

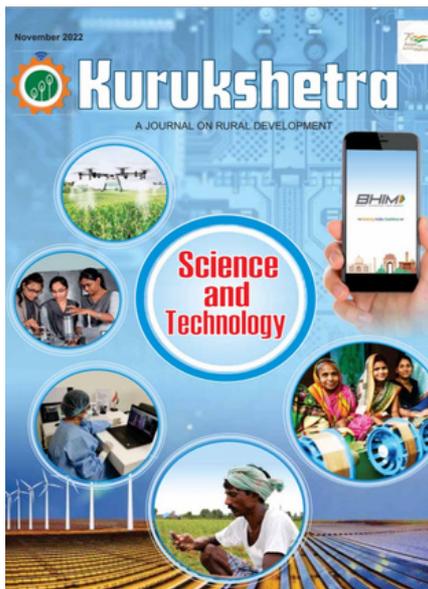
OFFICERS' Pulse

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Contents

1) Coastal Erosion.....	2	12) Streamlining the work of quasi-judicial courts.....	20
2) The lingering crisis of labour post-pandemic.....	4	13) A wellness wish for 2047	21
3) How is India planning to end child marriage?	5	14) The irrelevance of regional rural banks	22
4) Charting the economic journey ahead	6	15) Potential of Inland Waterways	23
5) The weakest link in the air pollution fight.....	8	16) Reforming the WTO	25
6) Opaque political financing could cost democracy dear	10	17) Leveraging India's Tourism Sector	26
7) India's G20 Presidency and Food Security	11	18) Geo engineering and climate control.....	27
8) The real issue at COP27 is energy equity.....	13	19) How can India boost millets cultivation?.....	29
9) Fixing India's malnutrition problem	14	20) Education and LiFE	31
10) It's time to discuss depopulation	16	21) Science and Technology in Agriculture	32
11) Think local climate action, think Meenangadi	17	22) Community Reserves	35
		23) GM Mustard	36
		Model Questions	40

1) Coastal Erosion

(GS1: Important Geophysical Phenomena)

Context

- A coastline is a complex series of interlinked physical systems in which both offshore and onshore processes are involved. Coastal Erosion is one of these physical processes, wearing away and redistributing solid elements of the shoreline as well as sediment, normally by such natural forces as waves, tidal and littoral currents, and deflation.
- Erosion occurs when the material being removed, for deposition elsewhere, exceeds the rate of supply finally resulting in the **landward shifting of the shoreline.**
- The developmental activities have put tremendous pressure on the fragile coastal environment and about **20% of the Indian population resides in the coastal area.**
- Around **15% of India's coastline has been eroded. Kerala** is the state which is worst affected by coastal erosion in India. Around **85% of the state's coastline is identified as vulnerable to erosion. Karnataka and Maharashtra** are also affected badly by sea erosion.

Causes of Coastal Erosion

- The causes of erosion are either **natural or man-made.** Sometimes, it is a **combination** of both natural and man-made factors.
- While the former is a relentless process that is often impossible to resist, the latter is often due to **ill-planned activities** and can certainly be **contained, or even reversed.**

Natural Causes

- Natural factors influencing coastal erosion are **waves, winds, tides, near-shore currents, storms, sea level rise, etc.**
- The combined action of different processes on the coastline like waves and tides maintains the stability of the shoreline. If the sediment supply to a section of beach is reduced due to **littoral drift/sea level rise or constant impact of waves,** it can cause **severe erosion.**
- Waves are the **main cause of coastal erosion.** Waves bring an enormous amount of energy to the coast that is dissipated through wave breaking, generation of currents, water level changes, and movement of sediment, turbulence, and heat.
- Another major factor promoting coastal erosion is the **sea level rise.** Coastal erosion is facilitated by a rising sea level that brings wave action to progressively higher levels and permits larger waves to reach and break upon the shore.
- Another factor is the **phenomenon of subsidence.** Subsidence is a regional phenomenon that **lowers the surface area** in a specific region. It impacts the coastline in a way similar to sea level rise, however, the rate may vary as per the factor causing this subsidence.
- Also, catastrophic events like **severe storms, tidal surges, and cyclones** cause the sea level to rise to abnormal heights and cause severe erosion.

Man-Induced Erosion

- Most of the human-induced erosion is due to **human interventions in the natural transportation process as well as in the sediment load** of the rivers.
- Human activity may be enumerated as **coastal defence structures,**

river regulation works, dredging aggregate extraction/sand mining, oil/gas exploration, and ports/harbours that impact sediment transport.

- **Sand removal** above replenishable quantities from the coast upsets the longshore sand transport budget and can result in erosion.
- **Coral mining** and other means of spoiling the protective coral reefs will also cause coastal erosion and beach degradation.
- Vegetation is important for maintaining/improving the sediment slope stability and consolidating the sediments by trapping the sediments. The **removal of mangroves** due to man interventions reduces sediment stability. This further promotes erosion of the coastal zone.
- The **phenomenon of Climate Change** has recently emerged as an important determinant in the coastal environment. Coasts are sensitive to sea level rise, changes in the frequency and intensity of storms, increases in precipitation, and warmer ocean temperatures.
- In addition, **rising atmospheric concentrations of carbon dioxide (CO₂)** are causing the **oceans to absorb more of the gas and become more acidic**. This rising acidity can have significant impacts on coastal and marine ecosystems.

Coastal Protection Measures

1. Non-Structural Measures:

- The Non-structural measures aim at the dissipation of the wave energy by mirroring the natural forces and maintaining the natural topography of the coast. These measures are also called **soft solutions**. Some of these are:
 - Artificial nourishment of beaches;

- Coastal vegetation such as mangrove and palm plantation;
- Sand bypassing at tidal inlets;
- Dune reconstruction/rehabilitation.
- These measures have **limitations**. While **artificial nourishment of beaches** (*a process by which sediment, usually sand, lost through erosion is replaced from other sources*) is **complicated and costly**, mangrove plantation is **possible only in marshy land and in semi-tropical or tropical conditions**.

2. Structural Measures:

- The structural measures, also known as the **hard structural/engineering measures**, use **physical structures constructed near the coast** to prevent or restrict water from reaching the potential damage areas.
- The structural measures used for coastal erosion prevention include **seawalls, revetment, off-shore breakwaters, groins/groynes/spurs, offshore reefs, and artificial headland**.
- The hard solutions offer a wide variety of **disadvantages** like causing **unnecessary accretion at points, being expensive**, and also, at times, **spoiling the economic value** of the site by making it look less beautiful.
- In terms of the soft solutions, it may be noted that these are **not quick-fix solutions** and they **take time to be effective** and these are **effective only in a medium to long-term perspective**.
- To optimise the long-term positive impact of prevention measures,

many **combinations of soft and hard solutions can be selected.**

Conclusion

- Coastal erosion is an extensive and multi-dimensional problem for a vast country like ours.
- Efforts are being made to counter the menace of coastal erosion and to protect our coasts, using both the traditional approaches (using hard structures like a seawall, etc) and also using the new, innovative soft measures like dune rehabilitation.

2) The lingering crisis of labour post-pandemic

(GS3: Effects of Liberalization on the Economy, Changes in Industrial Policy and their Effects on Industrial Growth)

Context

- The International Labour Organisation (ILO) recently released two reports that gave an indication of the global employment scenario post-pandemic.
- The '**Global Wage Report 2022-2023: The Impact of inflation and COVID-19 on wages and purchasing power**' discuss the twin crises, inflation and economic slowdown, which created a "striking fall" in real monthly wages around the globe. The report blames the **war in Ukraine and the global energy crisis** for this situation.
- Another report, the '**Asia-Pacific Employment and Social Outlook 2022: Rethinking sectoral strategies for a human-centred future of work**' stated that the Asia-Pacific region lost about 22 million jobs in 2022.
- Decrease in wages is placing millions of workers in a dire situation. Income inequality and poverty will rise if the purchasing

power of the lowest paid is not maintained.

What does the data show?

- The ILO report on wages looked at the real and nominal wages of employees. In each edition of the Global Wage Report the objective is to collect wage data from as many countries and territories (about 190) which are then grouped into five separate regions.
- In India, the **nominal wages rose to ₹17,017 per month** in 2021 from ₹4,398 in 2006. The data was taken from the Government of India's Ministry of Statistics and Programme Implementation.
- But when inflation is factored in, the **real wage growth in India plunged to -0.2% in 2021** from 9.3% in 2006. The negative growth in India **started after the pandemic.**
- The report said the **increasing cost of living has the greatest impact on lower-income earners and their households** as they have to spend most of their disposable income on essential goods and services, which generally experience greater price increases than non-essential items.

Is Inequality Rising?

- At the Asia-Pacific level, **only the jobs in high-skill occupations saw a recovery from the COVID-19 crisis**, which is true across all subregions.
- The ILO said it is **raising concerns about increased inequality.** While there is an employment gain of 1.6% among high-skill workers between 2019 and 2021, there is no such substantial gain among low-to-medium-skill workers.
- Among the G-20 countries, the report noted a **significant gap in the average level of real wages between advanced G-20**

countries and emerging G-20 countries such as India. It is on the level of about \$4,000 per month in advanced economies and about \$1,800 per month in emerging economies.

What are the ILO's remedies?

- The report suggests a set of policy options and responses to the cost-of-living crisis. The report said that **75 to 95 million people were pushed into extreme poverty during COVID-19.**
- The report said that there is a **need to strengthen labour market institutions and wage policies.**
- The ILO states that the **creation of decent formal wage employment is a prerequisite for a more equitable distribution of wages and income,** and is a key contributor to equitable and sustainable wage growth.
- It wants governments to **focus on the gender pay gap** as when women leave the labour market, they are less likely to return than men.
- Most importantly, the report says that a **multilateral approach** is the key to solving the crises around us.
- There is an urgent need to **address the negative effects of climate change; increasing inequalities; the poverty, discrimination, violence and exclusion endured by millions of people,** including the discrimination that women and girls continue to suffer in many parts of the world; the **lack of vaccines and access to adequate sanitation and essential healthcare** for all; and the **growing digital divide** between poor and wealthier countries.

3) How is India planning to end child marriage?

(GS1: Role of Women and Women's Organization, Population and Associated Issues, Poverty and Developmental issues, Urbanization, their problems and their remedies)

Context

- The UNFPA-UNICEF Global Programme to End Child Marriage has estimated that 10 million children could become child brides as a result of the pandemic globally.
- In India, in the last five years, **child marriages declined by 3.5% to reach 23.3% in 2020-21,** according to the latest National Family Health Survey-5 data.

What is the situation in the world?

- According to data from UNICEF, the **total number of girls married in childhood stands at 12 million per year,** and progress must be significantly accelerated in order to **end the practice by 2030 — the target set out in the Sustainable Development Goals.**
- While it is encouraging that in the past decade great progress has been made in **South Asia,** where a **girl's risk of marrying before she is 18 has dropped by more than a third,** from nearly 50% to below 30%, it is **not enough, and progress has been uneven.**
- Rights activists and health experts say the **consequences of child marriage are dire,** not only because it **violates children's rights,** but also because it **results in more infant and maternal deaths.**
- Children born to adolescent mothers have a **greater possibility of seeing stunted growth** as they have low weight at birth. According to NFHS-5, the **prevalence of child stunting is 35.5% in 2019-21.**

Where does India stand?

