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July 2024 (IN-DEPTH)

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Foreword

Officers Pulse-In Depth provides detailed analyses of significant articles from a variety of sources including **The Hindu, Indian Express, Business Standard, Down To Earth, Yojana, Kurukshetra, and others. These insights are extremely valuable for UPSC CSE Mains preparation. To ensure comprehensive preparation for both Prelims & Mains, we recommend studying Officers Pulse-In Depth along with Officers Pulse-Digest.**

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1) FOREST FIRES

(GS-III: Disaster and Disaster Management)

Definition:

- Forest fires are as old as the forests themselves. They pose a threat not only to the forest wealth but also to the entire regime to fauna and flora seriously disturbing the biodiversity and the ecology and environment of a region.
- During summer, when there is no rain for months, the forests **become littered with dry senescent leaves and twinges, which could burst into flames ignited by the slightest spark.**
- The Himalayan forests, particularly, Garhwal Himalayas have been burning regularly during the summers, with huge loss of vegetation cover of that region.

Causes of Forest Fire:

- **Natural causes** - Many forest fires start from natural causes such as **lightning** which set trees on fire.
 - However, rain extinguishes such fires without causing much damage. High atmospheric temperatures and dryness (low humidity) offer favourable circumstances for a fire to start.
- **Man made causes** - Fire is caused when a source of fire like **naked flame, cigarette or bidi, electric spark or any source of ignition** comes into contact with inflammable material.
- Climate change and the associated warming of the Earth has led to longer dry spells in forest regions. This has led to increasing forest fire incidents throughout the World.
 - Eg: Australian Bushfire, Fires in Uttarakhand.

Types of Forest Fire:

- **Surface Fire** - A forest fire may burn primarily as a surface fire, spreading along the ground as the surface litter (dry leaves and dry grasses on the forest surface) on the forest floor and is engulfed by the spreading flames.
- **Underground Fire** - The fires of low intensity, consuming the organic matter beneath and the surface litter of forest floor are sub-grouped as underground fire.
 - In most of the dense forests a thick mantle of organic matter is found on top of the mineral soil. This fire spreads by consuming such materials.
 - These fires usually spread entirely underground and burn for some metres below the surface.
 - This fire spreads very slowly and in most of the cases it becomes very hard to detect and control. This type of fire is also known as Muck fires.
- **Ground Fire** - These fires are fires in the subsurface organic fuels, such as duff layers under forest stands, Arctic tundra or taiga, and organic soils of swamps or bogs. There is no clear distinction between underground and ground fires.
 - They are more damaging than surface fires, as they can destroy vegetation completely.
- **Crown Fire** - A crown fire is one in which the crown of trees and shrubs burn, often sustained by a surface fire.
 - A crown fire is particularly very dangerous in a coniferous forest because resinous material given off burning logs burns furiously.
 - On hill slopes, if the fire starts downhill, it spreads up fast as heated air adjacent to a slope tends to flow up the slope spreading flames along with it. If the fire starts uphill, there is less likelihood of it spreading downwards.
- **Firestorms** - Among the forest fires, the fire **spreading most rapidly** is the firestorm, which is an intense fire over a large area.

- As the fire burns, heat rises and air rushes in, causing the fire to grow. More air makes the fire spin violently like a storm.

Impacts of Forest Fires:

- **Loss of Biodiversity:** Fires can destroy habitats, leading to the death of plants and animals, and potentially causing the extinction of local species. The degradation of ecosystems can have long-term impacts on biodiversity.
- **Soil Degradation:** Intense fires can damage the soil structure, reduce its fertility, and increase erosion. The loss of vegetation exposes soil to erosion by wind and water, further degrading the land.
- **Air Pollution:** Forest fires release large amounts of carbon dioxide, carbon monoxide, and other pollutants into the atmosphere, contributing to air quality deterioration and climate change.
- **Water Contamination:** Ash and debris from fires can contaminate water sources, affecting the quality of drinking water and harming aquatic ecosystems. Erosion following fires can also increase sedimentation in rivers and lakes.
- **Climate Change Feedback Loop:** The carbon released from burning forests contributes to greenhouse gas emissions, exacerbating climate change. This creates a feedback loop, as climate change can lead to more frequent and intense forest fires.

