs to set up world-class units, modern infrastructure, latest technology, and adequate training and HRD inputs, with market linkages and production diversification.
- Ambedkar Hastashilp vikas yojna:** to improve the handicraft artisans in India. The artisans are provided training and exposed to bigger marketplaces for better sale. It is with a purpose to empower and develop them into a well-organized market.
- SAMARTH (Scheme for Capacity Building in Textile Sector):** It will cater to bridge the shortage of skilled workers.

9

Carbon Dating of Excavated Finds at Mayiladumparai, Tamil Nadu

Context: Carbon dating of cultural deposits found in **Mayiladumparai in Krishnagiri district** has found they belong to **2172 BCE**, establishing that the **Tamils were aware of use of iron 4,200 years ago.**

Previous Theory

Iron technology was thought to have been brought to the Indian Subcontinent with the migration of **Indo-Aryans.**

Key-findings

- Of the 28 **Accelerator Mass Spectrometry-based (AMS)** dating of sites in India, Iron Age burial site of **Adichanallur** in southern Tamil Nadu is the earliest.

- The 28 sites include sites in Karnataka and Uttar Pradesh.
- ⦿ It has been established that Tamils who lived 4200 years ago were aware of iron.
- ⦿ This finding has answered questions relating to the use of iron and start of agricultural activity in Tamil Nadu.

Iron Age in India

- ⦿ **Origin:** The Iron Age began around 1200 B.C. in the **Mediterranean region** and Near East with the collapse of several prominent **Bronze Age civilizations**.
- ⦿ **Impact:**
 - It changed the earlier face of lithic-based culture and led to great changes in the sociocultural and economic conditions of early societies.
 - The use of iron led to change in the cultural milieu and also later ushered in the phase of urbanisation in Ganga Valley.
 - This urbanisation which is popularly known as **second urbanisation**.
- ⦿ **Significance of the findings:** Before Mayiladumparai, the earliest evidence of iron use for Tamil Nadu was from Thelunganur and Mangadu near Mettur, dating back to 1500 BCE.
 - The significance that the timeline of Iron-age in India need to be revisited and the beginning of culture might be in 2000 BCE further narrowed down the gap between **Indus Valley Civilisation (IVC)** and **Sangam Age**.

10

Preservation of Ancient Art forms in India

Context: Indian art forms serve as a means of preservation of cultural identity in a growing modernized world, making them invaluable, thus, there is a need to focus on the preservation of ancient art forms.

Significance:

- ⦿ The art is a social expression of the community to celebrate different occasions in life. It include visual, performing and literary arts with multiple art types in each category.

Need for Preservation of Ancient art forms in India

- ⦿ With Rapid industrialization of the world, the rural communities continue to be the **real flag bearers of our heritage traditions**. Ironically, the developing and under-served rural population is actually the one still practicing the ancient cultures of the world.
- ⦿ With the increasing urbanization, traditions and cultures are fast eroding.
- ⦿ Increasing living costs and urban aspirations for a convenient life, brings the rural population to the cities.
- ⦿ In the process of migration, the ancient practices are either looked down upon as 'backward' or are forgotten.
- ⦿ Dying Arts and Crafts of India includes **Chambalur paintings, Madhubani Paintings, craft of Kendrapara, Handloom Weaving, rangoli designs** and portraits and many others.
- ⦿ Indian government awards **Geographical tag** to these art forms to protect it from getting printed or produced in non-traditional ways.

11

Promoting Cultural Tourism in India

Context: Kerala Tourism department live-streamed **Theyyam performances** to promote cultural tourism

Significance of Cultural Tourism

- ⦿ India famous for its rich heritage and ancient culture. It is a mosaic of multicultural experiences. With a rich heritage and myriad attractions, the country is among the most popular tourist destinations in the world.
- ⦿ This cultural richness goes a long way toward projecting India as the ultimate **cultural tourism destination**.
- ⦿ Cultural tourism brings us closer to the local and world culture, gives us the chance to know both tangible cultural heritage (historical centers,

urban landscapes, museums), as well as intangible (customs, legends, music, dances, traditional cooking).

- It provides us with new knowledge, and teaches us. It inculcates in us human values and the valuation

of personal identity, as well as the knowledge of national heritage that gives us national values.

- Popular places in India famous for Cultural Tourism are: - **Varanasi, Tamil Nadu, Kerala, Udaipur, Karnataka etc.**

FESTIVALS

12 Chariot Festivals in India

Context: Annual chariot festivals carrying processional deities are held in temples across India.

Significance of Chariot Festivals in India:

- Inclusion:** Chariot is a moving temple; it makes it possible for the infirm, the poor, and the aged to worship their favourite deities, not by visiting the deity at the temple, but by getting the darshan of the deities at their doorsteps.
- Equality:** Also, a temple car being drawn by a huge number of devotees, who represent different strata of the society, signifies that everybody is equal before god.

Different Chariot Festivals in India

Tiruvuar chariot festival
Aazhi Ther
Srivilliputhur car festival
Chithirai festival, Madurai
Thanjavur
Samayapuram

Jagannath Rath Yatra:

- Origin:** Its origin dates back early medieval India.
 - The current temple was built by **Anantavarman of the Chodaganga dynasty** in the 12th century.



- Called the “**White Pagoda**” is a part of **Char Dham pilgrimages**.
- Ratha Yatra festival of Jagannath deva** celebrated in the month of **Asadha (June-July)** is the most well-known one.
 - Images of all three deities **Lord Jagannath, Lord Balabhadra, and Lordess Subhadra** are ceremoniously brought out of the inner sanctum (Garbhagriha) from the chief temple in **Jagannath Puri**.

Important Mentions

- This yatra is mentioned in Puranas.
- It is also mentioned in a **10th-11th century CE drama** written during the rule of the **Somavamshi dynasty**, which talks of the yatra of lord Purusottama (Jagannatha) near the sea shore.
- The earliest iconographical evidence of this ratha yatra is from the **Ganga dynasty era** (13th-14th century CE).

13 Attukal Pongala

Context: The largest congregation of women in the world in connection with the annual festival at **Attukal Bhagavathy Temple in Thiruvananthapuram** celebrated on February 27 this year.

Important facts about Attukal Pongala Festival

- ⦿ 10-day religious festival celebrated at the **Attukal Bhagavathy Temple** in Thiruvananthapuram of Kerala.
- ⦿ Devoted to Attukal Devi or Attukalamma. It is a women-centric festival.
- ⦿ The pongala preparation **starts** with the **ritual** called ‘**Aduppuvettu**’.
- ⦿ On the **ninth day**, there is a huge gathering of **millions of women** in the temple surroundings.
- ⦿ These women prepare a divine food made of rice in earthen pots and offer it to the **Attukal Amma (Goddess of the Temple)**.
- ⦿ The offering is made by **valiyachennellu, native organic**. This variety **is rich in iron content**.
- ⦿ This is the earliest Pongala festival in Kerala.

Attukal Bhagavathy Temple

- ⦿ A Hindu religious shrine of **Goddess Bhadrakali (Kannaki)**,
- ⦿ **Architecture:** The temple structure is a harmonious conglomeration of both Kerala and Tamil styles of architecture.
- ⦿ **Sculptures:**
 - The beautifully carved figures of Mahishasuramardini, Goddess Kali, Rajarajeswari, Sree Parvathy with Lord Paramasiva are depicted with other Gods.
 - The corridors walls also adorn the epic stories of the ten incarnations of Lord Vishnu viz., the “Desavathara”.
 - On the southern Gopura, the puranic story of “Dakshayaga” is depicted in sculptures.



Architecture

Topic of This Chapter

	TEMPLE ARCHITECTURE
1	Odisha's 11th Century Lingaraj Temple
2	Sacred Ensembles of the Hoysala
3	Sun Temple at Modhera and its Adjoining Monuments (Gujarat)
4	Sun Temple at Martand
5	Lepakshi Temple: An Architectural Marvel of Vijaynagara Empire
	CAVE ARCHITECTURE
6	Kanheri Caves: history of Buddhism
7	Charaideo Maidams (Ahom Burial Mounds)

TEMPLE ARCHITECTURE

1

Odisha's 11th Century Lingaraj Temple

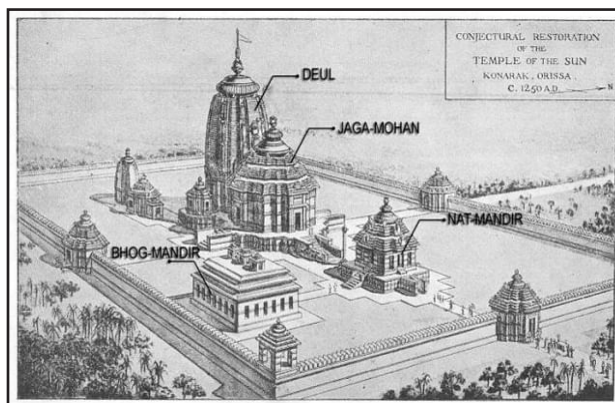
Context: Amid frequent incidents of delay in conduct of rituals and tussling among servitors, the state government may soon promulgate the Lingaraj Temple Ordinance, 2020.

About

- ⦿ Dedicated to Lord Shiva, who is also known as 'Lingaraj'.
- ⦿ It is approximately 54.8 metres high and enshrines a huge statue of Lord Shiva which is 8 feet in diameter and is made of granite.
- ⦿ Temple's construction history dates back to the later half of 11th century.
- ⦿ The temple comprises four parts namely the main temple-
 - the 'GarbhGriha'
 - the 'BhogaMandap'
 - the 'YajnaShala'
 - the 'NatyaShala'
- ⦿ Bindusagar, the sacred pond near the temple, has a unique connection with Lord Lingaraj. Religious scriptures say Bindusagar is the union of drops of water from various sacred rivers of India.

Architecture

- ⦿ **Kalinga style of architecture** built by the kings from the **Somavamsi dynasty**, with later additions from the **Ganga rulers**.
- ⦿ built in the **Deula style** that has four components, each increasing in the height to its predecessor, namely-
 - vimana (structure containing the sanctum)
 - jagamohana (assembly hall)
 - natamandira (festival hall)
 - bhoga-mandapa (hall of offerings)
- ⦿ Erected in red sandstone, has the stone of the darkest shade.



- ⦿ The tall spire of the temple extends to the height of 55 meters and literally, dominates the skyline of Bhubaneswar.
- ⦿ The spacious courtyard comprises 50 small shrines that are dedicated to several Gods.

Highlights of the redevelopment plan

- ⦿ Redevelopment of peripheral area of the 55-metre-tall temple, known as '**EkamravanKshetra**', in Bhubaneswar.

2

Sacred Ensembles of the Hoysala

Context: Hoysala temples finalised as India's nomination for **World Heritage site for 2022-23**.

Hoysala Temples

- ⦿ The Hoysala temples of **Belur, Halebid and Somnathapura** in Karnataka have been selected.
- ⦿ Also called '**Halebidu**' temple, is a 12th-century temple dedicated to Lord Shiva.
- ⦿ Largest monument in **Halebidu, Karnataka** and erstwhile capital of the **Hoysala Empire**.
- ⦿ By **King Vishnuvardhana**.