- There is a **growing trend for decline in the overall prevalence of child marriage, but 23.3% is still a disturbingly high percentage** in a country with a population of 141.2 crore.
- **Eight States have a higher prevalence of child marriage than the national average — West Bengal, Bihar and Tripura** top the list with more than 40% of women aged 20-24 years married below 18, according to NFHS data.
- A lot more needs to be done on factors closely linked to child marriage, including **eradication of poverty, better education and public infrastructure facilities for children, raising social awareness on health, nutrition, regressive social norms and inequalities.**
- They stress on an **all-pronged approach** to end the practice; **strong laws, strict enforcement, preparing an ideal situation** on the ground to ensure that the girl child — girls with either or below primary level education have experienced higher levels of child marriage as data show — gets an **education and preferably vocational training** as well so that she can be **financially independent.**

How are the States placed?

- Data shows that **child marriage is a key determinant of high fertility, poor maternal and child health, and lower social status of women.**
- Among the bigger States, **West Bengal and Bihar** have the highest prevalence of girl child marriage.
- **States with a large population of tribal poor have a higher prevalence of child marriage.** In **Jharkhand**, 32.2% of women in the age bracket 20-24 got married

before 18, according to NFHS-5; **infant mortality** stood at 37.9%, and 65.8% of women in the 15-19 age bracket are **anaemic.**

- **States with high literacy levels and better health and social indices** have fared much better on this score. Eg: **Kerala & Tamil Nadu.**

What are the laws and policy interventions?

- There are several laws including the **Prohibition of Child Marriage Act, 2006** and the **Protection of Children from Sexual Offences Act, 2012**, which aim at protecting children from violation of human and other rights.
- A **parliamentary standing committee** is weighing the pros and cons of **raising the age of marriage for women to 21**, which has been cleared by the Union Cabinet.
- With various personal laws governing marriages in India, the government wants to amend the law, a reform that activists and agencies have said will not be enough to stop the practice of child marriage.
- Besides centralised schemes like the **Beti Bachao Beti Padhao**, which need better implementation on the ground, States have launched many initiatives to improve the factors linked to child marriage, from education to health care and awareness programmes.

What needs to be done?

- To accelerate the decline in the prevalence of child marriage it is crucial to **empower girls, create proper public infrastructure and address societal norms.**

4) Charting the economic journey ahead

(GS3: Effects of Liberalization on the Economy, Changes in Industrial Policy and their Effects on Industrial Growth)

Background

- India's economic journey started with Independence. India's economic progress in the first half of the 20th century under British rule was dismal. During the five decades, India's annual growth rate was just 0.89%. With the population growing at 0.83%, per capita income grew at 0.06%.

Early Strategy

- In the early period, India's strategy of development comprised **four elements — raising the savings and investment rate; dominance of state intervention; import substitution, and domestic manufacture of capital goods.**
- There was no clear model available for accelerating growth in developing countries. State intervention on an extensive scale seemed to be appropriate, even though there were some critics even at that time.
- India's average growth till the end of the 1970s remained modest, with the **average growth rate being 3.6%**. However, on certain **health and social parameters**, such as the **literacy rate and life expectancy**, there were noticeable improvements.
- While India had to rely on the heavy imports of foodgrains on a concessional basis, initially, there was a breakthrough in agriculture after the **Green Revolution**.
- The **industrial base** also widened. India became capable of producing a wide variety of goods including steel and machinery.
- While India's post-Independence economic performance was reassuring when compared to the pre-Independence period, it is not

that impressive when compared with that of several developing countries even in Asia.

- By the end of 1970s, it was becoming clear that the model India had chosen was not delivering and that it needed modification.

Post 1990's

- It was the crisis of 1990-91 that compelled the policymakers to turn to the new model of economic reforms commonly known as the **LPG (Liberalisation, Privatisation and Globalisation) model.**
- The break with the past came in **three important directions:** first, in **dismantling the complex regime of licences and permits;** second, in **redefining the role of state;** and third, in **giving up the inward looking trade policy.**
- Between 1992-93 and 2000-01, **GDP at factor cost grew annually by 6.20%.** Between 2001-02 and 2012-13, it **grew by 7.4%** and the growth rate between 2013-14 and 2019-20 was **6.7%.**
- The best performance was between 2005-06 and 2010-11 when GDP grew by **8.8%**, showing clearly what the potential growth rate of India was. This is the **highest growth experienced by India** over a sustained period of five to six years. This was despite the fact that this period included the **global crisis year of 2008-09.**
- However, the growth story suffered a **setback after 2011-12.** The growth rate fell to **4.5%** in 2012-13 according to the 2004-05 series. The growth rate since then has seen ups and downs. The growth rate touched the **3.7%** level in 2019-20.

Raise the Growth Rate

- Post COVID-19 and the Russia-Ukraine war, there is a need to lay down a **road map for India's future development**. The first and foremost task is to **raise the growth rate**.
- Calculations show that if India achieves a **7% rate of growth continuously over the next two decades and more**, it will make a substantial change to the level of the economy.
- India may almost touch the status of a **developed economy**. This in turn requires that India needs to **raise the Gross Fixed Capital Formation rate from the current level of 28% of GDP to 33% of GDP**.
- If, at the same time, India maintains the **incremental capital output ratio at 4**, which is a reflection of the efficiency with which we use capital, India can comfortably achieve a 7% rate of growth.
- Raising the investment rate depends on a number of factors. A **proper investment climate** must be created and sustained. While **public investment should also rise**, the major component of investment is **private investment**, both corporate and non-corporate. It is this which depends on a **stable financial and fiscal system**. The importance of **price stability** in this context cannot be ignored.

Strengthen Social Safety Nets

- India needs to **absorb the new technologies** that have emerged, and that will emerge. Its development strategy must be **multidimensional**. India needs a **strong export sector** which is a test of efficiency.
- At the same time, India needs a **strong manufacturing sector**. The **organised segment** of this sector must also increase.

- As output and income increase, India must also **strengthen the system of social safety nets**. **Growth without equity is not sustainable**.
- The rapid pace of globalisation which India saw since the beginning of 1990s will slow down for a variety of reasons. Some countries which were champions of globalisation are making a retreat. Some countries feel that dependence on other countries for certain key inputs such as crude oil or chips may land them in difficulties at times.
- The Russia-Ukraine war has exposed this problem starkly. An **open economy with some limitations** is still the best route to follow.

Conclusion

- India today is the **fifth largest economy**. This is an impressive achievement. However, in relation to **per capita income**, it is a different story. In 2020, India's rank was **142 out of 197 countries**, according to IMF's data on per capita income. This only shows the distance we have to travel.
- **Environmental considerations** may also act as a damper on growth. Some adjustment on the composition of growth may become necessary. All the same, we have no choice but to grow fast, given the present level of per capita income.

5) The weakest link in the air pollution fight

(GS3: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment)

Context

- In the fight against air pollution in the Indo-Gangetic Plain, the State Pollution Control Boards (SPCBs),

and the Pollution Control Committees (PCCs) in the Union Territories play a crucial role.

- Their primary role is to **regulate emissions from point sources** such as industries and power plants that contribute substantially to ambient air pollution in urban and rural areas.
- More recently, they have also been tasked with **guiding cities in meeting targets** under the **National Clean Air Programme** and **spending Finance Commission grants for air quality improvements**.
- In short, there is no future with clean air in which the SPCBs do not perform at the highest level possible.

An Enhanced Mandate

- The SPCBs were initially constituted under the **Water (Prevention and Control of Pollution) Act, 1974**. Under the **Air (Prevention and Control of Pollution) Act, 1981**, the SPCB mandate was expanded to include air quality management. Subsequently, several new environmental regulations added to their roles and functions.
- Unfortunately, this enhanced mandate has **not been matched with increased capacity and capability** in the Boards. As environmental indicators such as air quality and water quality worsen in many parts of the country, the Boards are evidently failing to effectively discharge their statutory mandate.

Board Composition as Conflict of Interest

- The composition of SPCBs is a matter of serious concern as **important stakeholders and those with crucial expertise are missing** in most States.

- Boards are multi-member bodies headed by a chairperson and a member-secretary. Their decisions and policies guide the day-to-day functioning of the organisation.
- Over 50% of the Board members across the 10 SPCBs and PCC studied **represent potential polluters**: local authorities, industries, and public sector corporations.
- They are subject to the SPCB's regulatory measures, and their overwhelming presence raises fundamental questions around **conflicts of interest**.
- At the same time, **scientists, medical practitioners, and academics constitute only 7%** of the Board members.
- What is even more worrying is that most Boards do not meet the **statutory requirement** of having **at least two Board members who have knowledge of, and experience in, air quality management**.
- The lack of expertise and skewed representation of stakeholders on the Boards can only be a **hindrance to effective policy making**.

Short Timeframe

- The SPCB leadership — the chairperson and the member secretary — **do not enjoy a long, stable, and full-time tenure**. In many States, persons in these two posts hold an **additional charge** in other government departments.
- With the focus of the leadership of SPCB spread thin across multiple roles and their tenures being short, often they do not even have the time to understand their mandate fully before they are moved out.
- In such a scenario, long-term policy planning, strategic interventions and effective execution aimed at

reducing air pollution substantially are extremely difficult.

Staff Running on Empty

- The SPCBs are **critically understaffed**. At least **40% of all sanctioned posts are vacant** across nine SPCBs/PCCs for which there is data.
- Inadequate staff strength forces the Boards to **recast their priorities among their various functions**.
- This has significant implications on pollution regulation as **vital functions** such as monitoring industrial compliance, initiating enforcement actions in case of violations, and standard setting are often **not prioritised**. Less staff strength also means **weaker regulatory scrutiny and poor impact assessment**.

Conclusion

- Without essential capacity, capability, expertise, and vision in our frontline regulators, sustained and substantial gains in air quality are virtually impossible.

6) Opaque political financing could cost democracy dear

(GS2: Structure, Organization and Functioning of the Executive and the Judiciary—Ministries and Departments of the Government; Pressure Groups and Formal/Informal Associations and their Role in the Polity)

Context

- The Centre has amended the Electoral Bond Scheme to allow an additional period of 15 days for sale of Electoral Bonds in the year of General Elections to the Legislative Assembly of States and Union Territories.

What are Electoral Bonds?

- An electoral bond is designed to be an **interest-free bearer instrument** like a **Promissory Note** — in effect, it will be similar

to a bank note that is payable to the bearer on demand.

- It can be purchased by any **citizen of India or a body incorporated in India**. A person being an individual can buy Electoral Bonds, either singly or jointly with other individuals.
- The electoral bonds were announced in the **2017 Union Budget**.
- The bonds will be issued in multiples of ₹1,000, ₹10,000, ₹1 lakh, ₹10 lakh and ₹1 crore and will be available at specified branches of **State Bank of India**. SBI is the only authorised bank to issue such bonds.
- They can be bought by the donor with a **KYC-compliant account**.
- The bonds are available for purchase for a period of 10 days each in the beginning of every quarter, i.e. in January, April, July and October as specified by the Central Government.
- **Only political parties registered under Section 29A of the Representation of the Peoples Act, 1951** and have **secured no less than one per cent votes** in the last General Election to the House of the People or the Legislative Assembly of the State, are eligible to receive electoral bonds.

How does it play a pivotal role?

- The discourse around political finance in India usually revolves around the **issue of corruption**. We see this in the political contestation over the introduction of electoral bonds.
- It is either presented as a pious instrument for 'cleansing' politics, by routing funding through legal channels, or as a murky mechanism for legitimating 'institutionalised corruption'.