Measures by Government of India to address Forest Fire based issues:

- **National Action Plan on Forest Fire (NAPFF):** Launched by the Ministry of Environment, Forest and Climate Change (MoEFCC) in 2018, the NAPFF aims to enhance the capabilities of forest departments to prevent and control forest fires through better coordination and resource allocation.
- **Forest Fire Prevention and Management Scheme:** This is a centrally sponsored scheme focused on capacity building, modernization of the forest departments, creation of fire lines, and procurement of firefighting equipment. It also includes community-based fire management practices.
- **Forest Fire Alert System:** Developed by the Forest Survey of India (FSI), this satellite-based system provides near real-time alerts on forest fires to the concerned state forest departments and other stakeholders, enabling quick response and mitigation efforts.

Measures Required to combat Forest fires:

- **Enhance Coordination Among Agencies:** Create a centralised command to coordinate efforts between the forest department, fire services, emergency medical services, the air force, district administration, and political leadership.
- **Regular Inter-agency Drills:** Conduct regular joint drills and simulations to improve coordination and response times during actual fire events.
- **Improve Infrastructure and Resources:** Provide firefighters with modern equipment, including fire-resistant clothing, masks, oxygen tanks, and advanced firefighting tools.
 - Ensure that roads leading to and within forest areas are well-maintained to allow easy access for fire engines and ambulances.
- **Training and Capacity Building:** Implement regular training programs for firefighters, including volunteers, to ensure they are well-prepared and equipped to handle forest fires.
 - Also train local communities in basic firefighting techniques and first aid to support initial fire response efforts.
- **Community Involvement and Incentives:** Experiment with incentives for villagers to assist in firefighting efforts, such as allowing controlled use of forest resources.
 - Conduct awareness campaigns to educate the public about the dangers of forest fires and the importance of preventing them.

- **Research and Development:** Invest in research to understand the causes, behaviour, and impacts of forest fires, and develop new methodologies for fire prevention and management.
 - Promote the development and deployment of advanced technologies for fire detection, monitoring, and suppression.
- **Policy and Legislation:** Enforce existing laws and regulations related to fire safety, land use, and forest management strictly. Introduce policy reforms to address gaps in the current forest fire management framework.
- **Adopt Advanced Practices:** Implement advanced practices and technologies adopted by other countries to enhance India's forest fire management capabilities.

Conclusion:

- With increasing interactions and interventions into the forest ecosystem and climate change related events, forest fire events are bound to rise in India. Implementing the above measures can help the country in managing the forest fires in a feasible manner.

2) EDUCATION UNDER CONCURRENT LIST OR STATE LIST?

(GS-II: 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:

- The **Government of India Act, 1935** during British rule kept **education** under the **provincial list**.
- **After Independence**, this continued and education was part of the '**State list**' under the distribution of powers.
- Through the **42nd constitutional amendment (1976)** '**education**' was shifted from the State list to the **concurrent list**.
- With the recent irregularities in National Eligibility cum Entrance Test (NEET) and National Eligibility Test (NET), the efficacy of keeping education under State list has come under question.

Arguments Against Bringing Back Education to the State List

- **Uniformity in Education Policies:** Keeping education in the Concurrent List ensures a uniform education policy across the country, which can help in maintaining consistent educational standards.
- **Improvement in Standards:** Central oversight can help in improving the overall educational standards by implementing national-level reforms and policies.
- **Synergy Between Centre and States:** It allows for better coordination and synergy between central and state governments in formulating and executing educational policies.
- **Corruption and Professionalism Issues:** There is a concern that moving education to the State List could exacerbate issues related to corruption and lack of professionalism, which might vary widely across different states.
- **Resource Disparities:** Central control can help in addressing resource disparities among states, ensuring that less wealthy states receive adequate support.
- **National Interest in Key Fields:** Central control is essential for framing national policies in crucial areas like medical and engineering education, which have significant implications for the country's development.