Architectural details of Hoysala Temples

- ⦿ **Dravidian style:** These temples have a basic Dravidian style, but also show a strong influence

of 'Bhumija', which is seen in central India, along with 'Nagara' traditions of northern and western India.

- **Hoysala temple form:** made informed selections of features from other temple architecture style then complemented with their own particular innovations. This resulted in the birth of a completely novel Hoysala temple form.
- **Inclusive themes:** Hoysaleswara temple follows the **Shaivism tradition**, but includes themes from **Vaishnavism and Shaktism**, too, along with images from **Jainism**. The sculptures depict scenes from the **Ramayana, the Mahabharata and the Bhagavata Purana**.

3

Sun Temple at Modhera and its Adjoining Monuments (Gujarat)

Context: Modhera recently became India's first 24x7 solar-powered village along with this the Sun Temple of Modhera also became the first heritage site in India to be solar powered.

Origin

Attack

Mahmud of Ghazni attacked the city of Modhera around 1025. He plundered the sun temple left with his loot.

- The origin of practice of Sun worship from sambal purana. Sambal was son of Krishna.
- sometimes called Mundera, the original settlement of the **Modha Brahmins** and is fabled to have been given them as a **Krishnarpana** on occasion of marriage of Ram and Sita.
- The Jain acharya, Hemchandra, was of the Modha Parentage.
- Sun Temple at Modhera is located on the left bank of the river Pushpavati, a tributary of river Rupan in Mehsana, Gujarat.
- The temple was built in **1026 CE** by **King Bhimdev** – a **Solanki King (Suryavanshi dynasty)** who ruled from Patan.

Architectural features

- **Architectural Style:** Maru-gurjara architecture style
 - This was the **peak of Indian temple architecture** with ample examples across the country of the **finest sculpted architecture**.
- Modhera Sun temple has 3 main parts.
 - The main temple with a *Garbhagriha* and a *mandapa* called *Guda Mandapa*
 - An outer hall or assembly hall (*Sabhamandapa* or *rangamandapa*)
 - A stepped water tank called Ramakunda.
- The temple is built using the locking system that is said to be an earthquake resistant method. It also sits on the **tropic of cancer** that passes through India.
- This temple is a contemporary of **Chola temples in South** and **Chandela temples in the North**.

Architectural development in Gujarat

- Many dynasties, such as the **Chavdas, Solankis, Vaghelas**, as well as wealthy **Jaina** merchants founded innumerable temples, lakes and stepped wells and embellished them with sculptures through the centuries.
- Due to this patronage a distinct style of architecture developed in Gujarat.

4

Sun Temple at Martand

Context: In a recent event, some offerings and worship (*Navgrah Ashtamangalam Puja*) was done at Martand Sun Temple, Archaeological Survey of India-protected (ASI) monument. ASI said that it's not part of living temple or heritage.

About

- Built by the **Karkota dynasty king Lalitaditya Muktapida in 8th century AD**, who ruled Kashmir from 725 AD to 753 AD.
 - **Source of information:** 'Rajatarangini', written in the 12th century by Kalhana.

- ◎ **Architecture:** construction and architectural design has mix of Kashmiri, Gupta and Chinese style of architecture.
 - The temple is ringed by a row of pillars—the peristyle common in Kashmiri temple architecture.

Demolition

by Sultan Sikandar Shah Miri, who ruled Kashmir from 1389 to 1413, although many historians hold a different opinion.

Rules of Prayer in Ancient Monuments

- ◎ **Rule 7(1) of the 1959 Ancient Monuments and Archaeological Sites and Remains**, states that meetings, receptions, parties, entertainment or conferences cannot be held at a protected monument without permission in writing from the Union government.

Living Monuments

- ◎ Living monuments denotes the places where offerings of prayers or worship was carried on from generations and it was in continuity when ASI declared its as protected monument or heritage.
 - Best-known example of a living ASI monument- **Taj Mahal in Agra**, Other notable **Hindu temple inside the Dayaram Fort in Hathras**, three mosques in Kannauj, **Roman Catholic Church** in Meerut, **Nila Mosque** in Delhi's Hauz Khas Village, **Bajreshwari Devi Temple** in Himachal Pradesh's Chamba, and several Buddhist monasteries in Ladakh.

Sun worship in India

- ◎ Possibly started in the Neolithic period.
- ◎ Royal Patronage
 - Patronage among the ruling communities, **Pushyamitra, the Shunga ruler**.
 - The **Vardhan dynasty of Thaneswar** was a devotee of the Sun, as is evident by the epithet *paramadityabhakta* applied to three ancestors of Harshavardhan in the Sonipat copper plate inscription.

- In the religious assembly attended by Hiuen Tsang, the image of the Sun god was installed along with Buddha and Shiva.
- **Pratihara kings Rambhadra and Vinayakapala** appear to have been Sun worshippers too.

5

Lepakshi Temple: An Architectural Marvel of Vijayanagara Empire

Context: Veerabhadra Swami temple, got listed in the UNESCO's tentative list of world heritage sites in India for 2022.

About

- ◎ **Lepakshi temple** has its reference in *Skandapurana* as one of the 108 most significant Shaivite temples in India.
- ◎ Famous center of trade and pilgrimage during the period of **Vijayanagara Kings**.
- ◎ **Built by:** In the **16th century**, by Virupanna and Veeranna during the reign of **Vijayanagara King Achyuta Devaraya**.
- ◎ Situated on a low rocky hill called *Kurmasaila*, which resembles the unique shape of a tortoise.
- ◎ **Architecture:** Vijayanagara style of architecture
- ◎ **Deity:** The main deity of the temple is **Lord Veerabhadra**, the fiery form of Lord Shiva. Other deities worshiped here include **Lord Vishnu, Papavinaswara, Parvati, Bhadrakali, Hanumalinga, Ramalinga, and Sayanagara**.

Outstanding Features at Lepakshi

- ◎ **Veerabhadra Swami:** Veerabhadra Swami is situated atop the *Kurmasailam* (tortoise-shaped) hill.
- ◎ **Lepakshi Nandi:** The Lepakshi Nandi (Lepakshi Basavanna), is a monolithic bull in sitting posture.
- ◎ **Natya Mandapa:** Also called as Ranga Mandapa, which is renowned as the 100-pillared dance hall. Long pillared halls and intricate carvings of yalis,

flowers, trees, animals, yakshas and yakshis can be seen on each pillar.

- ◎ **Hanging pillars:** one of the most eye catching feature of the temple.

- ◎ **Seven-headed serpent:** the massive carving of a seven-headed serpent shielding a Shivalinga.
- ◎ **Murals:** depicting the scenes from Ramayana, Mahabharata and other scriptures.

CAVE ARCHITECTURE

6

Kanheri Caves: history of Buddhism

Context: Kanheri Caves, home to a renowned Buddhist university, in Mumbai and Vajreshwari town in neighbouring Bhiwandi have been declared as tourist centres

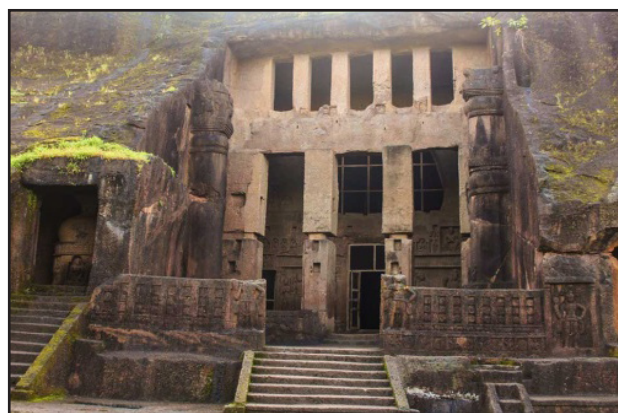
About

- ◎ Its cave known as Kanheri cave in Borivali, Mumbai, Sanjay Gandhi National Park.
- ◎ They span from the 1st century BC to 11th century AD, an era that saw the rise and decline of Buddhism.
- ◎ **Name game:** Kanheri, known as Krishnagiri or Kanhagiri in ancient inscription, literally means black mountain (*Krishna* means black and *giri* is mountain) and is mostly named after its black basaltic stone.
- ◎ **Architecture:** Kanheri Caves boast an ancient Buddhist architectural style, with viharas, stupas, prayer halls and more. Unique aspect is that they are carved out of a single bedrock (**rock cut architecture**).
- ◎ **Significance:** Its significance lies in the fact that in its caves,
 - All three vehicle of Buddhism are present, i.e. Mahayan, Hinayan and Vajrayan (Tantrik form of Buddhism associated with Tara Devi).
 - There are Chaityas and viharas along with a large statue of Buddha and others like Avalokiteshwara (Bodhisattava).

Rock cut architecture in India

- ◎ Maharashtra is the capital of ancient rock-cut architecture in the country a thousand or more are found here.

- ◎ The most well-known are **Ajanta, Ellora and Aurangabad**. While caves were mostly Buddhist, Hindu rock-cut caves at Ellora from the fifth century CE onwards.
- ◎ The cave architecture highest point in the development in the monumental “Kailasa Temple”, or Cave 16, at Ellora.



7

Charaideo Maidams (Ahom Burial Mounds)

Context: The Centre has decided to nominate Assam's Charaideo Maidams — the Ahom equivalent of the ancient Egyptian pyramids — for the UNESCO World Heritage Centre.

About

- ◎ These are the burial mounds of Ahom royals. Ahom Kingdom was in 13th century (1228) along the foothills of Patkai range and in the Brahmaputra valley.
- ◎ The Ahom rule lasted for about 600 years until the British annexed Assam in 1826.
- ◎ Charaideo, more than 400 km east of Guwahati, was the first capital of the Ahom dynasty founded by *Chao Lung Siu-Ka-Pha* in 1253.

Why is it a significant site?

- ⦿ Contains the mausoleum or the burial mounds of the Ahom royals, called Charaideo Maidam.
- ⦿ Also referred to as *the Pyramids of Assam*.
- ⦿ A sacred place for the ancestral gods of the Ahoms.

Significance of the development

- ⦿ The nomination attained significance at a time when the country is celebrating the 400th birth anniversary of Lachit Barphukan.



- Lachit Borphukan was an army general of Ahom's who repulsed the Mughals in a naval Battle fought at Saraighat in 1671 in the Brahmaputra valley.



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Literature

Topic of This Chapter

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| 1. | Konkan Petroglyphs |
| 2. | Uttaramerur Inscriptions |
| 3. | Chola Bronze Sculptures |
| 4. | Cyclopean Wall |
| 5. | Close Connection between India and Southeast Asia |
| 6. | 2nd G20 Culture Meet to Focus on Sustainability through Crafts |
| 7. | Ramcharitmanas of Tulsidas-Criticism and Controversies |
| 8. | Monuments of National Importance |

1 Konkan Petroglyphs

Context: Konkan petroglyphs find themselves in the tentative list of UNESCO World Heritage Sites.

What are Petroglyphs?

- It denotes a form of rock art.