- The inherent opacity of electoral bonds renders the power of the Election Commission of India (ECI) irrelevant in terms of ensuring a level-playing field. Meanwhile, the information asymmetry between the ruling and the Opposition parties gnaws at the fairness of electoral processes.

Bonds as Advantage to Ruling Party

- Within two years of its introduction, electoral bonds were said to cover **52% of the total income of national parties and 53% of the total income of regional parties**, according to an analysis by the Association for Democratic Reforms (ADR).
- There are two salient features of electoral bonds we must consider to gauge its impact on political competition.
- One, the design of electoral bonds, perhaps more than any other instrument of political finance, **leans to the advantage of the ruling party.**
- Second, electoral bonds **centralise political funding towards the national units of political parties, further entrenching the leverage of national leadership over the State and local units.**
- As a reply to a Right To Information (RTI) query revealed, out of the ₹5,851 crore of electoral bonds sold in 2018-19, 80% of the bonds were redeemed in Delhi.
- Electoral bonds were introduced alongside significant legal amendments, such as the **removal of erstwhile limits (7.5% of net profit) on corporate donations.**
- These changes in the legal architecture of political finance **enable the prospects of an alliance of national political elite and big business conglomerates**

squeezing the space for both local elites and regional capital.

- The **centralisation of political power** seems more commanding in the present time.

Conclusion

- The new political financing regime only **builds on the political pathologies already prevalent** in our system (**crumbling organisations; political centralisation; a business-politics compact fuelled by rent seeking and cronyism**) rather than creating them from scratch.
- Even so, it is important that independent institutions (such as the ECI and the Supreme Court of India) step in to layer the seeming black hole of electoral bonds with a **minimum level of institutional safeguards.**

7) India's G20 Presidency and Food Security

(GS2: Issues relating to Poverty and Hunger)

Context

- **Global and regional food security** have been deliberated upon as one of the priority agendas of the G20 for many years now. The situation has worsened with growing conflicts, and spiralling climate crises marked by droughts, floods, cyclones, and economic downturns in the past few years.
- India's presidency of the G20 offers a historical opportunity for the country to share its successful journey in moving from a **food-deficit nation to a food-surplus nation**, and address the growing challenges of food security for creating resilient and equitable food systems.

Leading the Conversation

- India's journey in the last 50 years provides learning on sustaining

growth in foodgrain production and improving food systems.

- One of India's greatest contributions to equity in food is the **National Food Security Act, 2013**, which anchors the targeted public distribution system, the mid-day meal scheme, and the Integrated Child Development Services. Today, India's food safety nets collectively reach **over a billion people**.
- Since Independence, India initiated policy measures, land reforms, public investments, institutional infrastructure, new regulatory systems, public support, and intervention in agri-markets and prices and agri-research and extension.
- The **1991-2015 period** saw the **diversification of agriculture** with greater focus being given to the **horticulture, dairy, animal husbandry, and fisheries sectors**.
- In the past three years, while responding to the pandemic, India has set a global example in alleviating hunger by bringing in the **Pradhan Mantri Garib Kalyan Ann Yojana** to ensure food safety by providing food items including 5 kg rice/wheat per individual and 1 kg gram per family every month for free.
- **International trade** is crucial to ensure access to inputs, goods, and services to produce safe, nutritious, and affordable food. The **Matra Declaration** (2021) of G-20 also emphasised keeping international food trade open and strengthening global, regional, and local diversified value chains for safe, fresh, and nutritious food, as well as promoting a science-based holistic **One Health approach**.

- In the face of climate change and a sudden decline in wheat harvest and decline in rice production, India formally announced an **export ban on wheat and rice**. However, it maintained a **flexible approach to help countries** like Afghanistan with humanitarian aid and others such as Bangladesh, Egypt, Yemen with commercial supplies, in collaboration with the respective governments.

Five Action Points

- There is also an opportunity to fast-track the processes and commitments that were started through the pioneering **UN Food Systems Summit**, held by the G20 leadership, for global food systems transformation to achieve the Sustainable Development Goals by 2030.
- The summit created a mechanism focused on **five identified action tracks**:
 - Ensure access to safe and nutritious food for all;
 - Shift to sustainable consumption patterns;
 - Boost nature-positive production;
 - Advance equitable livelihoods, and
 - Build resilience to vulnerabilities, shocks, and stress.
- The war in Ukraine and the restriction on the export of wheat have shown **how dependent nations are on a single source of global food supply**. This vulnerability is linked with production being impacted by the **changing weather**, and **disruption in the availability of inputs**.
- It is important to note the vulnerability visible in foodgrain production and supply or in the

availability with regards to exports will also raise the growing demand for India's wheat and rice.

Way Forward

- Over the decades, the Government of India has **institutionalised buying grains from farmers and food stocks** as strategic reserves for national food security.
- The **minimum support price** has encouraged farmers to produce, and protects them from financial fluctuations. This process has protected people, especially the most vulnerable and poor, during difficult times.
- There needs to be greater investment in agriculture; food safety nets for the poor and vulnerable; new ways of farming; and diversified livelihoods.
- We need to expand **south-south cooperation** to share experiences on food and agriculture production and make expanded efforts to share India's experiences for countries in Africa and Asia.

8) The real issue at COP27 is energy equity

(GS3: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment)

Context

- In the run-up to COP26, last year in Glasgow, several developed countries had declared their intention to reach **net-zero emissions by 2050**. These declarations did not square with the requirements of keeping the 1.5°C target alive. **Four-fifths of the global carbon budget** to limit warming within 1.5°C has **already been exhausted**.

Global Energy Inequality

- **Developed countries** are responsible for **more than half of these historical CO₂ emissions**.

- **Global energy poverty is concentrated in developing countries.** In 2021, 733 million people had no access to electricity and almost 2.6 billion people lacked access to clean fuels and technologies.
- The **average per capita energy use of the richest 20 countries is 85 times higher than that of the 20 poorest countries.**
- Addressing this stark energy poverty in developing countries is important because there is a **strong correlation between energy supply and human development.**
- The average annual per capita electricity consumption of sub-Saharan Africa is 487 kilowatt-hours (kWh), alongside an infant mortality rate of 73 per 1,000 live births; maternal mortality ratio of 534 per 1,00,000 live births, and per capita GDP of \$1,645.
- On the other hand, the OECD group of countries have a per capita electricity consumption of 7,750 kWh, corresponding to an infant mortality rate of seven, maternal mortality ratio of 18, and per capita GDP of \$42,098.
- The lack of reliable energy infrastructure has **compounded the difficulties and has multi-dimensional impacts** across developmental indicators.
- In this background, COP27 afforded a critical moment to acknowledge and address the concerns surrounding energy access and security in developing countries. Unfortunately, these long-standing problems of the global South have been ignored by developed country governments, academia, and civil society.

Hypocrisy of the Global North

- In the **United States**, 81% of primary energy is from fossil fuels. In **Europe**, fossil fuels constitute 76% of the energy consumption.
- Thirty years after acknowledging the problem of anthropogenic global warming and committing in the UNFCCC, to take the lead in climate change mitigation, the level of **decarbonisation in the global North has been minuscule**.
- These same developed countries **dismissed differentiation between developed and developing countries** and are lobbying for banning the financing of any fossil fuel projects in some of the poorest countries.
- Bridging the energy deficits in the global South using renewable energy alone is a very big challenge. Spokespersons for urgent climate action across the world must acknowledge this stark reality that the global South has to deal with.

Conclusion

- We need to achieve zero hunger, zero malnutrition, zero poverty, and universal well-being even as we collectively contribute to ensuring effective climate action.
- As the slogan for COP27 ("**Together for Implementation**") suggests, we must work together to ensure that these developmental goals are not side-lined in the pursuit of hollow declarations of net-zero targets three decades into the future.

9) Fixing India's malnutrition problem

(GS2: Issues relating to Poverty and Hunger)

Context

- The **Global Hunger Index (GHI) 2022** has brought more unwelcome news for India, as far as its global ranking on a vital

indicator of human development is concerned. India ranked **107 out of 121 countries**.

- The Government of India discredited the index immediately in its attempt to deny the findings of the report. However, the GHI is an important indicator of nutrition, particularly among children, as it looks at stunting, wasting and mortality among children, and at calorific deficiency across the population.
- India's own **National Family Health Survey (NFHS-5)** from 2019-21 reported that in **children below the age of five years, 35.5% were stunted, 19.3% showed wasting, and 32.1% were underweight**.

Government Schemes are not delivering

- Experts have suggested several approaches to address the problem of chronic malnutrition, many of which feature in the centrally-sponsored schemes that already exist. However, **gaps remain in how they are funded and implemented**.
- For instance, the Government of India implements the **PM POSHAN, or Pradhan Mantri Poshan Shakti Nirman**, known previously as the Mid-Day Meal scheme (National Programme of Mid-Day Meal in Schools). The budget for FY 2022-23 at ₹10,233.75 crore was **21% lower than the expenditure in FY 2020-21**.
- It is clear that the **budgets being allocated are nowhere near the scale of the funds that are required to improve nutrition in the country**.
- A recent study noted that **over 50% Child Development Project Officer (CDPO) posts were vacant** in Jharkhand, Assam, Uttar Pradesh,

and Rajasthan, pointing to **severe manpower constraints** in successfully implementing the scheme of such importance.

- **Social audits** of schemes that are meant to allow for community oversight of the quality of services are **not carried out routinely**.
- To summarise, not only are key nutrition schemes **underfunded**, but it is also the case that the **funds available are not being spent effectively**.
- Fixing these schemes is the obvious answer to addressing India's multi-dimensional nutrition challenge.

Cash Transfers and the Factor of Reliance

- Cash transfers seem to be a favoured solution for several social sector interventions in India today, and this includes the health and nutrition sectors. Much is made of the **JAM trinity (Jan Dhan bank accounts, Aadhaar, Mobile)**.
- Riding on the digital infrastructure available in India, it is said that **targeting the right beneficiaries** (i.e., pregnant women and families with children under the age of five) is possible.
- Cash also has the advantage of **expanding choice at the household level**, as they make decisions on what to put on their plates.
- But evidence of the impact of cash transfer on child nutrition in India is limited so far. Evidence from elsewhere too suggests primarily that while **cash transfers improve household food security, they do not necessarily translate into improved child nutrition outcomes**.
- The effect of cash transfers is also limited in a context where **food prices are volatile and inflation depletes the value of cash**.

- Equally, there are **social factors** such as '**son preference**', which sadly continues to be prevalent in India and can **influence household-level decisions when responding to the nutrition needs of sons and daughters**. This calls for a **comprehensive social education programme** — cash alone cannot solve this.
- Further, a study of the Mamata scheme in Odisha that targeted pregnant and lactating women, showed that there were **persistent socio-economic discrepancies in the receipt of cash transfers**, especially in comparison to entitlements received through the Public Distribution System (PDS). Thus, **cash may be part of the solution, but on its own, it is no panacea**.

Back to the Basics

- It is clear that malnutrition persists due to depressed economic conditions in large parts of the country, the poor state of agriculture in India, persistent levels of unsafe sanitation practices, etc.
- **Cash transfers have a role to play here, especially in regions experiencing acute distress**, where household purchasing power is very depressed.
- Cash transfers can also be used to **incentivise behavioural change** in terms of seeking greater institutional support.
- **Food rations** through PDS and special supplements for the target group of pregnant and lactating mothers, and infants and young children, **are essential**.
- Persistently under-funded and poorly implemented public programmes must take a large share of the blame for India's malnutrition problem.