Arguments For Bringing Back Education to the State List

- **State Specific Policies:** States can frame education policies that are modified to their specific needs, considering the diverse cultural, linguistic, and socio-economic conditions across the country.

- **Majority of Expenditure by States:** With states bearing the lion's share (85%) of the expenditure on education, they should have more control over how these funds are utilised.
- **Autonomy in Administration:** States can have the autonomy to administer and manage their education systems more effectively without central interference.
- **Flexibility in Curriculum and Testing:** States can develop flexible curricula and testing methods that suit their local context better than a uniform national approach.
- **Diverse Solutions for Diverse Needs:** Considering the vast diversity in India, a one-size-fits-all approach is not feasible or desirable. States can experiment with different models and solutions tailored to their unique challenges.
- **Potential for Innovation:** States can innovate and implement unique educational practices that can be tested and, if successful, adopted by other states.

Conclusion:

- States which are known for good education systems like Germany and Canada have education under the state domain. This calls for a productive discussion in reforming this particular sector.

3) INDIA-UNITED KINGDOM RELATIONS

(GS-II: Effect of Policies and Politics of Developed and Developing Countries on India's interests, Indian Diaspora)

Background:

- **1947-1950:** Despite the end of colonial rule, India chooses to remain a member of the **British Commonwealth**, maintaining a symbolic link with the UK.
 - Diplomatic relations between the two nations were established but early relations were cautious and influenced by post-colonial sentiments.
- **1950s-1960s: Economic and Political Divergence:** India's non-alignment policy during the Cold War leads to a divergence from the UK's NATO-aligned foreign policy.
 - India and the UK were on opposite sides regarding **decolonization efforts** in Africa and other regions.
- **1970s-1980s: Economic and Political Challenges:** India faces economic challenges and slow growth, limiting the scope of bilateral economic relations.
- **Cold War Tensions:** The UK's alignment with the US during the Cold War occasionally creates political tensions with non-aligned India.
- **Diplomatic Incidents:** Relations were strained by events like the storming of the Golden Temple in Amritsar (1984) and the subsequent assassination of Prime Minister Indira Gandhi, affecting the Indian diaspora in the UK.
- **Economic Liberalisation:** As India began to gradually open up its economy, setting the stage for closer economic ties in the future.
- **Strategic Partnership:** The UK and India established a strategic partnership in 2004, focusing on trade, investment, defence, and education.
 - The rapid growth of India's economy leads to increased trade and investment between the two nations.
- **Cultural Ties:** The Indian diaspora in the UK continues to grow, strengthening cultural and people-to-people connections. The Indian diaspora is one of the largest groups in Britain and plays a main role in Politics and other fields.
- **Brexit:** The UK's decision to leave the European Union (Brexit) opens new opportunities for bilateral trade agreements.

New Opportunities in the relations:

- **Completion of a Free Trade Agreement:** Newly elected Labour Government has expressed a commitment to accelerating the completion of a free trade deal, which could enhance economic ties and boost trade between India and the UK.
- **Mobility and Migration:** The existing Migration and Mobility Agreement can be further developed to manage immigration challenges and facilitate the flow of skilled Indian talent to the UK.
- **Green Transition:** Joint efforts in renewable energy and sustainability can help both nations meet their environmental goals and advance the global green transition.
- **Maritime Security:** Collaborative efforts in maritime security can enhance stability in the Indian Ocean region, benefiting both nations' strategic interests.
- **Economic and Financial Partnerships:** With the UK's significant financial clout, deepening economic and financial partnerships can provide a boost to India's economic growth and development.
- **Cultural and Educational Exchanges:** Expanding cultural and educational exchanges can enhance mutual understanding and build stronger people-to-people connections.
- **Realistic Foreign Policy Approach:** Labour Government's "progressive realism" approach, emphasising practical and realistic foreign policy, provides a stable foundation for advancing bilateral relations based on mutual interests rather than ideological differences.