- “Petroglyphs” is used to describe any image created on a rock surface by scouring, scratching, engraving, chiselling, carving, incising, picking, carving, or abrading or any similar method.

What is the difference between Petroglyphs and Rock Art?

- Whereas a petroglyph is a narrow type of stonework, the term “rock art” is a much wider term which embraces three types of art:
 - **Petroglyphs**
 - **Pictographs**, including cave painting or any other form of pictorial symbol.
 - **Megalithic Art**, or petroforms, involving the arrangement of stones

Petroglyphs in India

- **Bhimbetka rock shelters** in Madhya Pradesh
- **Rock carvings** in Mirzapur in Uttar Pradesh
- **Petroglyphs from the Tindivanam and Viluppuram districts** in Tamil Nadu
- **Unakoti** in Tripura

Konkan petroglyphs- Estimated to be 12,000 years old

- More than 1500 dating back to the **Mesolithic era**.
- **Significant biodiversity:** Most carvings are of land and marine animals, and get this, some of these rock art are of animals that are long extinct. This reflects the kind of biodiversity.
- **Filing the historical gap:** These petroglyphs fill a huge gap in the history of the Konkan region. In the medieval age, the Konkan coast was lined with **important port towns**.

2 Uttaramerur Inscriptions

Context: The inscription has been recently mentioned by PM in his *man ki baat* address while emphasizing the democratic nature of Indian socio-political realm since ancient times.

About

- A 1,100 years old inscription from Tamil Nadu, built during the reign of Chola king Parantaka I, describes processes of village self-governance. The walls of the Vaikunda Perumal Temple in Uttaramerur are inscribed with details revealing systems of local governance from the 10th century CE.



- The inscription found there is like a local constitution for the gram sabha.
- It tells how the assembly should be run, the qualification of members, the process to elect the members, and how a member would be disqualified.

What does the inscription says:

- ◎ The inscription gives details of the functioning of the local *sabha*, i.e. the village assembly.
 - A *sabha* was an assembly exclusively of *brahmins* and had specialised committees tasked with different things. It details how members were selected, their qualifications, roles and responsibilities, and the circumstances in which they could be removed.
- ◎ For constituting *sabha* there will be 30 wards. Everyone living in these 30 wards would assemble and select one representative for the village assembly.
- ◎ The qualifications for such a representative. These include ownership of a certain amount of land, having a house, being between the age of 35 and 70 and “knowing *mantras* and *Brahmanas*” (from the Vedic corpus). An exception can be made on land ownership if the person has learnt at least “one *Veda* and four *Bhashyas*”. One must also be “well-versed in business” and “virtuous”.
- ◎ While the Uttaramerur inscription gives details of local self-governance, on closer inspection, it is far from a truly democratic system.
- ◎ It restrict *sabha* membership to a tiny subsection of land owning *brahmins*, it also does not have true elections. Rather, it chooses members from the eligible pool of candidates through a draw of lots.
- ◎ However this does not mean that this inscription should not be cited as a precedent for democratic functioning. The idea of a democracy, as understood today, is a fairly recent phenomenon.

3 Chola Bronze Sculptures

Context: The Stolen sculpture of Lord Hanuman belonging to late **Chola Period** (14th -15th century) has been retrieved and handed over to the Idol Wing, Tamil Nadu.

Origin of Bronze Sculpture

- ◎ Besides dancing girl from **Mohenjo-Daro**, origin also lies in **medieval era** with the urge to take out the Gods in palanquins from the temples.

- ◎ Since this was not possible with huge stone idols, smaller idols carved in metal were light and easy to be taken around. Then gradually rich and famous started to donate bronze idols to temples.



◎ Notable Sculptures:

- **Nataraja** form of shiva denotes creation and destruction and removing illusion from minds of individual.
- Somaskanda where Shiva is depicted sitting with his consort Uma and his son Skanda dancing between them on a platform.
- In later period like 13th century, bronze sculpture showing **Bhudevi or the earth goddess as the younger consort of Vishnu** can be found.

◎ Features of Chola bronze idols:

- They are built using ‘Lost-wax technique.’
- Bronze from chola period depicted the fine details of body and its movements.
- Hence the shape, contours, facial and hand expressions of these idols are unparalleled in extent and sophistication.

4 Cyclopean Wall

Context: A proposal has been sent by Bihar government to ASI to get **2,500-yr-old Cyclopean wall** included in World Heritage site list.

About

- ◎ The Cyclopean Wall of Rajgir is a 40 km long wall of stone which encircled the **ancient city of Rajgir** to protect it from external enemies and invaders, built before **3rd century BC**.



- ◎ It is oldest examples of **cyclopean masonry** in the world. It is believed to have been built in the **pre-Mauryan era**.
- ◎ It is believed that the Cyclopean Wall at Rajgir is similar to “**Frontiers of the Roman Empire**” that runs through Germany, UK and Northern Ireland, which was included on UNESCO’s world heritage list in 1987.

Cyclopean masonry: Wall constructed without mortar, using enormous blocks of stone. This technique was employed in fortifications where use of large stones reduced the number of joints and thus reduced the walls’ potential weakness.

Benefits from getting UNESCO World Heritage site tag:

- ◎ **Awareness for preservation:** The resulting prestige often helps raise awareness.
- ◎ **Assistance:** A country may receive financial assistance and expert advice from the World

Heritage Committee to support activities for the preservation.

- ◎ **Tourism and growth:** It provides stimulus for growth in national and international tourism.
- ◎ **Geneva Convention:** Further it also gets the benefit under **Geneva Convention** in terms of protection against destruction during wars.

5

Close Connection between India and Southeast Asia

Context: The Government of India’s ‘Act East policy’ aims at improving economic and political relations with the Southeast Asian region which has had close contacts with India for centuries and is linked culturally with it.

What led to cultural exchange?

Trade: Influence of Hinduism and Indian culture in Southeast Asia is commonly understood as a result of conquest and trade.

- ◎ Campaigns of **Rajendra Chola I**, ruler of the **Chola dynasty**, invaded the Indianized Indonesian state of **Srivijaya (650–1377 CE) in 1025 CE**.
- ◎ Tamil, rather than Malay power, predominated in maritime Southeast Asia for two centuries subsequent to this.
- ◎ For centuries Indian traders have carried out trade of **exotic spices, tea, precious and semi-precious metals etc.** with South East Asia. This led to exchange of many cultural traditions.

Examples

- ◎ **Language:** It can be seen in influence of **classical languages of India** on SE Asian languages and scripts.
- ◎ **Common traditional themes:** Traditional dances, puppetry, name of places temples architectural style of temples, customs and traditions exhibit Indian culture.
 - **For example**
 - Adventures of Ram, Sita and Hanuman form a common theme in traditional dances and puppetry.

➤ **Lakhan Khol Mask theatre of Cambodia** having its origins during the Angkor period has epics like Ramayan (Ramker) in its theme. Angkor Wat temple in Cambodia means "Abode of Vishnu"

➤ Temple complexes at Angkor Wat have beautiful, intricate panels depicting scenes from the Ramayana and the Mahabharata.

⊙ **Festivals:** Various Indian Hindu festivals are celebrated with great pomp in Southeast Asian countries. **For example**, Diwali is one of the most celebrated festivals in Singapore.

⊙ **National symbols:** National symbol of Indonesia bears the symbol of Garuda, The eagle mount of the Hindu God Vishnu. National airline is known as 'Garuda Indonesia'

⊙ **Sculptural arts:** Padma Subrahmanyam and Kapila Vatsyayan made the observation that the sculptural arts of Southeast Asia reflected a deep understanding of codes within the Natyashastra.

6

2nd G20 Culture Meet to Focus on Sustainability through Crafts

Context: G20 India's second **Culture Working Group Meet** concluded in Bhubaneswar with a holistic vision to work towards a collective sustainable future and universal well-being.

Key-highlights

- ⊙ **Theme:** *culture unites all*
- ⊙ **Major point of discussion:** Issues facing the culture sector to deliberate in-depth work towards tangible, action-oriented recommendations.
- ⊙ Culture has been designated as a global public good, placing it at the heart of international policy and cooperation.
- ⊙ **Key-priority areas:** The meetings of the Culture Working Group focus on four key priority areas:
 - Protection and Restitution of Cultural Property
 - Harnessing Living Heritage for a Sustainable Future
 - Promotion of Cultural and Creative Industries and Creative Economy

➤ Leveraging Digital Technologies for the Protection and Promotion of Culture

- ⊙ According to the United Nations Conference on Trade and Development report, global creative goods exports stand at \$1.1 trillion.
- ⊙ South-South trade in creative goods amounts to 40.5% of exports by developing economies.
- ⊙ India's creative economy accounts for an overall market size of about \$36.2 billion.

7

Ramcharitmanas of Tulsidas-Criticism and Controversies

Context: Political controversies surrounded around Ramcharitmanas interpretation and depiction of various personalities.

About

- ⊙ The Ramcharitmanas is based on the Ramayana, sage Valmiki's great epic.
- ⊙ It is the holiest book of the Indo-Gangetic region. It was written in Awadhi dialect in 16th century. Divided into seven chapters (Kand) that tell the story of Lord Ram from birth to his becoming King of Ayodhya.

Goswami Tulsidas

- ⊙ A Brahmin whose original name was **Ram Bola Dubey**. He composed the Ramcharitmanas on the bank of the Ganga in Varanasi — he is said to have begun writing on Ram Navami day in 1574.
- ⊙ In the seventh shloka of the first chapter (Baal Kand), Tulsidas declares, "Swantah sukhay Tulsi Raghunathgatha..." — that is, he has written the "story of Raghunath (Lord Ram) for his own happiness".
- ⊙ Tulsidas lived in the time of Emperor Akbar, and some believe that he was in touch with **Abdurrahim Khan-e-Khanan**, the son of Akbar's commander **Bairam Khan**, and they possibly exchanged some poetic communication as well.

Genesis of controversy

- While in the Ramcharitmanas, Lord Ram is *maryada purushottam*, the epitome of righteousness, his conduct has been criticised by leaders of anti-Brahmin movements like **E V Ramasamy Periyar**.
- Non-upper caste assertion in politics has sometimes been manifested in criticism of the Ramcharitmanas.
- Critics have used these parts of the poem to accuse Tulsidas of being against the non-upper castes and women, and a flagbearer of the idea of Brahminical superiority.

8

Monuments of National Importance

Context: A report- 'Monuments of National Importance (MNI): Urgent Need for Rationalization' has been released by **Economic Advisory Council to the Prime Minister (EAC-PM)**.

Monuments of National importance

- Article 49** of Indian constitution directs the state to protect monuments and places and objects of national importance across the country.

- Thus in this regard the **Ancient Monuments and Archaeological Sites and Remains Act, 1958 (AMASR Act, 1958)** was enacted.
- It provides for the declaration and conservation of ancient and historical monuments and archaeological sites and remains of national importance
- Issue in the Act:** lack of definition of national importance.
- According to the report there are **3695 Monument of National importance (MNI)** and the responsibility to protect those lies with ASI.
- Once a monument or a site is declared to be of national importance, they come under the supervision of ASI under the provisions of the **AMASR Act, 1958**.
- One hundred-meter radius of the monument is then considered a 'prohibited area' where there is a ban on construction activities.
- Further 200 meters (i.e. 100+200 meters) is considered a 'regulated area' where there are regulations on construction.
- Ministry of Culture** manages all the **Centrally Protected Monuments (CPMs) of National Importance**, through the **Archaeological Survey of India**.