- But getting these schemes right requires **greater involvement of local government and local community groups** in the design and delivery of tailored nutrition interventions.
- A **comprehensive programme targeting adolescent girls** is required if the **intergenerational nature of malnutrition** is to be tackled.

Way Forward

- The need of the hour is to make **addressing child malnutrition the top priority** of the government machinery, and all year around.

10) It's time to discuss depopulation

(GS1: Role of Women and Women's Organization, Population and Associated Issues, Poverty and Developmental issues, Urbanization, their problems and their remedies)

Context

- Recently when the **world population touched 8 billion**, several headlines focused on how **India** was the largest contributor to the last billion and is set to surpass China as the **world's most populous nation by 2023**.
- But missing in this conversation is the **real threat of depopulation** that parts of India face, and the country's complete lack of preparedness to deal with it.

Lack of Focus

- By current United Nations estimates, **India's population will begin to decline only in 2063**, by which time it will be just shy of 1.7 billion. The world's population is expected to grow until 2086.
- On the other hand, demographers, policy experts and politicians in countries such as Japan, South Korea and Europe, which are experiencing falling fertility and

nearing the inflection point of population declines, are beginning to talk about what the future holds and whether reversal is possible.

- However, the **global conversation around depopulation is missing some key elements**.
- Without talking about **equitable sharing of housework; access to subsidised childcare** that allows women to have families as well as a career; and **lowered barriers to immigration** to enable entry to working-age people from countries which aren't yet in population decline, the narrative can sometimes be tinged with **anti-feminism and ethnic superiority**.

Fertility in India

- It is now well-established that **fertility in India is falling** along expected lines as a direct result of **rising incomes and greater female access to health and education**.
- India's total fertility rate is now **below the replacement rate of fertility**. However, what needs more urgent policy intervention is the fact that parts of India have not only achieved replacement fertility, but have been below the replacement rate for so long that they are at the cusp of **real declines in population**. **Kerala**, which achieved replacement fertility in 1998, and **Tamil Nadu**, which achieved this in 2000, are examples.
- Moreover, even in States with relatively high fertility, **many cities have been at the replacement rate or below the replacement rate** for over a decade, if not more; the **National Family Health Survey (NFHS)** estimated **India's urban fertility rate in 2019-21 to be 1.6**, which places it next to the U.K.

- Yet, India, especially States and cities with below-replacement fertility, is not having the urgent conversation that the U.K. is having about what a **future with an ageing population and a declining workforce** is going to look like.
- In the next four years, both Tamil Nadu and Kerala will see the first absolute declines in their working-age populations in their histories. With falling mortality, the total population of these States will continue to grow for the next few decades, which means that **fewer working-age people must support more elderly people than ever before**. Among the **female elderly** in particular, **economic dependence** is a serious concern.
- Against this backdrop, both States will also need to **re-examine the continued sustainability of low in-migration**. In 2011, the median Tamilian was 10 years older than the median Bihari. By 2036, they will be separated by over 12 years and the median Tamilian will be over 40 years old; the **working-age population of the future will skew northwards**.
- Yet, even though political and popular rhetoric in Tamil Nadu and Kerala often makes it appear as if these States are facing a surge of migrants from the poorer, more populous northern States, the fact is that both States had **negative net migration rates**, which means they sent out more migrants than they received, as of 2011, the most recent year for which this data are available.
- This will make **access to working-age persons notably different** from the situation in other States with low fertility. These include

Delhi and Karnataka which are both net recipients of migrants, and will not confront population decline in the near future.

Three Challenges

- A depopulating future poses at least **three unique challenges to India**.
- First, a **skewed sex ratio** remains a danger. As the latest round of the NFHS showed, **families with at least one son are less likely to want more children than families with just one daughter**.
- Second, the **stark differences between northern and southern States in terms of basic literacy as well as enrolment in higher education**, including in technical fields, will mean that **workers from the southern States are not automatically replaceable**.
- Conversations around fertility reductions in the southern States are often framed around the price that these States are having to pay in relation to others in terms of the share of **federal tax receipts or political representation**.
- But there is also the question of the price their own citizens will have to bear in terms of **economic productivity and welfare sustainability**.

Way Forward

- With decades of focus on lowering fertility, the conversation in India is stuck in a rut.
- It is for the southern States to break away from this outmoded, data-free rhetoric and join the global conversation on depopulation.

11) Think local climate action, think Meenangadi

(GS2: Functions and Responsibilities of the Union and the States, Issues and Challenges Pertaining to the Federal

Structure, Devolution of Powers and Finances up to Local Levels and Challenges Therein)

Background

- If India has to achieve the set of goals enunciated in the **'Panchamrit' resolution** of the COP26 climate summit in Glasgow 2021, it is necessary that **panchayati raj institutions**, the third tier of government which are closest to the people, are involved.
- Although international and national policies have been formulated with large-scale investments, it is necessary to have a **suitable local action plan for implementation and enforcement**, initiated and coordinated by local governments.
- In the context of greater devolution that has taken place, panchayats, as local governments, can play a pivotal role in tackling many of the causes and effects of climate change.

Panchayati Raj's Greater Role

- Over the past few decades, there has been a manyfold increase in the number of climate-related national disasters. Much of India's population still lives in the rural areas and is involved in agriculture and other agri-based activities.
- The greater variability in rainfall and temperatures, etc. experienced of late has directly affected the livelihood and well-being of millions of rural households.
- **India's National Action Plan on Climate Change 2008** identifies a range of priority areas for coordinated intervention at the national and State levels. However, there would have been better results had **panchayati raj institutions been given a greater role**.
- Through the ongoing decentralisation process which

ensures people's participation, panchayats can play a crucial and frontline role in coordinating effective responses to climate risks, enabling adaptation and building climate-change resilient communities.

Carbon Neutrality Projects across India

- The climate change discussion also focuses on the emerging and widely accepted concept of **'carbon neutrality'** which puts forth the notion of zero carbon developments, nature conservation, food, energy and seeds sufficiency, and economic development.
- As human activities are the cause of the current climate crisis, mitigating greenhouse gas emissions and adapting to growing and extreme weather events are critical.
- **Zero carbon development** which promotes sustainable living is the effective solution to reducing anthropogenic emissions and improving climate resilience.

Meenangadi Gram Panchayat

- In recent years, many panchayats have come forward with the concept of carbon neutrality, a prominent example being **Meenangadi gram panchayat in Kerala's Wayanad district**, which serves as a model to emulate.
- In 2016, the panchayat envisaged a project called **'Carbon neutral Meenangadi'**, the aim being to transform Meenangadi into a state of carbon neutrality. There were campaigns, classes and studies to begin with.
- An **awareness programme** was conducted initially. A **greenhouse gases emission inventory** was also prepared. An **action plan** was prepared by organising gram sabha meetings. **Socio-economic**

surveys and energy-use mapping were also carried out.

- Several multi sector schemes were implemented to reduce emissions, increase carbon sequestration, and preserve the ecology and bio-diversity.
- **'Tree banking'** was one of landmark schemes introduced to aid carbon neutral activities which encouraged the planting of more trees by extending interest-free loans. Interestingly 1,58,816 trees were planted which have also been **geo-tagged** to monitor their growth. The entire community was involved in the process, with school students, youth, and technical and academic institutions given different assignments.
- Five years have passed and the changes are visible. **Local economic development** was another thrust area where LED bulb manufacturing and related micro-enterprises were initiated.

Palli Gram Panchayat

- There is also the example of **Palli gram panchayat in Jammu and Kashmir** that has followed the same people-centric model, with specific local activities.
- The panchayat has prepared a **climate-resilient plan** where villagers have been made aware of climate change Mitigation factors such as reducing energy consumption, cutting down on the use of fossil fuels, the use of solar energy, abandoning plastics and promoting plantation and water conservation measures.
- **Bio-gas plants and solar panels** were also introduced. A solar plant (500KW) has been installed to power 340 households.
- A **Gram Panchayat Development Plan for 2022-23** is being

prepared by integrating a climate-resilient plan.

Other Examples

- There are many other panchayats that have also initiated carbon neutral programmes.
 - In **Seechewal gram panchayat (Punjab)**, the Kali Bein river was rejuvenated with people's involvement.
 - **Odanthurai panchayat in Tamil Nadu** has its own windmill (350 KW).
 - **Tikekarwadi gram panchayat in Maharashtra** is well known for its extensive use of biogas plants and green energy production.
 - **Chapparapadavu gram panchayat in Kerala** has several green islands that have been nurtured by the community.
- Many more panchayats are coming forward in this regard.

The 'Clean and Green Village' Theme

- The **Ministry of Panchayati Raj** has focused its attention on **localising the Sustainable Development Goals (SDGs) on a thematic basis**.
- **'Clean and Green Village'** has been identified as a theme where panchayats can take up activities on natural resource management, biodiversity protection, waste management and afforestation activities.
- According to the latest data, 1,09,135 gram panchayats have prioritised 'Clean & Green Village' as one of their focus areas for 2022-23.
- The Ministry has highlighted the need for the documentation of best practices and for wider dissemination. The net result is that

many panchayats are coming forward with their eco plans.

- The **Integrated Panchayat Development Plan** prepared by all panchayats is a stepping stone towards addressing many of the environmental concerns of villages.

Conclusion

- In today's age of rapid technological advancements and digital transformation, India's rural local bodies are silently contributing their strength to ensuring the global target of carbon neutrality, as envisaged in the UN conference on climate change.

12) Streamlining the work of quasi-judicial courts

(GS2: Statutory, Regulatory and various Quasi-judicial Bodies)

Context

- There is a class of quasi-judicial agencies that are not discussed in conversations on the pendency of cases. These are generally **handled by the revenue authorities** and largely relate to land, tenancy, excise, arms, mining, or preventive functions under the Criminal Procedure Code.
- There is a **hierarchy** among these fora and **usual judicial procedures like appeal and revision can be made to superior authorities**. The procedures for handling these cases have been laid out in the **Civil Procedure Code**.
- The functioning of these bodies is of paramount importance as they deal with vital land and related issues. Their **failure to administer speedy justice** leads to harassment of citizens, besides abetting criminal activity by unscrupulous elements.

Challenges

- The maladies that these agencies suffer from are **far graver than**

judicial set-ups, as they are **staffed by revenue authorities who have several other functions**. Usually, many of these offices are **understaffed**. Their engagement with duties such as law and order, protocol, coordination and other administrative functions leaves them with much less time for court work.

- **Computers and video recorders** are not available in many of these courts. Only a few states — such as Maharashtra, Madhya Pradesh and Rajasthan — have electronic platforms for supporting activities such as the filing of cases, publication of cause lists and sending summons.
- Several of the presiding officers **lack proper knowledge of law and procedures**.
- The most critical issue faced by these systems is the **lack of adequate supervision and ownership by the administrative and political leadership**. Data on the level of pendency or the speed of disposal is not compiled in many states. This is why there is scarcely any attempt to increase staff strength. There is **hardly any public scrutiny** by the press or legislature.

How can their status be improved?

- A **multi-pronged action plan** inclusive of legal, governance and HR reforms is required to move ahead.
 - The government should make the **efficient functioning of these agencies a priority** and clearly articulate its position on the issue.
 - **Detailed data** on the functioning of these agencies must be collected

and published from time to time at least annually. These should be **laid before the concerned legislatures**. If the pendency exceeds a certain threshold, additional officials should be posted to exclusively handle judicial functions. This data should be used to **enforce accountability**.