Conclusion:

- The change in Government in Britain is a positive step to develop a smooth and mutually beneficial relations for both the countries.

4) INDIA-MYANMAR RELATION

(GS-II: India and its Neighborhood- Relations)

Background:

- India-Myanmar relations are rooted in shared **historical, ethnic, cultural and religious ties**.
- As the land of Lord Buddha, India is a country of pilgrimage for the people of Myanmar.
- The geographical proximity of the two countries has helped develop and sustain cordial relations and facilitated people-to-people contact. India and Myanmar share a long **land border of over 1600 km and a maritime boundary in the Bay of Bengal**.
- A **large population of Indian origin** (according to some estimates about 2.5 million) lives in Myanmar.
- **India and Myanmar signed a Treaty of Friendship in 1951**. The visit of the Prime Minister Rajiv Gandhi in 1987 laid the foundations for a stronger relationship between India and Myanmar.
- In 2018, both countries signed a landmark '**Land Border Crossing Agreement**' to deal with the pending border problems along with issues relating to smuggling and illicit drug trafficking.
- The conflict between ethnic armed organisations (EAOs) and the military junta in Myanmar has created a serious humanitarian crisis.
- Since 2023, the **ethnic armed groups and the PDF (People's Defence Force)** in Myanmar have coordinated their effort to resist the military junta.
- These **groups** have been fighting the junta for many years, but this is the first time that they have been coordinated and have been able to **hold at least 45% of the territory in Myanmar**.
- In this context, many people have called for a rethink of India's policy and said that we must have some dialogue with these ethnic armed organisations (EAOs).

Concerns of India due to instability in Myanmar:

- **Humanitarian Crisis and Refugee Influx:** The ongoing conflict between the military junta and EAOs has created a **severe humanitarian crisis** in Myanmar, affecting civilians and leading to a dire need for humanitarian assistance.
 - The conflict has resulted in a **significant influx of refugees into India**, particularly in the northeastern states, straining local resources and complicating border management.
- **Balancing Relations with Military Junta and Democratic Forces:** India's traditional policy of maintaining cordial relations with the military junta is increasingly problematic as the junta fails to control large parts of the country and faces widespread rebellion.
 - Balancing support for democratic forces, such as the National Unity Government (NUG) and other democratic movements, while maintaining relations with the military junta is complex and fraught with diplomatic challenges.
- **Influence of External Powers:** China has significant influence over both the military junta and some EAOs, which complicates India's strategic interests and efforts to balance power in the region.
- **Regional Stability:** The potential balkanization of Myanmar, with its fragmentation into various ethnic and political entities, poses a risk to regional stability and directly impacts India's security and economic interests.
- **Lack of Cohesion Among Resistance Groups:** While the EAOs and the People's Defence Force (PDF) have shown unprecedented coordination, their varying objectives and alliances make it difficult for India to engage with them uniformly.
 - The ongoing discussions within the NUG about forming a federal union and the reluctance to reconcile with the military junta add another layer of complexity to India's engagement strategy.
- **Security Concerns in Northeast India:** The instability in Myanmar, particularly the idea of a larger Kuki state that includes parts of Myanmar, has direct implications for India's northeastern states, exacerbating local tensions and security issues.
 - Some Kuki underground groups are trying to control border routes with intentions that may destabilise the region, requiring vigilant security measures.
- **Humanitarian and Diplomatic Dilemmas:** Delivering humanitarian assistance to conflict-affected areas in Myanmar without appearing to interfere in its internal affairs is a delicate balance that India needs to manage.
 - Ensuring effective communication and cooperation with the government in Naypyidaw to address humanitarian needs while respecting Myanmar's sovereignty is challenging.