Religious Movement

Topic of This Chapter

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| 1. | Saint and Philosopher: Sri Ramananujacharya |
| 2. | Raja Ram Mohan Roy's 250th Birth Anniversary |
| 3. | Maharishi Dayanand Saraswati |
| 4. | Anubhava Mantapa of Lord Basaveshwara |
| 5. | Sammed Sikhar and Shatrunjay Hills |

Saint and Philosopher: Sri Ramananujacharya

Context: Statue of Equality, a gigantic statue of Ramanujacharya, unveiled in Hyderabad.

Ramananujacharya- Life and contributions

- Born in 1017 in Sriperumbudur in Tamil Nadu; he is revered as a **Vedic philosopher and social reformer**.



- Revived the **Bhakti movement**, and his preaching's inspired other Bhakti schools of thought.
- The inspiration for poets like **Annamacharya, Bhakt Ramdas, Thyagaraja, Kabir, and Meerabai**.
- He wrote nine scriptures known as the navaratnas, and composed numerous commentaries on Vedic scriptures and is credited with establishing the correct procedures for rituals performed in temples throughout India, the most famous being Tirumala and Srirangam.
- His major work was **Vedārtha Sangraha, Sri Bhashya, and Bhagwat Gita Bhasya**.
- **Major contributions:**
 - **Against inequality:** Sri Ramanujacharya preached the **spirit of equality** and fought against all sorts of inequalities.
 - **Social equality:** He was an ardent advocate of social equality among all sections of people centuries ago, and encouraged temples to open their doors to everyone irrespective of caste

or position in society at a time when people of many castes were forbidden from entering them. He took education to those who were deprived of it.

- **Protection of nature:** He has also stressed the need of being in tune with nature and not to over-exploit it. He appealed for the protection of nature and its resources like air, water, and soil.
- **Unifying universe:** His greatest contribution is the propagation of the concept of “*vasudhaiva kutumbakam*”, which translates as “all the universe is one family”.
- **Sri Vaishnavam Sampradaya:** He spoke of universal salvation through devotion to God, compassion, humility, equality, and mutual respect, which is known as Sri Vaishnavam Sampradaya.
- **Liberation:** He liberated millions from social, cultural, gender, educational, and economic discrimination with the foundational conviction that every human is equal regardless of nationality, gender, race, caste, or creed.

Raja Ram Mohan Roy's 250th Birth Anniversary

Context: In 2022, the Ministry of Culture held the inaugural ceremony to commemorate the yearlong celebrations of Raja Ram Mohan Roy's 250th birth anniversary.

Early life

- Born on May 22, 1772 in then **Bengal Presidency's Radhanagar** in **Hooghly** district.
- He grew up within the framework of orthodox caste practices of his time: **child-marriage, polygamy and dowry** were prevalent.
- A polyglot, Roy knew Bengali and Persian, but also Arabic, Sanskrit, and later, English.
- His exposure to the literature and culture bred in him a scepticism towards religious dogmas and social structures.

Works and Contribution towards society- Maker of Modern India

- Roy was among **India's first liberals**. He believed

religion to be the site of all **fundamental changes**. What he fought was not religion but what he believed to be its perversion. (Rabindranath Tagore called him a '**Bharatpathik**' by which he meant to say that **Rammohun** combined in his person the underlying spirit of Indic civilisation, its spirit of pluralism, tolerance and a cosmic respect for all forms of life)

- ⦿ Roy was among **India's first liberals**. He chafed at practices such as Sati.
- ⦿ **Campaign against social evils:** In 1814, he started the **Atmiya Sabha (Society of Friends)**, to nurture philosophical discussions on the idea of monotheism in Vedanta and to campaign against idolatry, casteism, child marriage and other social ills.
 - The **Atmiya Sabha** would make way for the **Brahmo Sabha** in 1828, set up with **Debendranath Tagore**, Rabindranath Tagore's father.
 - It was his relentless advocacy alongside contemporaries such as **Ishwar Chandra Vidyasagar** that finally led to the abolition of Sati under the governor generalship of **William Bentinck** in 1829. Roy argued for the property rights of women, and petitioned the British for freedom of the press (in 1829 and 1830).
- ⦿ **Modernisation of education:** He campaigned for the modernisation of education, in particular the introduction of a Western curriculum, and started several educational institutions in the city.
- ⦿ **Hindu College:** In 1817, he collaborated with Scottish philanthropist David Hare to set up the Hindu College (now, Presidency University). He followed it up with the **Anglo-Hindu School** in 1822.
- ⦿ He was given the title of **Raja** by the **Mughal emperor Akbar II**. He was among the first Indians to gain recognition in the UK and in America for his radical thoughts, in his lifetime, Roy was also often attacked by his own countrymen who felt threatened by his reformist agenda, and by British reformers and functionaries, whose views differed from his.

Roy was unquestionably the first person on the subcontinent to seriously engage with the challenges posed by modernity to traditional social structures and ways of being. He was also one of the first Indians whose thought and practice were not circumscribed by the constraints of kin, caste and religion.

3

Maharishi Dayanand Saraswati

Context: On February 12th, 2023, PM Modi inaugurated the year-long celebrations commemorating 200th birth anniversary of **Maharishi Dayanand Saraswati**, the social reformer.

About Maharishi Dayanand Saraswati (1824-1883)

- ⦿ Born on **12th February 1824**, Maharishi Dayanand Saraswati was a social reformer who founded **Arya Samaj** in 1875 to counter social inequities prevalent during the times.
- ⦿ Arya Samaj has played a crucial role in the cultural and social awakening of the country through its emphasis on social reforms and education.

Works and Contribution:

- ⦿ Started **Shuddhi movement** with the objective of bringing back converts from Christianity and Islam to back to **Hinduism**. This was particularly aimed at bringing back backward classes and give them an egalitarian feel through **arya samaj**.
- ⦿ **Back to Vedas:** He preached that all should read **veda** and we shall follow the basic principles enshrined in it. His famous slogan was "Back to vedas". He was also in favour of imparting Vedic teachings to women and backward classes for making more inclusive changes in societal approach.
- ⦿ **Dayanand Anglo vedic schools:** He was in favour of **anglo vedic** mode of education, this aim was fructified through establishment of **Dayanand Anglo vedic schools**, the first one in Lahore in 1886. These **DAV schools** were also poised as alternative to missionary schools.
- ⦿ He expressed his socio-political and religious views in his well-known work, *Satya Prakash (1875)*.
- ⦿ **Against untouchability:** He was against the ills of untouchability. He said that dharma according to him is justice which shall be free from any partiality. This echoed well with varied sections of population.

- ☉ **Equal society for women:** Through his **Arya samaj movements** he supported the women education, girl's education, supported widow remarriage, voiced against child marriage. He also emerged as a logical and effective voice against the stereotypes that had flourished in society regarding women.
- ☉ He established **Paropkarini sabha** under **Arya samaj** to propagate **Vedic traditions** and teachings. His notion of religion in India goes beyond rituals and is defined as an entire way of life.

4

Anubhava Mantapa of Lord Basaveshwara

Context: Recently The Prime Minister of India mentioned about the **Anubhava Mantapa** of Lord Basaveshwara in his 'Mann ki Baat' episode.

Anubhava Mantapa

- ☉ One of the earliest Parliament in history of mankind which was established to facilitate exchange of philosophy and ideas.
- ☉ It tackled issues which were of various natures and dimensions covering social, religious, spiritual, yogic psychological, economic, and literary spheres.
- ☉ However it was different from present day parliamentary system as it was not elected but nominated by higher authorities of Mantapa.
- ☉ Among its higher authority- Prabhudeva, a great Yogi of extraordinary achievement, was the President and Lord Basava acted as the Prime Minister.

Lord Basaveshwara (1105-1167):

- ☉ A 12th century poet and born in Karnataka. He is known for **Socio-Religious Reforms, Anubhava Mantapa**, Vachana Literature and Lingayat Movement. Lingayats are subcaste within hindu fold and not a separate religion yet.
- ☉ His full life account and ideas are in **Basava Purana**, written by **Palkuriki Somanatha** in 13th-century, He **rejected gender and caste discrimination, superstitions and rituals**. He was a strong preacher and promoter of **ahimsa (non-violence)**.

5

Sammed Sikhar and Shatrunjay Hills

Context: The recent past has witnessed an outpouring of anger in the Jain community as hundreds took to the streets protesting two incidents related to holy sites in Jharkhand and Gujarat.

Reasons behind protest

- ☉ The protest in Jharkhand was against the categorisation of one of the community's most sacred sites— **Sammed Shikharji atop Parasnath Hill in Giridih district** — as a **religious tourist destination**.
- ☉ Sammed Sikharji or Shikharji is considered one of the most sacred sites among the **Digambara and Shwetambar Jain communities**.
- ☉ The shrine is located atop a range of hills, named after the **23rd Tirthankara, Parasnath**.

About Sammed Shikharji

- ☉ Shikharji also known as Sammed Shikharji is a pilgrimage site in Giridih district, Jharkhand, India.
- ☉ It is located on Parasnath hill, the highest mountain in the state of Jharkhand.
- ☉ It is the most important **Jain Tirtha (pilgrimage site)** by both Digambara and Shwetambara, for it is the place where twenty of the twenty-four Jain Tirthankaras along with many other monks attained Moksha.
- ☉ The hill holds significance for the state's tribal community as well. "The Santhals call it 'Marang Buru', the hill of the deity. They celebrate a hunting festival on the full moon day in Baisakh (mid-April)," says the Jharkhand government website.
- ☉ The hill is named after Parasnath, the 23rd Tirthankara. Twenty Jain Tirthankaras attained salvation on this hill.
- ☉ Some of the temples on the hill are believed to be more than 2,000 years old. However, although the place is habited from ancient times, the temples may be of more recent origin.



Puppetry

Topic of This Chapter

1. Kerala Puppets Showcase India's Pride In Korea Museum

Kerala Puppets Showcase India's Pride In Korea Museum

Context: Two Tholpavakoothu puppets from the district were displayed at a prestigious international exhibition being held at Chuncheon in South Korea.

- ⦿ The leather puppets of Ravana and Hanuman were chosen for the exhibition as they perfectly suited the Chuncheon theme of '**traditional and contemporary Asian puppetry**'.
- ⦿ Most traditional Indian puppet shows tell the story of **Ramayana and Mahabharat**. In States such as Kerala, Tamil Nadu and Odisha, it is exclusively Ramayana.
- ⦿ It was a recognition not only for the traditional temple art of shadow puppetry from the State,

but also for the entire country which has given the world the epics of Ramayana and Mahabharat.