- An **electronic platform** should be established to handle all ancillary work related to the administration of justice, such as filing of complaints, issue of summons, movement of case records between courts, issuing copies of the judgments and so on.
- **Annual inspections** of the subordinate courts should be made mandatory.
- **Interdisciplinary research on the functioning of these courts** should be encouraged. It would identify the areas of improvement such as legal reforms or issue of clear guidelines.
- **Regular training and customized orientation** of the adjudicating authorities should be taken up from time to time.
- The **state index of performance** of these quasi-judicial courts be made and published. It would draw the attention of the states to their performance in comparison to others and help them identify areas of weakness.
- **More rigorous induction training of officials**

handling judicial work would help.

- **Procedural reforms** such as minimizing adjournments, mandatory filing of written arguments and other such reforms proposed by bodies like the Law Commission for reform of the Civil Procedure Code should be adopted by these adjudicating bodies.

13) A wellness wish for 2047

(GS2: Issues Relating to Development and Management of Social Sector/Services relating to Health, Education, Human Resources)

Context

- For India in 2047 to be an equitable country, it should build on firm access to high-quality education and healthcare.

Areas of Focus in Enabling Quality Education

- **Foundational Education:** It must begin at an early stage at home, and then in schools, before institutions of higher learning to ensure that all children achieve their full cognitive potential.
- **Role of Parents and Teachers:** Parents should understand the importance of verbal engagement and sensorimotor stimulation and teachers must also be trained, competent and engaged.
- **Addressing Socio Economic Deprivations:** As socioeconomic status of a family determines the amount and quality of the interactions children have in their early life, school environments can mitigate socioeconomic deprivation to an extent. For that to happen, **schools have to be functional**. The functionality of schools comes not from buildings and administrative structures, but the

quality and commitment of teachers.

- **Strengthen Vocational Training Institutes:** Parallel to improving the schooling system, we must strengthen vocational training centres — Industrial Training Institutes, for instance — that provide skills necessary for employment.

Relation Between Education and Health

- As per the **World Bank**, **education of women** is the major driver of change in the **health status of societies**.
- **Reduced fertility, safer births and better health of children and increased social status** are causally linked to the **education of women**.

Scope for Improvement in Healthcare

- Enabling people to **increase control over, and improve their health, preventing life-threatening diseases and improving palliative care** for patients of such diseases should acquire importance.
- **Primary healthcare** has to be made truly functional, especially when it comes to preventing illness and high out-of-pocket expenses on health.
- **Healthcare providers should be made available close to patients** by creating proper and functional physical and digital infrastructure.
- **Right and rapid referral pathways** should be created in order to avoid unnecessary delays in treatment.
- Architecture of health should place individuals and their needs at the center and ensure that these needs are met without large payments being required at the point of care.

Significance of Focussing on Healthcare

- The **UN's Sustainable Development Goals for 2030** are

unlikely to be addressed in full measure by 2047 if we do not address health, health emergencies and catastrophic health expenditures.

- Although only **Goal 3** of the SDGs directly focuses on good health and well-being, the **other goals are also linked to health**. For example, Goals 1 and 2 — no poverty and zero hunger cannot be attained if issues related to health are not addressed.

Conclusion

- To realize the dream of becoming an equitable nation in health and education by 2047, the foundation for the next century has to be created for which we need to invest in education and health in the next 25 years — not just for the elite, but for all.

14) The irrelevance of regional rural banks

(GS3: Indian Economy and issues relating to Planning, Mobilization of Resources, Growth, Development and Employment)

What are Regional Rural Banks (RRBs)?

- The Regional Rural Banks were established in 1975 under the provisions of the Ordinance promulgated on 26th September 1975 and Regional Rural Banks Act, 1976.
- RRBs are jointly owned by the **Government of India, the concerned State Government and Sponsor Banks** with the issued capital shared in the proportion of **50%, 15% and 35%** respectively.
- RRBs were set up with the **objective to provide credit and other facilities**, especially to the **small and marginal farmers, agricultural labourers, artisans and small entrepreneurs in rural areas** for development of

agriculture, trade, commerce, industry and other productive activities.

- **NABARD** is responsible for regulating and supervising the functions of RRBs.
- The RRBs are required to provide **75% of their outstanding advances as priority sector lending** with primary focus on agricultural credit, including small and marginal farmers, as well as micro entrepreneurs and rural artisans.

What is the issue?

- RRBs are said to be facing **existential crisis** because of the following reasons:
 - **Dwindling business** and inability to scale up business volumes;
 - **Soaring bad assets.** For instance, while the number of RRBs has nearly halved from 82 to 43, their non-performing assets have more than doubled from 2.05 per cent to 4.68 per cent in the past one decade;
 - The **volume of the credit disbursed** by the RRBs has **shrunk** while the share of commercial banks has surged;
 - **Swelling operational costs;**
 - **Lack of internet banking facilities** because of which most people in rural areas prefer to deal with commercial banks;
 - Some of the RRBs even today have **not fully digitised their operations;**
 - RRBs **haven't managed to expand their business operations** beyond farm-related activities by

reaching out to micro, small and medium enterprises.

Way Forward

- These issues are evidently an indication of the **growing irrelevance of the RRBs**, which were conceptualised originally as institutions having the **characteristics of cooperatives** in terms of familiarity with rural issues and **commercial banks** in terms of professional functioning and resource mobilisation ability.
- Under the circumstances, the best course for most RRBs is to **either merge with their sponsoring banks** — which is possible only in the case of economically viable entities — or **close down**. They have very little space to survive as stand-alone financial enterprises.

15) Potential of Inland Waterways

(GS3: Infrastructure: Energy, Ports, Roads, Airports, Railways etc)

Context

- The Uttar Pradesh government recently decided to leverage inland waterways to move export-bound cargo to international seaports.
- The integration of the Varanasi-Haldia inland waterway with the existing roads and highways network would translate into a convenient and coherent cargo and passenger transportation system.

India's Inland Waterways Network

- India has a huge inland waterways network, spanning nearly **15,000 km**, in the form of rivers, rivulets, canals, backwaters, creeks, and other kinds of water bodies, which can be used for the movement of goods and passengers.
- The **National Waterways Act, 2016**, has identified as many as **111 navigable water courses** and

declared them “**national inland waterways**”.

- The significant ones among them are the Ganga-Bhagirathi-Hooghly track; Brahmaputra; Barak; the rivers in Goa; the backwaters in Kerala; the inland waters in the Godavari-Krishna deltaic area; and the water stretches in the Mumbai region.

Benefits of Inland Water Transportation

- Inland water transportation is **relatively cost-effective**.
 - A **World Bank** study has found that **water transportation is about 30 percent cheaper than railways and 60 percent less expensive than roadways**.
- It is a **hassle-free, and environment-friendly** mode of ferrying goods, especially bulk cargo such as coal, fly-ash, iron, and odd-sized consignments.
- **Carbon emission** in the case of container vessels is **lesser** compared to road transport vehicles.
- Development of inland waterways networks would generate a **series of forward and backward linkages** with prospects to penetrate deep into the economy. The **multiplier effect** of the investment and its linkages can result in a **virtuous cycle of all-round growth**.
- A well-coordinated inland waterways network could bring a **fundamental alteration in the logistics scenario of the country**. It represents a **ready built infrastructure network**, which can be utilised without any further capital investment. The network requires no green field investment,

but only capex for improvement/upgradation.

- Waterways can **decongest roads**, including highways by moving cargo away.
- Waterways **do not involve challenges associated with land acquisition**, which has always been a sensitive issue, causing time and cost overruns of numerous projects.
- They are also expected to help create **seamless interconnectivity connecting hinterlands** along navigable river coasts and coastal routes and are likely to play a **crucial role in connecting the north-eastern states to the mainland**.

Challenges

- Most commercially navigable waterways are **largely unutilised**. For instance **only about 25 of 111 have so far been developed into operable water channels and merely 13 are being used fully or partially for this purpose**.
- Inland waterway network has **no continuous connectivity**. It requires a **multimodal network** comprising water bodies and roadways, including culverts, bridges etc, to be developed. This involves investment in a **large number of activities to be carried out for infrastructure development**.
- Some of the rivers in national waterways are **seasonal** and **do not offer navigability through the year**.
- Further, all the identified waterways require **intensive capital and maintenance dredging**, which could be resisted by the local community on environmental grounds, including displacement fears, thereby posing implementation challenges.

- Water also has **important competing uses**, viz. need for living as well as for irrigation, power generation etc. It would not be possible for the local government/others to overlook these needs.

Way Forward

- As every riverine system is unique and presents diverse challenges, **separate studies** based on a detailed micro-level review to assess viability need to be done for each, before taking up implementation.
- An effective waterways network would necessitate drawing up a **well-coordinated strategy** on lines of complementarity between the national network and other waterways, not declared as such, as well as between waterways and roadways/railways.
- The following measures are **prerequisites for the optimal utilization** of inland waterways:
 - **Regular dredging of the water courses** to clear silt, weeds, and other obstructions;
 - **Augmentation** of the network of terminal facilities and loading and unloading points;
 - **Maintaining adequate water flows** in these streams at all times.

16) Reforming the WTO

(GS2: Bilateral, Regional and Global Groupings and Agreements involving India and/or affecting India's interests)

Context

- At the concluding session of the G-20 summit at Bali, Prime Minister Narendra Modi said that reforming the World Trade Organization (WTO) is crucial for strengthening

trust in the multilateral trading system.

- **Rules-based, non-discriminatory, free, fair, open, inclusive, equitable, sustainable and transparent multilateral trading system**, with the **WTO at its core**, is indispensable to the advancing shared objectives of G20 members.

Key Takeaways of G20 Bali Declaration

- The Bali Declaration of G-20 urges members to engage in active, constructive, pragmatic, and focused discussions on WTO reforms to improve all its functions. For instance, **reform of the dispute settlement mechanism**.
- It highlights the **importance of allowing agriculture and food trade to flow smoothly** and update global agricultural food trade rules and facilitate trade in agricultural and food products.
- It emphasizes the **importance of not imposing export prohibitions or restrictions on food and fertilizers** in a manner inconsistent with relevant WTO provisions.
- It says that **trade and climate/environmental policies** should be mutually supportive, WTO consistent and contribute to the objectives of sustainable development.

Appellate Body of WTO

- The Appellate Body (AB) is **part of the WTO's dispute settlement mechanism**. It is a **permanent body with seven members**, and acts as an appellate court hearing appeals from the decisions given by WTO panels.
- However, since December 2019, the AB has **stopped functioning due to rising vacancies**. Over the years, **the U.S.** has consistently blocked the appointment of AB members. The U.S. also vetoes

proposals to find solutions to this impasse, including stalling the proposal of the European Union to establish an alternative interim appellate arbitration mechanism.

- As a result, countries now have an easy option **not to comply with the WTO panel decisions** by appealing into the void. Many of the panel rulings of the Dispute Settlement Body are pending at the appeal stage and the disputes linger.

Significance of Dispute Settlement Body

- Dispute settlement is the **central pillar of the multilateral trading system**, and the WTO's unique contribution to the stability of the global economy.
- This is because the rules can be enforced only when there is a mechanism for settling disputes.

Way Forward

- India should persuade the U.S. administration to allow the appointment of judges to hear appeals at the WTO. It will demonstrate the resolve of the G-20 leadership to move forward towards its stated aims.
- It will also bring disproportionate goodwill and enhance India's standing in the global community.