- ⦿ **Different forms and types-**
 - Tholpavakoothu in Kerala
 - Tholu Bommalatam in Tamil Nadu
 - Tholu Bommalatta in Andhra Pradesh
 - Thogalu Gombeyatta in Karnataka
 - Raban Chhaya in Odisha
- ⦿ Although Kerala has another puppet art named **Pavakkathakali too**.
- ⦿ The post-pandemic scenario had opened a great opportunity for the traditional Indian artistes to present their art across the world.
- ⦿ However across India, the puppetry art shows is not much happening at large scale and done by traditionals only.
- ⦿ A pinch of globalisation along with commercialisation would fetch far better results in terms of both propagation and preservation of this beautiful art form.



Miscellaneous

Topic of This Chapter

1.	Hakku Patra
2.	Suranga Bawadi and Karez System- An Efficient Water Harnessing and Conservation System
3.	Numismatic History of India
4.	SC Declares Amended Jallikattu Law Valid
5.	New finds at Rakhigarhi-Largest Site in Sub-continent
6.	Dholavira as Source of Information about IVC

1 Hakku Patra

Context: PM has recently distributed the **Hakku Patra** to the members of **Banjara tribes** in Karnataka.

About

- ⦿ The Hakku Patra is a **property ownership document** by which the bearer gets to own land.
- ⦿ With the help of this document, the bearer is eligible to purchase and sell land to which the title deed is granted by the government. They will further receive bank benefits by means of the Hakku Patra.
- ⦿ The **Banjaras**, are also known as **Lambadi, Gour Rajput, Labana**. They are a historically nomadic trading caste who may have origins in the Mewar region of Rajasthan.
- ⦿ This Hakku Patra will also secure the future of thousands of people living in the 'Thandas' (Lambani habitats) in **Kalaburagi, Bidar, Yadgiri, Raichur and Vijayapura districts**.
- ⦿ According to the National Informatics Centre, the name Banjara /Banjari probably had come from two different sources: 'Baniya' - trade or 'Banachara', the forest dwellers. Their principal group's name Laban/Labana is derived from the Sanskrit word lavana, meaning salt as they were salt traders. They are found moving around in different parts of the country especially during fairs and festivals.
- ⦿ They are multi-lingual. Their mother tongue is 'Banjari'. Besides, they are also conversant in regional languages like Odia, Hindi, Telugu, Tamil, Kannad, Marathi etc depending upon their place of residence as they move here and there for trading.

2

Suranga Bawadi and Karez System- An Efficient Water Harnessing and Conservation System

Context: Suranga Bawdi was recently inducted in the World Monument Watch list.

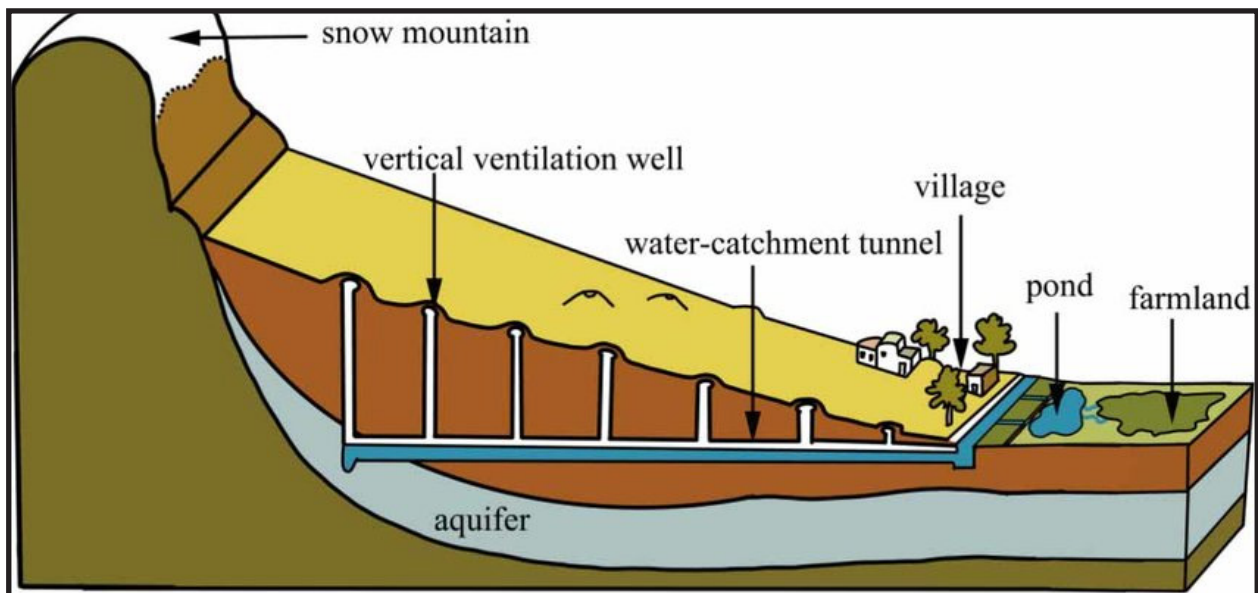
What is Suranga Bawdi?

- ⦿ **Suranga Bawadi**, an integral part of the ancient **Karez system of supplying water through subterranean tunnels built during the Adil Shahi era in Vijayapura or Bijapur (Karnataka)**, is now set to get funding for restoration.
- ⦿ The Adil Shahis built the magnificent underground system to supply water to the city, which had a population of nearly 12 lakh then.
- ⦿ His successor, **Ibrahim Adil Shah-II**, brought in several changes by adding more structures to strengthen it.



Karez System

- ⦿ **Origin:** Karez System is a water harnessing technology that originated in **Iran/Persia**.
- ⦿ **How does it work?** The Karez technology basically taps into the groundwater sources (or natural springs) and transports it through an **underground tunnel** to the settlement, ending in surface canal and/or pools in the village for various uses like drinking, washing, ablution, watering livestock, and also further used for irrigating fields, orchards and gardens.
- ⦿ **Advantages:**
 - **Easy transportation:** Karez allow water to be transported over long distances in hot dry climates without loss of much of the water to evaporation.
 - **Resistant to natural disasters:** The system has the advantage of being resistant to natural disasters such as earthquakes and floods, and to deliberate destruction in war.
 - Furthermore, it is almost insensitive to the levels of precipitation, delivering a flow with only gradual variations from wet to dry years.



- **Sustainable:** A karez is environmentally sustainable as it has no additional energy requirement and, thus, has low life cycle operation and maintenance costs.

3

Numismatic History of India

Context: A Maharashtra-based numismatist has urged the Union government to exempt **Indian antiques, artefacts and ancient coins** from Customs duty and encourage historians in bringing them back to India.

About numismatics

- ☉ The study of coinage in history is called **numismatics**.
- ☉ Most of the artefacts went missing under the British colonial rule and later, due to illegal activities.
- ☉ Strenuous effort is being made by historians and numismatists to protect India's history with their attempt to repatriate the rich heritage items from international antiques market.

Origin and History of currency/ Coins in Indian subcontinent

- ☉ Cowry shells were first used in India as commodity money.
- ☉ A term *Nishka* appears in this sense in the *Rigveda*. Later texts speak of cows given as gifts being adorned with *pādas* of gold.

- ☉ A *pāda*, literally a quarter, would have been a quarter of some standard weight.

Ancient Coins

- ☉ The **Coinage of India** began between early 1st millennium BCE to the 6th century BCE, consisted mainly of copper and silver coins in its initial stage. The coins of this period were *Karshapanas* or *Pana*.
- ☉ Evidences of punch marked coins from 6th BC to 1st AD. Coins were punched with a different symbols and each time a different punch was used. These coins were from Early Janpadas/mahajanpadas and Imperial Mauryas. Buddhist texts and Panini's *Ashtadhyayi* refer to terms like *kahapana*/*karshapana*, *nikkha*/*nishka*, *shatamana*, *pada*, *vimshatika*, *trinshatika*, and *suvanna*/*suvarna*.
- ☉ The Mauryan Empire used the punch-marked coins but with royal standard to make sure of their authenticity.
- ☉ **Indi Greeks**- They were the first to bear names and images of ruler. Metal used was gold, silver, copper and nickel. Standard weight was used. The languages on these coins was **Prakrit**, inscribed mostly in Kharoshthi script.
- ☉ **During the period of Kushanas**- Names of Gods/deities and king on the other side of coin was began to be issues. They have brought (first dynasty) gold, silver and copper coins. In terms of representation, the coins depicted the images of Buddha, Shiva and Kartikeya.
- ☉ The **Imperial Guptas** issued well-minted and well-executed gold coins. King on the obverse

and deity on reverse. The coins of Gupta denotes successions, sacrifices, plays, etc. Gupta Coins have also shown rulers like Samudragupta and Kumaragupta playing Vina. They issued coins in gold in large numbers and have been credited to their fine aesthetic appeal. However, the period saw the decline in purity of gold in coins owing to decline in trade and economy at large.

Post Gupta

- ◎ **Satvahans-** They issued Copper, silver, lead and Potins. They have symbols, motifs, portraits, legends and nature.
- ◎ The dynasties like the **Gurjaras, Pratiharas, Chalukyas, Paramaras, and the Palas** from circa 530 CE to 1202 CE can be put under a broad category of Indo-Sassanian styled coinage.
- ◎ The main features-bust of the ruling sovereign in a simplified geometric style on the obverse and a motif like a fire altar on the reverse.

In Southern India

- ◎ Depicted dynastic motifs like tiger of chola, fish for pandya and bow for cheras. These coins also shows political developments, conquests and co-existence.
- ◎ Dynastic motifs and symbol were used during vijaynagar times but we don't find evidences of gods on coins till vijaynagar.
- ◎ Vijayanagara Empire issued large quantities of gold coins, other metals used in their coinage are pure silver and copper.
- ◎ The weight standard was the same that used by the earlier dynasties of the south. Pagodas stood at the higher denomination, gold fanams with its fractional units, silver taras with its fractional units and the copper coins were used for day to day transactions.
- ◎ The earlier coinage were produced in different mints and were called by different names such as Barkur gadyanas, Bhatkal gadyanas, etc.

During Sultanate and Mughals times

- ◎ Coins were struck in gold, silver, and copper. **Allauhdin Khilji** issued coins with titles like '**Sikandar-I Shahi**'. Gold coins were issued in large numbers during **Mohamad bin Tughlaq**.

During **Lodhi** period coins of copper and bullion were issued.

- ◎ During Sher shah coins of silver called rupiyah were issued. Together with silver rupia issued gold coins called Mohur, copper coins were called DAM. Sher Shah's system was adopted by Akbar who ditched the Shahrukhi for the rupaiya and also introduced gold coins called **asharafi (mohurs)**.
- ◎ Akbar also issued heavier mohars worth 10 and 12 rupees and experimented with the shape of coins, issuing square and even polygonal ones called mehrabi. Akbar's abundant silver rupees occur in both round and square formats. Jahangir issued many gold and silver coins with poetic verses on them.

4

SC Declares Amended Jallikattu Law Valid

Context: The Supreme Court termed *Jallikattu* a "type of bovine sport" existing in Tamil Nadu for at least a century, and did not interfere with the State legislature's finding that the **bull-taming event** is part of the **cultural heritage and tradition** of the people of Tamil Nadu.

Key-highlights

- ◎ Upheld the validity of the **Prevention of Cruelty to Animals (Tamil Nadu Amendment) Act of 2017** and **Prevention of Cruelty to Animals (Conduct of Jallikattu) Rules of 2017**.
- ◎ The apex court also upheld the validity of laws passed by Maharashtra and Karnataka to allow the bullock-cart races and buffalo racing sport Kambala in their respective regions.

What is Jallikattu?

- ◎ **Mohenjodaro:** Jallikattu's first references date back to a seal discovered at Mohenjodaro, which is dated between 2,500 BC and 1,800 BC.
- ◎ **Sangam age:** It also finds mention in Silappadikaram, one of the great Tamil epics from the Sangam age

- Jallikattu is a **2,000 years old competitive bull taming sport** in which contestants attempt to tame a bull for a prize, wherein if they fail, the bull owner wins the prize.
- **Jallikattu belt:** It is revered across the **Madurai, Tiruchirappalli, Theni, Pudukkottai and Dindigul districts** of Tamil Nadu.
- It is celebrated in the second week of January at the time of the **Pongal (harvest) festival**, and also represents a symbolic event to honor bull owners who rear them for mating.

- **Preservation of pure-breed native bulls:** Kangayam, Pulikulam, Umbalachery, Bargur and Malai Maadu are among some native cattle breeds reared for Jallikattu in the state.

● **Cultural significance:**

- Sport cultivates and represents a cordial man-animal relationship, wherein the owner strives to develop an “emotional connect” with the bull through the long process of rearing.

Points in favour of ban	Points against the ban
<ul style="list-style-type: none"> ● inherently cruel to animals ● continuance of the practice is immoral and antithetical to a compassionate treatment for animals as per provisions of the Prevention of Cruelty to Animals Act, 1960 ● Animal fatalities: The animals face “unimaginable torture”, ranging from tails twisted and fractured, chemicals poured into eyes, ears mutilated, sharp edged weapons used to poke the animal. ● Deaths: It often results in manhandling of animals, human deaths and injuries. 	<ul style="list-style-type: none"> ● The practice is a key component of the cultural heritage of the state ● It is centuries-old and symbolic of a community’s identity ● Rearing of pure-bred bulls supports conservation of animal breeds in line with Article 48 of the Constitution.

5

New finds at Rakhigarhi- Largest Site in Sub-continent

Context: In the latest excavations, findings have been reported of structures like houses, drainage pattern etc.

About

Township sites of Indus valley civilisation	
India	Pakistan
<ul style="list-style-type: none"> ● Rakhigarhi ● Dholavira 	<ul style="list-style-type: none"> ● Harappa ● Mohenjo-Daro ● Ganhverivala

- Now largest site in subcontinent. Also one of the township sites of **Indus valley civilisation**.

● **Major finds at Rakhigarhi:**

- Planned township having mudbrick as well as burnt-brick houses with proper drainage system
- Peculiar artefacts belonging to Harappan civilisation
- Indication of a possibility of an aristocratic settlement
- a common definite pattern of settlement at most sites comprising of Common with mud bricks and elite settlements with burnt bricks
- Skeleton remains of opposite’s sex together
- The skeleton remains of two opposite sex in same grave also reflects presence of some social institutions like marriage or other which have social acceptance.
- The archaeological findings of the recent excavation establish Rakhi Garhi not only as a well-planned city of antiquity but also as the largest of all Harappan sites till date—much larger than what was thought to be the largest, Mohenjodaro.

Dholavira as Source of Information about IVC

Context: Dholavira becomes 40th UNESCO site from India.

About Harappan city of Dholavira

- ⊙ An outstanding example of Harappan urban planning, with its preconceived city planning, multi-layered fortifications, sophisticated water reservoirs and drainage system, and the extensive use of stone as a building material.
- ⊙ Located at **Khadir Bet**, Kutch district, **Gujarat**. **Dholavira** is the larger of the two most remarkable excavations of the **Indus Valley Civilisation** after **Rakhigarhi**.

Dholavira's Answers about the IVC

- ⊙ Memorials contain no bones or ashes but offerings of precious stones, etc, this gives new dimension to our knowledge of **Harappans**.
- ⊙ **Metallurgy:** Remains of a copper smelter indicate people knew metallurgy. A hub of manufacturing jewellery made of shells and semi-precious stones, like agate and used to export timber.
- ⊙ **Trade linkage with Mesopotamians:** Beads peculiar to the Harappan workmanship have been found in the royal graves of Mesopotamia, indicating Dholavira used to trade with the Mesopotamians.
 - Its decline also coincided with the collapse of

Mesopotamia, indicating the integration of economies.

- Harappans, who were maritime people, lost a huge market, affecting the local mining, manufacturing, marketing and export businesses once **Mesopotamia** fell.
- ⊙ **Climate Change:** From **2000 BC**, **Dholavira** entered a phase of severe aridity due to climate change and rivers like Saraswati drying up.
 - Due to the drought people started migrating toward the **Ganges valley** or towards south **Gujarat** and further beyond in Maharashtra.
- ⊙ The **Great Rann of Kutch** used to be navigable, but the sea receded gradually and the **Rann** became a mudflat.

Water Management System in Dholavira

- ⊙ **Fighting with climate change:** An **expansive water management system** was in place shows the ingenuity of the people to survive against the **rapid geo-climatic transformations**.
- ⊙ **Stone-cut reservoirs:** Water diverted from seasonal streams, scanty precipitation and available ground was sourced, stored, in large stone-cut reservoirs which are extant along the eastern and southern fortification.
- ⊙ **Rock-cut wells:** To further access water, few rock-cut wells, which date as one of the oldest examples, are evident in different parts of the city, the most impressive one being located in the **citadel**.

Such elaborate water conservation methods of **Dholavira** is unique and measures as one of the most efficient systems of the ancient world.



Reflective Questions

Art & Culture

- Q 1. Discuss the distinct features of Dholavira site and provide evidence that led to the rise and fall of the Indus valley Civilization.
- Q 2. To what extent did trade play a role in disseminating Indian culture abroad in ancient times? Illustrate.
- Q 3. Assess the role of UNESCO's World Heritage status in safeguarding the Indian art heritage.
- Q 4. 'The medieval and modern architecture in India is a mixture of the elements from different parts of the world, while the indigenous elements are very few and far in between'. Comment.
- Q 5. Elaborate on the concept of Sufism in India and its relevance in present context. Highlight the influence of Indian tradition on Sufism.
- Q 6. Elaborate on the evolution of pillar architecture in the early history of India and explain how Ashokan pillar architecture was different from Persian pillar architecture.
- Q 7. 'The Sangam literature is a major source of information about the socio-economic life of the people in those times.' Elucidate.
- Q 8. Buddhist monasteries were not only the places of worship but also successfully expounded Buddhist philosophy through various iconographic presentations. Discuss.
- Q 9. To what extent is the Kakatiyas Art and architecture a masterpiece of human creative genius and bears a unique or exceptional testing to a cultural tradition? Discuss.
- Q 10. The Gupta age shows the transitions from cave temples and monolithic shrines to glorified architecture. Discuss with examples.
- Q 11. The most unique feature of the Harappan civilization was the development of urban centers. Elaborate.
- Q 12. Despite the gap of thousands of years the present Indian culture finds similarities in the past Vedic culture. Examine with respect to society and culture of Vedic times.
- Q 13. It is said that the Gupta Empire was the golden age for India in history particularly for the advancements in the field of science and technology it achieved. Substantiate with relevant examples.
- Q 14. The comprehensive analysis and chronology of the earliest known stone sculptures of India illustrates the deep rooting of its theme in the social context. Elucidate.
- Q 15. "Reconstruction of Early Indian history is hardly possible without the help of inscriptions and coins." Discuss.
- Q 16. "Art, literature and culture reached a high level of development in the Vijayanagar Empire." Critically examine.
- Q 17. Discuss the evolution of different schools of art in the Indian subcontinent between the second century BCE and the third century CE and evaluate the socio-religious factors responsible for it.
- Q 18. The accurate picture of the complex socio-cultural milieu of Peninsular India is presented in the early Sangam literature. Elucidate.
- Q 19. Though Paintings have been part of regional culture throughout India, yet the diversity of schools of painting of Rajasthan is unique in itself. Discuss.
- Q 20. The mandala art symbolizes the transitory nature of existence and the Buddhist value of non-attachment. Elucidate.

- Q 21. Painting is one of the most delicate forms of art giving expression to human thoughts and feelings through the media of line and colour. In this light trace the origin, evolution and significance of wall paintings in India.
- Q 22. Discuss the nature, evolution and striking features of paintings in India from pre-historic up to medieval period.
- Q 23. While classical dance in India is linked to its 'divine origins', the origin of Indian theatre lies with the people. Illustrate with examples.
- Q 24. Discuss the origin of Kathak dance and explain how it differs from Bharatnatyam.
- Q 25. How far conservation of art forms is ensured through inclusion in UNESCO's Heritage sites? Identify the contemporary threats to art forms.
- Q 26. How does archaeology help us understand history and culture? In what ways the study of ancient culture benefit modern societies?
- Q 27. Enumerating the significance of ancient art forms, discuss need for preservation of ancient art forms in India.
- Q 28. Explain the significance of cultural tourism. Also, discuss the steps taken by the Ministry of Tourism and Culture to promote cultural tourism.
- Q 29. How do festivals and fairs help in understanding the cultural heritage of India?
- Q 30. India's ancient inscriptions and temples do not just have religious and cultural value, lessons can be drawn from these to solve the crisis like water stress and drought. Discuss.
- Q 31. Kalinga architecture is an ancient Indian style of architecture that is characterized by an extraordinary diversity of styles and forms. Discuss.
- Q 32. Why is Gupta art characterized by its "Classical decorum", in contrast to the subsequent Indian medieval art?
- Q 33. Unique architectural design and intricate sculptures make Sun temples in India distinct and culturally significant structures. Discuss.
- Q 34. The Vijayanagara rule marks a distinct and significant period in the field of architecture of India. Explaining the influences on it from different existing styles, discuss the salient features of Vijayanagara architecture.
- Q 35. Enumerate the Significance of the cave paintings in reconstruction of early History. Assess the role of climate change in speeding up the degradation of ancient rock art and cave Painting.
- Q 36. What are Petroglyphs? How Petroglyphs are different from Rock Art?
- Q 37. The inscriptions serve as valuable cultural artifacts, providing windows into the past and contributing to the knowledge and appreciation of our shared human history. Discuss.
- Q 38. Assess the contribution of the Cholas in the expansion of Indian culture outside India.
- Q 39. The Bhakti movement gave impetus to the growth of vernacular literature in India. Explain.
- Q 40. The protection of Jain culture in India is crucial for preserving an ancient tradition, promoting cultural diversity and pluralism. Discuss.
- Q 41. Describing the feature of puppetry art, explain its historical and social significance.
- Q 42. Assess the role of UNESCO's World Heritage status in safeguarding the Indian art heritage.
- Q 43. To what extent did trade play a role in disseminating Indian culture abroad in ancient times? Illustrate.
- Q 44. Monuments of national importance in India play a crucial role in preserving and promoting the country's historical, cultural, and architectural heritage. Discuss.
- Q 45. Numismatic art offers a unique perspective on the past and contributes to the conservation of India's rich heritage. Discuss.
- Q 46. The cultural significance of Jallikattu and the concerns raised by animal rights activists are two perspectives that need to be understood and balanced. Discuss.
- Q 47. Discuss the distinct features of Dholavira site and provide evidence that led to the rise and fall of the Indus valley Civilization.