17) Leveraging India's Tourism Sector

(GS2: Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation)

Context

- As the government gets into the act of robust post covid recovery in the economy, grabbing the opportunity and promoting the travel and tourism sector for further economic growth and employment is needed.

Signs of Recovery

- Pandemic had snatched the livelihood of millions of people in direct and indirect employment. The **share of the travel and tourism industry** in the Indian GDP went down to just **5.3 per cent** in 2020 from as much as 10.3 per cent in 2019.
- However, the **share of the tourism industry** in the overall GDP had **risen to 6.1 per cent** in 2021. There is an **addition of 18 million jobs** in 2021 as compared to the previous year.

Significance of Developing the Tourism Sector

- **Multiplier effect on other industries:** A booming travel and tourism industry can have a spiralling effect on various other sectors like food, restaurant, catering and hospitality. For instance,
 - Organizing food festivals and establishing food hubs at places close to major tourist destinations will result in further growth in the restaurant sector.
- **Livelihood opportunities:** The tourism industry is a significant driver of employment creation for **women, migrant workers and young people**, particularly to the rural youth.
- **Developmental objectives:** Social development and poverty alleviation can be achieved through social inclusion and regional integration through the development of this important sector.
- **Forex earnings:** Higher forex reserves because of foreign tourists' arrival in India is of great significance, especially when the global energy and food prices are northward bound.

- Foreign tourist arrivals account for the country's **third largest share of foreign exchange (forex) earnings.**
- Forex earnings from the tourism sector saw around **9.4 per cent annual growth** in the 2011 to 2019 period.

Opportunity within the G20 group

- G20 member nations account for the **highest foreign tourist arrival numbers in India.**
- In 2021, **Bangladesh, the United States, the United Kingdom, France and Germany** took the top five places for foreign tourist arrivals in India. Except for Bangladesh, all the others are G20 members.
- To clinch the rightful place of India's tourism industry in the global arena ahead of other G20 countries, the government of **India can work with the tourism ministers of member nations** to further ease the norms and do away with redundancies in granting E-tourist and E-medical visas to visitors of these countries.

Multi-pronged Approach

- To support a fast-growing travel and tourism industry, the government will have to have a multi-pronged approach which includes:
 - **Ensuring ample skilled labour** is available;
 - Providing **vocational education and training** the youth;
 - **Improving the sector's working conditions** to improve the industry's service quality;
 - Need for institutes and colleges that can **impart professionalism and soft**

skills to the youth to support the industry's growth;

- **Intertwining the development of the travel and tourism industry** with the prospects and growth of **other related sectors** like handicrafts, transport, infrastructure development, etc;
- Making improvements in **road and water connectivity** in some prime tourist destinations, apart from **security arrangements.**

Conclusion

- As India marches ahead in its dream of having a \$5 trillion economy, the emphasis on developing the tourism industry will be a step in the right direction.

18) Geo engineering and climate control

(GS3: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment)

Context

- Geoengineering is a deliberate, large-scale intervention carried out in the Earth's natural systems to **reverse the impacts of climate change.** This involves techniques to **physically manipulate the global climate to cool the planet.**
- These techniques fall primarily under **three categories:**
 - **Solar radiation management (SRM)**
 - **Carbon dioxide removal (CDR)** and
 - **Weather modification.**
- Specific technologies include
 - **Solar geoengineering or 'dimming the sun'** by spraying sulfates into the air

to reflect sunlight back into space;

- **Ocean fertilization or the dumping of iron or urea** to stimulate phytoplankton growth to absorb more carbon;
- **Cloud brightening or spraying saltwater** to make clouds more reflective and more.

Climate Change Status

- The November 2022 assessment by the Climate Action Tracker says that, on the basis of current policies and actions, the **2100 temperature will rise by 2.7°C from the preindustrial average** and will continue to increase after 2100.
- The future generations will face severe and relatively long heat episodes, floods, droughts and water uncertainty, more storms, sea-level rise and biodiversity loss.

Potential of Geo-engineering

- Geo-engineering basically **compensates for the significant shortfall in mitigation options** that are necessary to keep temperature rise below the agreed target level.
- At present, at the practical level, it is mostly **focused on capturing carbon** from emissions in high emission plants, like those producing electricity, steel or cement.
- Carbon capture is a geo-engineering option, but it **does not have significant cross-border effects** and can be **left to the discretion of each country's mitigation plan**.
- A more speculative geo-engineering option that is being discussed is the **planting of aerosols in the stratosphere**. Most aerosols cause **atmospheric**

cooling, either by directly reflecting incoming solar radiation or indirectly through their impact on clouds. They are **short-lived** in the atmosphere and more **regionally variable** relative to longer-lived emissions, like carbon dioxide.

- It is estimated that anthropogenic aerosols alone have **cooled global surface temperatures by up to 0.8 °C** over the last century. However, their **impact is uncertain** and certainly **does not respect national boundaries**. Moreover, there is **very little scientific data to assess the impact and the uncertainty**.
- **Stratosphere aerosol injection (SAI) and other measures for solar radiation modification (SRM)** are, at present, **largely theoretical in nature** as they have not been tried on a pilot basis to assess their impact, not just on reducing the incidence of solar radiation but also other side effects like impact on precipitation or the ozone layer.
- Solar radiation also does not respect national boundaries and any SAI or SRM action will have **cross-border effects**.

Prerequisites

- Hence, if these geo-engineering options are to be considered legitimate there must be **two crucial moves** to bring countries together.
- The first one, that can be set up now or assigned to the Intergovernmental Panel on Climate Change is a **cooperative scientific research process** to analyse available information for major volcanic eruptions that altered solar radiation and to plan and evaluate **pilot experiments**,

which must be multilaterally approved.

- The second requirement is to agree on a **global agreement that prohibits unilateral action** and sets up a **process for multilateral agreement on geo-engineering initiatives**.

Criticisms

- Critics argue that geoengineering plans **do nothing to change the underlying cause of climate change**, the buildup of heat-trapping gases, i.e., they **distract attention** from the need for deep cuts to gross emissions which is achievable with the right political will and resource mobilisation.
- Conducting tests for geoengineering are **potentially harmful** as they need to be deployed at a scale large enough to impact the global climate system to be certain of their efficacy.
- And some of these consequences are already known. **Solar geoengineering**, for example, **alters rainfall patterns** that can disrupt agriculture and water supplies.
- **Injecting sulfate aerosols** in the stratosphere above the Arctic to mimic volcano clouds, for example, can **disrupt the monsoons** in Asia and **increase droughts**, particularly in Africa.
- There are also **geopolitical concerns**. If governments ever gain control of changing the course of potentially damaging storms, diversions that direct storms toward other countries may be seen as **acts of war**.

Conclusion

- The actual implementation of geo-engineering will happen only when **extreme climate events** like high heat waves start happening and that is way into the future. Also, it

will be required only if there are concerns that **greenhouse gas reduction will not go at the pace** required to keep the temperature increase down to **1.5°C**.

- But even though the application of the results of research, if at all, will only take place decades into the future, the process of establishing a **credible multilateral process for dialogue and decision** must start soon because the risk of wrong decisions is very high.
- A global move on geo-engineering is a **precautionary measure** and **should not dilute the pressure on major emitters to do more to reduce their carbon emissions**.
- What is geo engineering? Mention some geoengineering technologies. Can geoengineering options be a substitute for climate change mitigation shortfalls?

19) How can India boost millets cultivation?

(GS3: Major Crops - Cropping Patterns in various parts of the country)

Context

- The United Nations has, at India's initiative, has declared **2023** as the **International Year of Millets**.

India's Millet Production Status

- India is the **largest producer of millets** in the world. Though **India**, currently, **dominates acreage and production of millets with 19% and 18% global share**, respectively, shares of sown areas under millets and its production continue to be quite less in the overall foodgrain basket within the country.
- India's production of these "**nutri cereals**" — **jowar, bajra and ragi and minor millets** such as kodo, kutki, kakun, sanwa, cheena and kuttu has fallen from 23-24 million

to **19-20 million tonnes** over the last 4-5 decades.

Reasons for Low Levels of Production

- The main reasons behind the decline are
 - **low remuneration,**
 - **lack of input subsidies and price incentives,**
 - **subsidised supply of fine cereals through the public distribution system (PDS) and**
 - **change in consumer preferences.**
- For farmers, too, millets are **orphan crops**. With **access to irrigation**, they will immediately switch to growing **wheat and rice** that yield 3-4 times more than jowar or bajra.

Advantages of cultivating millet

- Millets have **nutritional superiority** over wheat and rice whether in terms of **amino acid profile or vitamins, minerals and crude fiber content**.
- They are also **hardier and drought-resistant crops**, which has to do with their **short growing season** (70-100 days, as against 120-150 days for paddy and wheat) and **lower water requirement** (350-500 mm versus 600-1,200 mm).

How to Boost Millet Cultivation?

- Generation of demand for millets-based products, along with productivity enhancement, will help farmers in realising better prices. Since the processing of millets involves hardships, **proper processing and value additions** will be effective in creating more demand among consumers.
- Millets can be promoted in **rain-fed semi-arid and hilly terrain areas** where they have been well-adapted.

- Farmers in **western Rajasthan, southern Karnataka or eastern Madhya Pradesh** who are already cultivating bajra, ragi and minor millets can be incentivised. These districts/regions can be promoted as **clusters for particular millets** like Dindori in MP for kodo and kutki.
- The farmers should be incentivised through **market intervention** and **appropriate technology inputs** in seed, harvesting and storage to make it competitive with alternative crops.
- To strengthen the **millet market ecosystem**, the following measures could be undertaken:
 - **Establishment of primary and secondary processing centres** in the vicinity of production. **Community-owned processing units** facilitated by farmer collectives can play an instrumental role in leveraging economies of scale.
 - **Corporates and start-ups** in the food processing industry can assist through better **branding prospects** with food quality/safety standards to increase consumer awareness of its nutritional benefits.

How to Boost Millet Consumption?

- The government needs to **create awareness** through various promotional activities and mass awareness campaigns, highlighting its **nutritional advantage and its benefits** for farmers in opting for low-cost climate-friendly sustainable farming.
- A **region-specific strategy** and their **introduction in mid-day meals** in schools and anganwadis could boost millet consumption.

- The schools and anganwadis can serve khichdi, dosas, energy bars and puddings made from locally-sourced millets, along with a daily glass of milk and egg for every child.
- The need for wholesome nutrition would also be more for children in the very regions that are suited for millet cultivation.

Conclusion

- A **dedicated panel** constituting professionals such as policymakers, research institutions, state representatives, the private sector, and civil societies should be part of the **millet promotion mission** for effective coordination.
- The **convergence of ministries** such as Agriculture, Health, and Women & Child Development is crucial to ensure better coordination for program implementation in a specified time.
- These efforts combined will help India in the millet revolution that can improve nutrition, climate and farmer empowerment outcomes.

20) Education and LiFE

(GS3: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment)

Context

- At COP27, India emphasised the role of a Lifestyle for Environment (LiFE) as a mass movement towards sustainable consumption and production.

About Mission LiFE

- Mission LiFE is a global initiative by India to **help the world in its fight against climate change and lead to a sustainable way of life** to achieve the sustainable development goals set by the U.N.
- Mission LiFE will be India's signature initiative at the UN and other international platforms for

showcasing climate action and early achievement of the Sustainable Development Goals.