Modern History

- Q 48. Emergence of political organizations in the second half of the 19th century was a result of the changes brought about by the Britishers in India in its social and political landscape. Comment.
- Q 49. To what extent did the politics of the 18th-century impact economic, social and cultural development in India? Highlight features of Indian society of the period.
- Q 50. British land revenue policy was the villain which not only played foul with Indian agriculture but also furthered the economic drain from India to England. Examine.
- Q 51. What role did the press play in increasing the national consciousness among Indians? Also, briefly discuss various regulations by the British government to diminish its liberty.
- Q 52. Enumerate issues faced by Indian society in the 19th century. Substantiate how socio-religious reformers furthered new ideas. How far were these ideas derivative of western discourse?
- Q 53. Briefly explain the phenomena of deindustrialisation of the Indian economy under colonial rule. Also, outline various phases of deindustrialization of the colonial Indian economy.
- Q 54. Briefly explain the nature of the leadership of peasant and tribal movements before 1858. In what ways demands of tribal movements of post-independent India are similar to the demands of such movements before 1858?
- Q 55. "Mahatma Gandhi found in salt a powerful symbol that could unite the nation". Discuss.
- Q 56. Lucknow Pact between the Congress and Muslim League was an acceptance of the separate interests of the two communities. In light of the above statement, explain the fallouts of the Pact on Indian freedom movement.
- Q 57. Morley-Minto Reform was crucial in establishing parliamentary democracy in India. Critically analyse.
- Q 58. The division of Congress after the Surat Split effectively rendered the moderate section toothless, until it was revived by the return of Gandhi. Critically analyse.
- Q 59. What were the circumstances that favoured the growth of socialist/left ideologies in the Indian national freedom struggle? Also, by giving examples explain how did it affect the Anti-colonial struggle led by Indian National Congress.
- Q 60. "The economic rationale of the British empire in India, if ever there was one, evaporated in the white heat of war." In light of this statement explain the role of the Second World War in the demise of the British Empire in India.
- Q 61. Explain the various features of the Quit India Movement that distinguishes it from the previous anti-imperial struggle in colonial India.
- Q 62. How did the outcomes of World War I create a conducive platform for the establishment of Gandhiji as an undisputed leader of Indian nationalism?
- Q 63. Explain the nature and contours of the RIN mutiny. Also, highlight the significance of RIN mutiny.
- Q 64. The Jallianwala Bagh massacre stands as a symbol of struggle and sacrifice, and marked a turning point in India's struggle for independence. Discuss.
- Q 65. "The RIN revolt convinced the British that the sword arm of the Raj could no longer be relied upon to protect it". Explain.
- Q 66. Examine how the Gandhian philosophy of Satyagraha was different from a mere 'passive resistance'. Also, discuss its effectiveness against colonial rule.
- Q 67. What were the objectives of various tribal uprisings in India during British rule? Discuss their contributions in the national movement.
- Q 68. Discuss the significance of 'Battle of Plassey' and 'Battle of Buxar'. Also, examine how these resulted in ruralization and deindustrialization of the Indian economy.

- Q 69.** The working class struggle in the country entered into a different phase after the First World War. In context of the above statement give a brief account on a role played by the Working class in India's Freedom struggle.
- Q 70.** The strand of revolutionary fighters such as Bhagat Singh and Surya Sen, which emerged after the Non-cooperation movement, failed to contribute significantly to the national struggle. Critically analyze.
- Q 71.** The structure and policies of the re-established British rule were, in many respects, drastically changed after the revolt of 1857. Elaborate. Also, explain how the revolt of 1857 was the conscious beginning of the Independence struggle against the colonial tyranny of the British.
- Q 72.** The social and educational policy changes under British rule reveal its potential as well as limitations. Analyze.
- Q 73.** Briefly explain the state of the Pre-colonial Indian agriculture economy. Also, discuss how new land settlements and commercialization of agriculture introduced by the colonial British government affected Indian agriculture.
- Q 74.** What were the various changes introduced in the fabric of Indian society in the 19th century due to the various Socio-Religious Reform Movements?
- Q 75.** Briefly explain why there is so much significance attached to the Lahore Session of Congress held in 1929 in the history of India's freedom struggle?
- Q 76.** How the British policies in the first decade of the 20th century holds a very special responsibility for favouring the growth of communalism? Also, briefly explain the role of the Swadeshi movement in increasing communalism in India.
- Q 77.** "The peasant revolts and uprisings in 19th century India against colonial rule were not religious, but in most of the cases, religion did play a very important role." Discuss the nature of Peasant uprisings in 19th century India with appropriate examples considering the above given statement.

Post-Independence Consolidation (PIC)

- Q 78.** Do you agree that the five-year plan approach of India to economic development failed to realise goals of rapid growth and bridging of social equity? Argue.
- Q 79.** India's intervention in liberation of Bangladesh was not just altruistic in nature, but was primarily based on realpolitik. Discuss. Also, analyse the factors that led to the liberation of Bangladesh.
- Q 80.** Integration of the hundreds of princely states with the Indian Union took place with a skilful combination of baits and threats under the leadership of Sardar Patel. Analyse.
- Q 81.** How far do you agree with the view that the Indo-China war of 1962 was a betrayal of India's attempts at establishing a long-standing peace with China and having strong Asian Axis to counteract the increasing influence of the Cold War bloc superpowers?
- Q 82.** Language has proved a cementing agent for unity of the country rather than being a force for division. Examine. Also, analyse how the map of India was redrawn on the lines of language.
- Q 83.** To what extent Dalit Movements of post-independent India has empowered the Dalits? Explain various constitutional, legal and policy measures taken by the government to empower them.
- Q 84.** Examine the role played by science and technology in the post-Independence period in order to put India on the path of modernity.
- Q 85.** The Chipko movement was a turning point in forest conservation efforts in India. Discuss.
- Q 86.** Do you agree with the view that adoption of nation building perspective instead of federation building perspective was a reason behind Naga insurgency in the second half of 20th century India? Comment.
- Q 87.** Discuss the factors that led to the declaration of internal emergency in India on 25th June, 1975. Also, evaluate its consequences.

- Q 88. How far has post-independence science and technology progressed in bringing India closer to modernity? Discuss.
- Q 89. Events since 1956 have clearly shown that loyalty to a language was quite consistent with, and was rather complementary to, loyalty to the nation. Elucidate.

World History

- Q 90. Examine the issues involved in the American Civil War. Was it a contest between two separate nations?
- Q 91. The Industrial Revolution brought about great changes in the social and economic life of Europe. Explain.
- Q 92. What do you understand by “new imperialism”? Describe its distinct characteristics in the instance of Africa.
- Q 93. What were the causes for the success of the Bolshevik Revolution of 1917? Discuss its significance in the history of the world.
- Q 94. “Any single explanation for the outbreak of the First World War is likely to be too simple. An amalgam of intellectual, social, economic as well as political and diplomatic factors contributed to this horrifying conflict of monumental propositions”. Explain.
- Q 95. Do you agree that the Treaty of Versailles was a compromise between a treaty of force and a treaty of ideas? Argue.
- Q 96. Analyze the factors leading to the end of the Cold war and account for the U.S. ascendancy in the world.
- Q 97. “The long-standing discontent of the French people found an outlet in the French revolution whose spirit found expression in the writings of the intelligentsia”. Elucidate.
- Q 98. “The transformation of Italy from a mere geographical expression to a full-fledged nation- state was a long drawn process spearheaded by many personalities”. Elucidate.
- Q 99. What were the eventual outcomes of the Korean War for the major regions involved? Also, discuss the involvement of India in the war.

Indian Society

- Q 100. “The tradition of accommodation, tolerance and interdependence of Indian society has been in existence in India for long and is still present.” Elaborate.
- Q 101. Do you agree that that feminist movement in India suffers from a caste and class bias? Discuss with justification. Also, list out the achievements of feminist movements in India.
- Q 102. Contemporary Dalit assertion has moved beyond traditional political boundaries to new frontiers. Discuss the causes for the new modes of Dalit assertion and show how it has changed the contemporary dalit discourse.
- Q 103. Enumerate the demographic factors that propelled the elderly population in India. Discuss various associated issues faced by them along with major initiatives taken by the government to improve their conditions.
- Q 104. Wealth of linguistic richness exists outside what are known as the official languages of India. Analyze the statement showing how extremely rich is India in terms of linguistic diversity.
- Q 105. India has high income inequality despite equalizing forces. Do you agree with this imperative? Give examples in favor of your answer.
- Q 106. Analyze the trends of change and continuity in the marriage and family system in India. How far is globalization responsible for these changes?
- Q 107. Before independence, communalism formed an integral part of the national discourse of India”. In light of the above statement, discuss the evolution of communalism in India. Also, how is it different in present times than it was in the past?
- Q 108. The urbanization process in India has witnessed a skewed growth towards particular regions of the country as well as within the cities itself. Discuss.
- Q 109. What are the causes of regionalism in India? Do you agree that regionalism is a threat to national unity and integrity? Argue.

- Q 110.** “Indian secularism has been identified both by its proponents and opponents alike exclusively with the defence of minority rights “Critically analyse.
- Q 111.** Road to social empowerment goes through breaking away from shackles of poverty, patriarchy, and caste both in the public and private spheres. Analyze
- Q 112.** An ageing population that can topple existing insurance and pension systems strain the public health-care system and fundamentally alter disease burdens, economies and trade, and human migration.” Elaborate the statement in the Indian context and what are the measures that are needed to tackle this situation successfully.
- Q 113.** A youthful populace is India’s irrefutable demographic dividend. Analyse why India still lags behind in terms of productivity due to lack of skills? Elaborate on how skill development initiatives of India could help in this regard.
- Q 114.** Has Westernization impacted the Indian value system adversely? Elaborate your answer with illustrations.
- Q 115.** In contemporary Indian society traditional forms of marriage and family are increasingly getting replaced by more fluid arrangements. Do you agree with this view? Give arguments in favour of your answer.
- Q 116.** Explain the contribution of women’s organizations in the pre-independence era in social and political spheres.
- Q 117.** Marginalized caste groups such as the Dalits are witnessing some forms of socio-economic mobility, but women within these groups are experiencing different forms of constraints. Critically examine.
- Q 118.** Legislative and judicial steps are reflecting the importance of recognizing minorities of all kinds, not just religious. Evaluate the progress of Indian society in this regard.
- Q 119.** With rising income and urbanization, over nutrition has become a serious problem. Discuss the causes and implications of over nutrition in India.
- Q 120.** Analyze the underlying factors contributing to the prevalence of gender-based violence, including patriarchal norms, cultural attitudes, and systemic inequalities.
- Q 121.** Evaluate the impact of gender-based violence on the physical, psychological, and socio-economic well-being of women, and its implications for gender equality and social justice.
- Q 122.** Discuss the implications and effectiveness of increasing the legal marriage age for women in India in promoting gender equality and addressing child marriage.
- Q 123.** “Lack of educational opportunities is often what drives parents into marrying their daughters at a young age.” Discuss
- Q 124.** “The marital rape exception is the result of moral ambiguity that comes out of uneasy relationship between law and morality.” Discuss.
- Q 125.** Examine the importance and impact of gender-transformative policies in the water domain for achieving gender equality and sustainable development in India.
- Q 126.** Discuss the unique challenges faced by women migrants, including exploitation, discrimination, and limited access to essential services.
- Q 127.** Examine the persisting social issue of dowry in India and its impact on gender equality and women’s empowerment.
- Q 128.** In the light of the evolving trends of gender-neutrality in the law making bodies in India, suggest some measures to make Indian parliament more gender neutral.
- Q 129.** Discuss the underrepresentation of women in the field of science in India and its implications for national development.
- Q 130.** Evaluate the role of inclusive policies, mentorship programs, and support systems in promoting gender equality and empowering women in the field of science.
- Q 131.** To what extent does the digital gender divide impact women’s participation and empowerment as Internet users in India? Analyze the socio-economic factors and

cultural barriers that contribute to the underrepresentation of women in the digital space.

- Q 132. Discuss the potential benefits and challenges associated with increasing women's access to the Internet, including opportunities for education, employment, and social empowerment.
- Q 133. Examine the evolution of women's right to property in India, considering historical, legal, and socio-cultural factors.
- Q 134. Evaluate the effectiveness of legislative reforms, such as the Hindu Succession Act and the Married Women's Property Act, in enhancing women's access and control over property. Analyze the persisting challenges and discriminatory practices faced by women in asserting their property rights, including patriarchal norms, societal attitudes, and legal loopholes.
- Q 135. Discuss the challenges and opportunities faced by Indian women prisoners in the context of their lives inside correctional facilities. Analyze the impact of gender-specific issues, including the prevalence of socio-cultural biases, inadequate healthcare, and limited access to rehabilitation programs.
- Q 136. Examine the role of the criminal justice system in addressing these issues and suggest measures to promote holistic development and reintegration of women prisoners into society.
- Q 137. Discuss the issues with the norms for medical examinations of Rape Victims.
- Q 138. The legal protection given to women is another challenge in promoting of gender inclusivity of India's economy. Discuss
- Q 139. Gender inequality is one of the oldest and most pervasive forms of inequality in the world. Comment
- Q 140. Critically analyse the provisions of the Medical Termination of Pregnancy Act, 2021.
- Q 141. A growing body of evidence shows that women's inability to manage their

menstrual hygiene has severe economic costs on their lives and on the country. Comment

- Q 142. What are the issues faced by the women in the corporate sector in India? Illustrate with suitable examples
- Q 143. Examine the role of inter-caste marriages in reshaping cultural norms, challenging regressive traditions, and empowering individuals from marginalized castes.
- Q 144. Children are denied an education and forced to join the labour class. In the light of this statement, discuss the factors responsible for prevalence of child labour in India.
- Q 145. Examine how the legalization of "same-sex marriage" would protect and promote the rights of LGBTQ community in accessing tangible and intangible benefits of society?
- Q 146. Discuss the significance of paternity leave as a social issue and its impact on gender equality and work-life balance in India.
- Q 147. Analyze the current state of paternity leave policies in the country, considering legal frameworks, workplace practices, and societal attitudes.
- Q 148. Discuss the issues faced by the internal migrants of India. Also, suggest some logical measures to solve the issues.
- Q 149. Analyze the social challenges faced by the elderly population in India and the implications for their well-being and social integration.
- Q 150. Examine the factors contributing to the neglect and marginalization of older adults, including changing family structures, socio-economic disparities, and inadequate social support systems.
- Q 151. Manual scavenging is a flagrant violation of human rights and perpetuates caste-based discrimination in society. Comment
- Q 152. People living in impoverished conditions may be more vulnerable to human trafficking. In the light of the statement discuss the factors responsible for human trafficking in India.

- Q 153. Examine the digital divide in the education sector in India and its implications for inclusive and equitable education.
- Q 154. Analyze the socio-economic factors and geographical disparities that contribute to unequal access to digital resources among students.
- Q 155. The rising incidence of drug abuse in India has come to the limelight. What are the causes of increasing cases of drug addiction in India? Also, ventilate various solutions to the drug problem in India.
- Q 156. Discuss the social and environmental implications of overpopulation in India. Analyze the factors contributing to the rapid population growth, including socio-cultural norms, lack of awareness, and inadequate access to family planning services.
- Q 157. Discuss the socio-economic disparity created by the Disasters.
- Q 158. Lack of basic necessities such as food, shelter, and healthcare can push individuals to beg in order to survive. Do you agree? Justify your views.
- Q 159. Changes in last few decades have witnessed so many changes in lifestyle which ultimately have implications on the mental health. Discuss.
- Q 160. Discuss the multifaceted nature of deaths by suicide in India as a critical social issue.
- Q 161. Discuss the challenges in realizing the dream of demographic dividend in India.
- Q 162. In the absence of appropriate education, training, and employment prospects, India's demographic dividend might soon become a demographic disaster. Examine
- Q 163. Examine the significance and implications of conducting a caste-based census in India.
- Q 164. Caste system perpetuates social inequality and discrimination in the society. Comment
- Q 165. Critically analyse the socio-economic impact of the Globalization 4.0.
- Q 166. Identify and critically analyze persistent challenges faced by Indian society that

hinder its progress and development. Examine the impact of these challenges on various dimensions of society, such as education, healthcare, gender equality, poverty alleviation, and social harmony.

- Q 167. Malnutrition continues to be a major problem for India despite the fact that it has a number of programmes in place to combat it. Discuss.
- Q 168. Describe the underlying causes of the prevalence of poverty in India and suggest a plan of action to hasten the sustainable eradication of poverty.
- Q 169. Describe the socio-economic effects of the process of urbanisation. How can urban resilience be increased further to ensure a sustainable future?

Geography

- Q 170. Discuss the hazardous effects of geomagnetic storms. Also, analyze how they are associated with the sunspots activity.
- Q 171. Explain the process of subduction with reference to the Pacific ring of fire. Why does this process result in geo-hazards?
- Q 172. What is Reservoir-induced Seismicity? How does it disturb the isostasy of the region? Suggest measures to be taken in this regard.
- Q 173. Discuss the role of albedo of ice caps in maintaining the heat budget of earth. Analyze the impact of deposition of black carbon on ice caps on their albedo.
- Q 174. The Indian Ocean is not only a source of disastrous tsunamis and cyclones, it is also a source of some untapped mineral and energy resources. Elucidate.
- Q 175. The precipitable water vapor (PWV) is one of the components of climatic impact on High Altitude Himalayas and is important to understand the meteorological impacts on the Indian Himalayan Region. Discuss.
- Q 176. Mention the types of drainage patterns found in India and explain how landforms are a major control factor of drainage system development.

- Q 177. Montane forests have different characteristic vegetation in northern and southern parts of India. Examine the statement.
- Q 178. Discuss the role of geological, geophysical and inherited tectonic factors in shaping of the climate and geomorphology of the Indian peninsula.
- Q 179. Compare the eastern and western coastal plains of India and explain their significance.
- Q 180. Analyze the causes behind the changing rainfall patterns in the northeast region of India and suggest measures to mitigate this climate crisis.
- Q 181. In India there are many caves and caverns found in different areas. What were the conditions under which these caves formed and can these caves be included in classic Karst topography? Discuss.
- Q 182. Retreating glaciers in the Himalayan region are posing the double whammy of droughts and floods. Illustrate with examples.
- Q 183. Explain successive development of cotton textile industry in India while describing factors affecting its localization. Also, suggest measures to strengthen cotton industry.
- Q 184. The dry zones of India need sustainable planning and efforts to ensure food and nutritional security. Elucidate.
- Q 185. Discuss the reasons why the fishing industry is more developed in North American and European countries. Also, suggest measures to make this industry environmentally sustainable.
- Q 186. Will National Interlinking of Rivers Authority (NIRA) solve the longstanding issues and challenges in the implementation of the river interlinking projects in India keeping in view their multidimensional benefits? Discuss.
- Q 187. Describe climate smart agriculture (CSA) and discuss a variety of measures adopted under the CSA in India and the world over.
- Q 188. With the development of Smart Cities there will occur a greater migration from urban and rural areas to these Smart Cities. Discuss various urban and peri-urban issues resulting from the prospective spate of migration to these futuristic cities. Suggest measures to be taken for facing these challenges.
- Q 189. What are the determining factors of cropping patterns in India? In what way have the cropping patterns changed after the introduction of the Green Revolution programme?
- Q 190. What is tri cellular meridional circulation of the atmosphere? Discuss the role of meridional circulation in the transfer of energy and in maintaining the heat budget of the earth.
- Q 191. Plate tectonics have played a critical role in sustaining life on the earth. Discuss.
- Q 192. How do the physiography and climate of India explain the biodiversity of the country?
- Q 193. Briefly explain the formation of marine resources. How can the economic benefits be increased from sustainable use of marine resources in India?
- Q 194. Not only coal burning but coal mining is also a major environmental concern. In this context, discuss the Clean Coal Technologies (CCTs) that can be employed to reduce GHG emissions.
- Q 195. The Dam Safety Rehabilitation and Improvement Project (DRIP) will pave the way towards dam safety and management which is critical for surrounding areas and downstream communities. Discuss.
- Q 196. Critically analyse the aims and pitfalls of India's draft Arctic policy in the light of India's energy needs and the mandate of the Svalbard Treaty.
- Q 197. Define El Niño–Southern Oscillation (ENSO) and explain its impact on precipitation in various parts of the world.
- Q 198. How climate change is making heat waves worse in the form of heat domes in a few parts of the world? Throw light on this phenomenon.

Q 199. Bring out the causes of desertification in India and explain how desertification leads to major environmental and socioeconomic problems.

Q 200. Although many countries around the world practice daylight saving time so as to save energy, its overall benefits are still debatable. In this context, discuss the feasibility for India to bring this into practice taking cues from other countries.

Q 201. How does geographical location affect international trade? Also, assess the impact of globalization on international trade.

Q 202. Explain the resource-base and other

locational factors that led to the development of the Ukraine Industrial Region. Are Ukraine's vast natural resources one of the latent reasons behind Russia's recent invasion?

Q 203. Discuss the locational factors, prospects of the Electronic Systems Design Manufacturing (ESDM) industry in India and explain the reasons for its sluggish growth in the country.

Q 204. The ocean's global circulation system plays a key role in distributing heat energy, regulating weather and climate, and cycling vital nutrients and gasses. Elaborate.