- It envisages a **circular economy through people's participation**. It also plans to **nurture a global network of individuals**, namely "**pro-planet people**" or **P3**, who will have a shared commitment to adopt and promote environment-friendly lifestyles.
- It aims at following a **three-pronged strategy** for changing people's collective approach towards sustainability.
- This includes **nudging individuals** to practice simple yet effective environment-friendly actions in their daily lives (demand), **enabling industries and markets** to respond swiftly to the changing demand (supply), and to **influence government and industrial policy** to support both sustainable consumption and production (policy).

Education's Role in LiFE Movement

- From behavioural shifts of individuals to the re-shaping of markets, **education has a vital role in the LiFE movement**.
- This could make a **significant dent in reducing planet-warming gases — demand-side actions have the potential to cut greenhouse gas emissions by 40-70 per cent** in 2050, according to the Intergovernmental Panel on Climate Change (IPCC).

Hurdles in Education Sector

- Currently, the education sector and children face several obstacles.
- First, **school closures during the pandemic** have led to a **learning deficit**. This will likely **impact productivity and per capita income levels** in the long term.
- **One year of school closures could reduce GDP levels by anywhere**

from 1.1 to 4.7 per cent by mid-century, according to a paper by the Organisation for Economic Co-operation and Development.

- Second, **climate impacts are already disrupting children's learning and well-being** globally. For instance, **extreme heat** reduces students' learning levels and causes physiological harm.
- Schools are temporarily shut down and children's health is affected due to persistently poor **air quality** in cities like Delhi. **Debilitating deluges** are permanently displacing families, often leading to children (and disproportionately girls) dropping out of schools and being trafficked or subject to child labour due to distressed household incomes.

Measures Required

- As these disasters grow more frequent and intense, **we must prepare the infrastructure, content, and delivery of the public education system** to protect the most vulnerable citizens.
- At a national level, a **strong enabling framework for a climate-resilient education system** could cover matters from curricula to nutrition to school building codes in a climate-changed world.
- Across the board, children should be able to **access clean water and nutritious food. Students' mental health** needs should be served through an empathic expansion and an emphasis on social and emotional learning.
- **Curricula can be infused with scientific and technical know-how alongside indigenous and local knowledge.** For instance: With the help of non-government organisations, Baiga and Gond

students in the buffer zone of Kanha National Park are learning about the **potential of integrating biodiversity conservation with regenerative agriculture.**

Conclusion

- **Investments in primary and secondary education are the greatest lever for development** and can often be **net positive for public finance** in the long term.
- From consumer choices to innovation to policy to finance, each aspect of a green economy will be underpinned by a strong education system that is resilient to climate change.
- This could be the **greatest enabler of a uniquely Indian Lifestyle for Environment** that taps into our civilisational richness and becomes a model and movement to be emulated by the world.

21) Science and Technology in Agriculture

(GS3: Science and Technology- Developments and their Applications and Effects in Everyday Life)

Context

- The agriculture and allied sector play a critical role in rural livelihood, employment and national food security. **Around 55-60 percent of its rural households depend primarily on agriculture** for their livelihood.
- According to the **Economic Survey (2021-22)**, the **agriculture sector** which is the **largest employer of workforce**, accounted for a sizable **18.8 percent** (2021-22) in **Gross Value Added (GVA)** of the country registering a growth of 3.6 percent in 2020-21 and 3.9 per cent in 2021-22.
- The survey stated that the **growth in allied sectors including livestock, dairying and fisheries**

has been the major drivers of overall growth in the sector.

Digital Technologies in Agriculture

- Digital technologies are finding increasing use in the agricultural value system because the government has taken various initiatives to give a push to digital agriculture in the country.
- **India Digital Ecosystem of Agriculture (IDEA) framework:**
 - It would lay down the **architecture for the federated farmers' database** and would serve as a **foundation to build innovative agri-focused solutions** leveraging emerging technologies to contribute effectively in creating a better Ecosystem for Agriculture in India.
- **Funds under NeGP-A:**
 - Under the National e-Governance plan in Agriculture (NeGP-A), the funds are released to the States and Union Territories for **projects involving use of modern technologies** such as Artificial Intelligence, Machine Learning, Robotics, Drones, Data Analytics, Block Chain etc.
- **Sub mission on Agricultural Mechanisation:**
 - It aims at '**reaching the unreached**' by bringing to the small and marginal farmers in the core and **giving the benefits of farm mechanization**, by promoting Custom Hiring Centers (CHCs), creating hubs for hi-tech and high value farm-equipments, distribution of various agricultural equipments, creating awareness among stakeholders through demonstration and capacity building activities, and ensuring performance-testing and certification at designated testing centers located all over the country.
- **e-NAM Online Marketplace:**
 - The National Agriculture Market (e-NAM) is a **pan-India electronic trading portal** which networks the existing Agricultural Produce Market Committee (APMC) mandis to create a unified national market for agricultural commodities.
 - Digital services through various modules of e-NAM platform such as Farmers Producers Organisation trading module, warehouse-based trading module.
 - **Platform of Platforms (POP)** under e-NAM intended to promote trade and marketing of agricultural produce wherein farmers will be facilitated to sell the produce outside their state borders.
 - **GPS based e-NAM Mandi Locator:** Farmers / Sellers can locate their nearby e-NAM mandi using GPS based mandi locator feature through e-NAM mobile app.
- **PM KISAN Digital Payment:**
 - Under the scheme **Rs. 6000**, annually in three installments is directly transferred into the bank accounts of the eligible farmers under Direct Benefit Transfer mode.
 - The **PM-KISAN mobile app** was launched to broaden the reach of the scheme where farmers can view the

status of their application, update or carry out corrections of name based on their Aadhaar card and also check the history of credits to their bank accounts.

- **AGMARKNET portal:**

- AGMARKNET portal is a **G2C e-governance portal** that caters to the needs of various stakeholders by providing agricultural marketing related information (daily arrivals and prices of commodities) from a single window.

- **National Mission on Horticulture:**

- It promotes holistic development of the horticulture sector (including bamboo and coconut).
- **HORTNET** project is a **web enabled work flow-based system** for providing financial assistance under the mission for Integrated Development of Horticulture.

- **National Project on Soil Health and Fertility:**

- Integrated Nutrient Management has been promoted through implementation of **Soil Health Cards scheme** since 2015.
- Soil health card provides **nutrient status of the soil** along with prescription about balanced and integrated use of inorganic and organic fertilizers to maintain good soil health.
- **Soil Health Card Portal** is available where farmers can track soil samples.

- **Kisan Suvidha App:**

- Kisan Suvidha mobile application **facilitates dissemination of information to farmers** covering range of issues - weather forecast, extreme weather alert, market price of commodities, information about dealers of fertilizer, seeds, pesticide, seeds etc, plant protection for 12 major crops, agro advisories, soil health card, soil testing labs, cold stores and godowns, veterinary laboratories and diagnostic centers, crop insurance and government schemes.
- Besides, **Pusa Krishi mobile app disseminates information about the latest technologies** developed by the Indian Agricultural Research Institute.

- **Usage of Drones in Agriculture:**

- To make drone technology affordable and available to the farmers- **financial assistance of 100 percent cost of drone** (upto Rs. 10 lakhs per drone) is provided under **sub-mission on Agricultural Mechanisation** to the Institutions engaged in agricultural activities for its demonstration on the farmer's fields.
- FPOs are provided grants of 75 percent for purchase of drones for its demonstration on the farmers' fields.

- **Thrust on Genetic Improvement:**

- The research by ICAR focuses on genetic enhancement of crops, livestock, fish for high yield,

quality and climate resilience, conservation of resources and, development of intelligent information technology (IT) enabled platform for technology transfer among farmers and stakeholders.

Conclusion

- Digital technologies play a vital **transformational role in modernizing and organizing how rural India performs its agricultural activities** as reported by the Committee on Doubling Farmers' Income in 2018.
- The governments' thrust has been to help farmers accessing the latest farm technologies to ensure that **farmers' income get a boost** and sustained in coming years besides ensuring that India remains self-reliant in production of most of the agricultural commodities.

22) Community Reserves

(GS3: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment)

Context

- Since 2007, the Central government has gained joint control of nearly 1,300 sq km of **community-owned forests** that were exclusively held by forest and tribal communities of India.

Classification of Forests

- **India State of Forest Report, 2021** classifies forests into three categories: **Reserved, Protected and Unclassed**.
 - **Reserved forests** have the **maximum protection**, with all activities prohibited unless permitted by the forest department.
 - **Protected forests** have a **limited degree of protection**, where all

activities are permitted unless prohibited by the forest department.

- **Unclassed forests** are all areas recorded as forest but not included in **reserved or protected forest categories**. They can be **owned** by the **government, communities, clans or individuals**. In recent times **unclassed forests** are primarily being converted to **community reserve**.

Community Reserves

- Under the **Wild Life (Protection) Act (WLPA), 1972**, **protected areas** include, **National Parks, Wildlife Sanctuaries, Community reserves, Conservation reserves and Tiger reserves**.
- Community and Conservation reserves, act as **buffer zones** between established **national parks, wildlife sanctuaries, reserved and protected forests**. While **community reserves** can be **privately owned**, either by an individual or the entire community, **conservation reserves** include **reserve and restricted land** occupied by the **government** to protect wild animals.

Joint Forest Management

- The concept of "community reserve" was added to the WLPA through an amendment in 2002 for conserving community-owned flora and fauna using **traditional ways and means**.
- A community reserve is usually formed by the **local village council** and the **forest department** signing a **memorandum of understanding (MoU)**, paving the way for **Joint forest management (JFM)**.
- Once the Centre notifies an area as a community reserve, as per

Section 33 of the WLPA Act, the Chief Wildlife Warden of the state becomes the governing authority of the forest, whose consent is required for all decisions pertaining to the area.

- Under JFM, a **bank account** is opened with the forest department and village council members as co-signatories.
- The money in the account is allocated by the Centre in **periodic installments on the basis of the conservation and livelihood projects** that have already been approved by the Environment Ministry to be undertaken in the community reserve. These can be ecotourism activities, such as bird watching or hiking, to generate income for the community.
- The money is used to **help conservation efforts** and to **aid those who have suffered due to the creation of the community reserve**, for instance, families that have lost cultivable land due to the forest being declared a community reserve.
- A **Joint Forest Management Committee**, consisting four members nominated by the village council and one member nominated by the forest department, is responsible for identifying the beneficiaries to distribute the money. The government, therefore, becomes a co-manager of the forest, along with the community.

Issues

- After a forest has been made into a community reserve, **people are not allowed** to hunt there, or collect non-timber forest produce, or use it for agricultural practices such as jhum cultivation.
- The benefits to communities, after the designation of community

reserves, vary from place to place. In many places, **people are not happy with the meager monetary benefits.**

- Several communities are demanding denotification of community reserves as they do not get their promised benefits and there is conflict between the forest department and local communities.

Conclusion

- Community Reserves illustrate a **community-based co-management model**, a first of its kind within the protected area (PA) network of India. Such reserves mark a shift towards an **inclusive and decentralised approach** within PAs in the country.
- For Community based conservation to be a reality in India the need of the hour is to create legal instruments and guidelines that support efforts made by communities for biodiversity conservation rather than impose new institutions or laws.

23) GM Mustard

(GS3: Awareness in the fields of IT, Space, Computers, Robotics, Nano-technology, Bio-technology and issues relating to Intellectual Property Rights)

Context

- Dhara Mustard Hybrid-11 (DMH-11) had recently been approved by the Genetic Engineering Appraisal Committee (GEAC) for cultivation in farmer fields, as a precursor to commercial cultivation.

What is GM Crop?

- A genetically modified organism (GMO) or living modified organism (LMO), is **any organism whose genetic material has been modified using laboratory-based transfer of genetic material from another organism.**

- GM crops are derived from **plants** whose **genes are artificially modified**, generally by inserting genetic material from another organism, to **give it new properties**, such as **improved nutritional value, increased yield, resistance to disease or drought, etc.**

Regulations

- In India, Genetically modified organisms and products are regulated by the **Ministry of Environment, Forest and Climate Change (MoEFCC)** under the provisions of the **Environment (Protection) Act, 1986**.
- **Genetic Engineering Appraisal Committee** under MoEFCC is authorised to review, monitor and approve, import, export, transport, manufacture, use or sale of GMO.
- The **Food Safety and Standards Act 2006** prohibits import, manufacture, use or sale of **GM food** without the approval of the Food Safety and Standards Authority of India (FSSAI).
- So far, **commercial release is granted only for Bt cotton**. Recently, the GEAC has given approval for the commercial cultivation of GM Mustard.
- It should be noted that the GEAC's approval does not mean commercial cultivation, the **final decision to allow commercial cultivation is taken by the MoEFCC**.

Dhara Mustard Hybrid-11

- It is an **indigenously developed transgenic mustard** which is a **genetically modified variant of herbicide tolerant (HT) Mustard**.
- It contains genes such as 'barnase' and 'barstar' isolated from soil bacterium, *Bacillus amyloliquefaciens*.

- It has been developed by the **Centre for Genetic Manipulation of Crop Plants (CGMCP) at Delhi University**.

Need for DMH - 11

- As **mustard crop accounts for 40 percent of the total oilseed production** in India, GM mustard would make **India self-reliant in oil production**.
- **India produces only 8.5-9 million tonnes (MT) of edible oil** annually while it **imports 14-14.5 MT**, thus GM mustard would also result in **huge savings of foreign exchange reserves**.
- At present, mustard is grown in 8 million hectares, with the **average yield of 1-1.3 tonnes per hectare**. It is said that GM mustard could potentially **raise the yields to 3-3.5 tonnes per hectare**.
- They are also **resistant to pests** that cause **white rust**, a common disease of mustard, and thereby significantly improve yield while reducing farm inputs.

Concerns

- **Details of the trial and its outcome on food safety have not been made public** before sanctioning its introduction.
- There is also an **apprehension that the seeds of this crop cannot be used for regeneration**. Hence, the farmers need to **buy new seeds every time** they want to grow the crops.
- Today, mustard is a **primary natural crop** that **bee farmers** depend on. Hybrid mustard crops can result in **fewer flowering days, reducing honey harvesting season and affecting bee population and honey bee production**.
- Besides, through **pollination, honeybees could transfer the genes of GM mustard to other**

plants. This may lead to **horizontal and undesirable gene transfer** among plants, affecting the biodiversity and causing the growth of unwanted and invasive weeds.

Need for adoption of GM crops

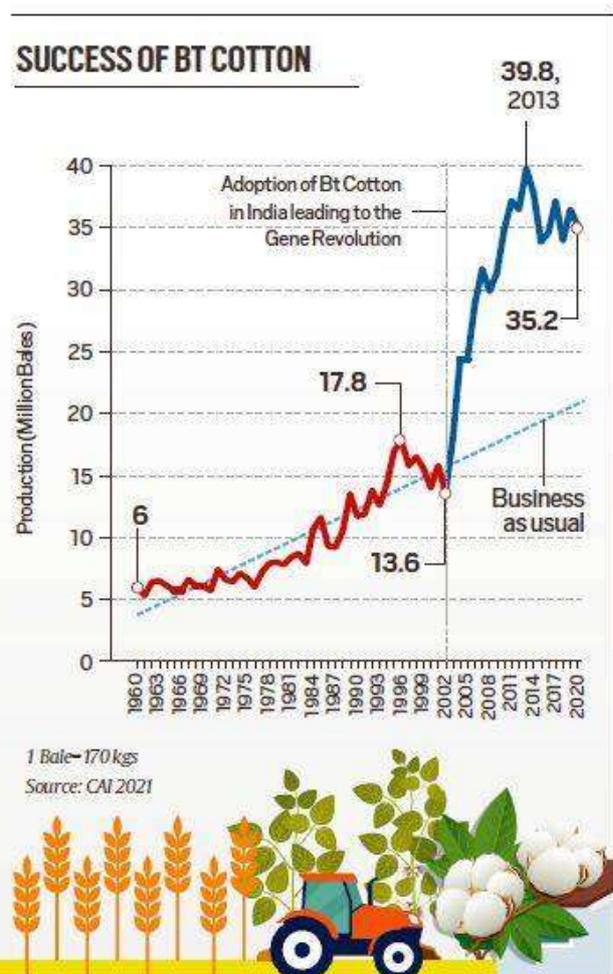
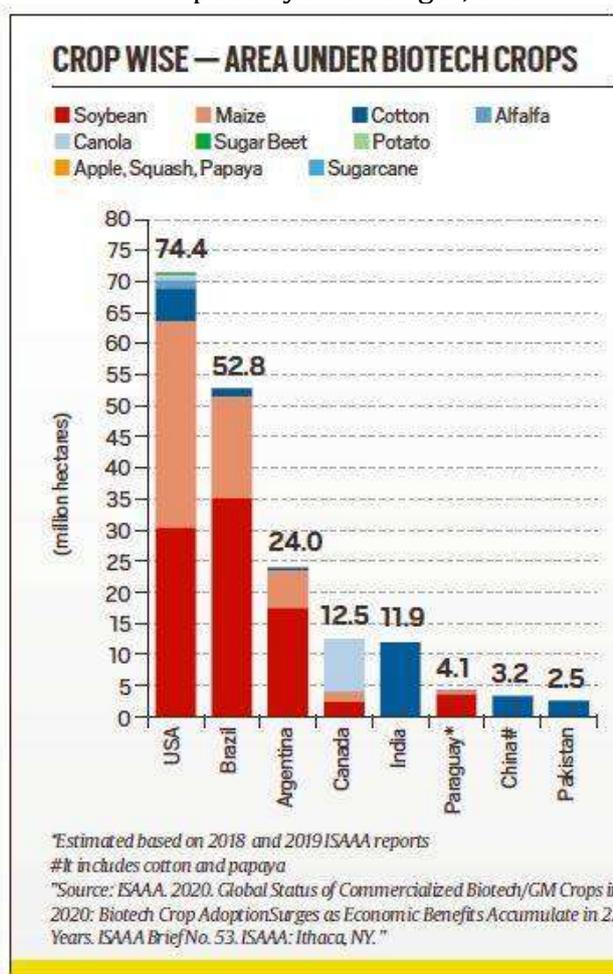
- Scientific innovations like GM Crops has to be adopted to meet the **current challenges** as given below:
 - **Over-exploitation** of natural resources (soil, water, biodiversity);
 - **Declining farm productivity;**
 - Urgency to achieve **sustainable development goals**, especially ending poverty and hunger, and

- Addressing timely the adverse effects of **climate change**.

- By not allowing GM crops, **one is denying the basic rights of farmers** who want to increase their incomes.
- It is **scientifically proven that the consumption of refined GM oil does not allow any protein to enter the human system** and hence is **completely safe from a health point of view**.

World Scenario

- Genetically modified maize, soybean, cotton, tomato and canola are grown across the world. More than 70 countries have accepted the use of GM crops.



Graphic: Ritesh Kumar

India's History of GM crop adoption

- First GM crop, **Bt cotton**, was adopted in **2002** in India. India had witnessed remarkable changes after its adoption as below:
 - **Cotton production** witnessed an **increase of 192 per cent** in just 12 years.
 - **Cotton productivity** increased from 302 kg per hectare in 2002-03 to **566 kg per hectare** in 2013-14, an **increase of 76 per cent**.
 - **Area under cotton cultivation expanded by 56 per cent**, of which about **95 per cent is under Bt cotton**.
 - The **income of cotton farmers increased significantly**.
 - It made **India the second-largest producer after China**, and the **second-largest exporter after the US**, of cotton in the world today.

Issues associated with GM crops

- The success of Bt cotton holds many lessons for policymakers but several concerns have been expressed by NGOs, civil society groups and farmers' groups from time to time to emphasize the risks associated with GM crops.
- Some of these include

- **enhanced sucking pest damage** in Bt cotton;
- **increase in secondary pests** such as mired bugs and Spodoptera;
- emergence of **pest resistance**;
- **environmental and health implications** in terms of toxicity and allergenicity that can cause hematotoxin reactions in the human body and
- **farmers' exposure to a greater risk of monopoly** in the seed business.

Way Forward

- **Effective monitoring and surveillance** is needed to ensure that **safety protocols** are followed strictly, to prevent the spread of **illegal GM crops**.
- Further, **Environmental Impact Assessment** should be carried out by **independent environmentalists, research bodies, civil society organisations** before the introduction.

Model Questions

- 1) Coastal erosion is a natural phenomena. The aggravated erosion by humans affects the biodiversity. Enumerate the measures to control coastal erosion.
- 2) Labour market has undergone rapid changes post corona pandemic. The wage inequality between high skilled and low skilled labour is wider than before. Critically analyse the above statement and give remedies for the same.
- 3) Child marriage prevalence in India is higher in spite of strict regulations in place. Enumerate the ways and measures to end it.
- 4) India's growth rate should be accompanied with sustainable and inclusive growth. Critically examine the above statement.
- 5) Critically examine the measures needed to improve the enforcement of State Pollution Control Boards across India.
- 6) Political financing of parties is inherently skewed towards ruling parties. Comment.
- 7) India's leadership at G20 will help in resolving global hunger and ensure food security. Critically examine the above statement
- 8) Developed countries must take sincere steps to reduce the global carbon footprint as they are historically net emitters. Critically examine the above statement.
- 9) Overhauling the governmental schemes is necessary for fixing the malnutrition problem in India. Substantiate the above statement.
- 10) As population explosion has its own disadvantages, depopulation too has its own. Discuss.
- 11) Democratic decentralisation leads to inclusive growth from the bottom. Explain it with references from a few gram panchayats.
- 12) What are quasi judicial bodies? Suggest measures to address the failure of quasi judicial bodies to administer speedy justice.
- 13) What steps have to be taken to realize the dream of becoming an equitable nation in health and education by 2047?
- 14) Analyse the relevance of Regional Rural Banks in fulfilling the objective of enhancing credit needs of the relatively unserved sections in the rural areas.
- 15) Explain the potential of inland water transportation in India. What are the prerequisites for optimal utilization of inland waterways?
- 16) Discuss the need for reforming WTO with respect to delay in appointment to the appellate body of dispute settlement mechanism.

17) India's tourism industry is a significant economic multiplier and is getting more crucial as the nation aims for rapid economic growth and the creation of employment opportunities. Discuss.

18) What is geo engineering? Mention some geoengineering technologies. Can geoengineering options be a substitute for climate change mitigation shortfalls?

19) Millet production assumes significance in recent years as it ensures sustainable agriculture and nutritional security. Discuss.

20) Given the frequency of climate change associated disasters, it's imperative for the government to lay the foundation for a climate resilient education system. Discuss.

21) Discuss how Digital Agriculture is transforming the lives of people in the rural parts of the country.

22) What are community reserves? How are they different from conservation reserves? How effective have they been in promoting joint forest management in India?

23) How are GM crops significant for ensuring food security in India? List challenges associated with the cultivation of GM crops.