Measure available before India:

- **Establish Dialogue with EAOs:** Open channels of communication with EAOs to help affected civilians. Explore potential cooperation with these groups to ensure the delivery of humanitarian aid and at the same time continue diplomatic relations with the military junta while emphasising humanitarian concerns.
- **Engage in Multilateral Dialogue:** Participate in **Track 1.5 and Track 2 dialogues**, such as those initiated by Thailand (Bangkok process), to foster regional stability.
 - Collaborate with neighbouring countries like Thailand, Bangladesh, Laos, and China to find a collective solution to the crisis.
- **Humanitarian Assistance:** India can offer essential humanitarian assistance, particularly in border areas between India and Myanmar. Critical resources such as water, sanitary products, anaesthesia, and medical support can be supplied for injured civilians.

- **Monitor and Address Security Concerns:** India should address potential threats related to the fragmentation of Myanmar, such as the creation of autonomous regions or states within its territory.
 - India should ensure that the instability does not spill over into India's northeastern regions, particularly concerning groups like the Kuki.
- **Long-term Development and Cooperation:** India should continue investing in infrastructure and development projects that benefit both countries.

Conclusion:

- Now India should convey its deep interest in the good health, stability, and prosperity of Myanmar. This should lead to mutual benefit and ensure that Myanmar plays a constructive role in India's 'Act East' policy amid its internal turmoil and external influences from China and other powers.

5) INDUS WATER TREATY

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

Background:

- The Indus Waters Treaty was signed in **1960** between **India and Pakistan** with the help of the **World Bank**, which is also a signatory.
- It is one of the **most successful international treaties** and has survived frequent tensions, including conflict, and has provided a framework for irrigation and hydropower development for more than half a century.
- The Treaty allocates the **Western Rivers (Indus, Jhelum, Chenab) to Pakistan** and the **Eastern Rivers (Ravi, Beas, Sutlej) to India**. At the same time, the Treaty allows each country certain uses on the rivers allocated to the other.
- The Treaty sets out a mechanism for cooperation and information exchange between the two countries regarding their use of the rivers, known as the **Permanent Indus Commission**, which has a Commissioner from each country.
- The Treaty also sets forth **distinct procedures to handle issues** which may arise:
 - "questions" are handled by the Commission;
 - "differences" are to be resolved by a Neutral Expert; and
 - "disputes" are to be referred to an ad hoc arbitral tribunal called the "Court of Arbitration."

Issues in the Indus Water Treaty (IWT)

- **Dispute Resolution Process:** India's dissatisfaction with the existing dispute resolution process.
 - Pakistan's concerns regarding India's hydroelectric projects, such as Kishenganga and Ratle.
- **Climate Change Impacts:** Increased variability of flow volume due to climate change is a concern. **NASA has ranked the Indus basin as the world's second most over-stressed aquifer.**
- **Infrastructure Development:** Concerns over the impacts of infrastructure development on downstream flows. Specific projects like the Shahpurkandi barrage are causing tensions.
- **Trust Deficit:** Trust deficit between India and Pakistan due to various tensions and terror attacks complicate the water-sharing issues.
- **Lack of Ecological Considerations:** Absence of Environmental Flows (EF) implementation within the IWT creates issues which affect the ecological state of the rivers.
 - Water quality due to the inflow of pollutants from urban areas is posing threats to food security, human health, and biodiversity.

- According to the **Brisbane Declaration and Global Action Agenda on Environmental Flows (2018)**, EFs refer to the quantity and timing of freshwater flows and levels necessary to sustain aquatic ecosystems which, in turn, support human cultures, economies, sustainable livelihoods, and well-being.

Recommendations for Effective Working of the Indus Water Treaty

- **Integrate Ecological Perspectives:** Institutionalise the adoption and implementation of Environmental Flows within the IWT framework. Align EF practices with the Brisbane Declaration and Global Action Agenda on Environmental Flows (2018).
- **Harmonise with International Legal Frameworks:** Incorporate principles from the 1997 UN Watercourses Convention (UNWC) and the 2004 Berlin Rules on Water Resources. Ensure adequate flows for protecting the ecological integrity of the Indus basin.
- **Climate Change Adaptation:** Both countries should come together to develop mechanisms to address climate change-induced impacts on water resources.
- **Data Sharing Framework:** A legally binding, World Bank-supervised data-sharing framework within the IWT would ensure accountability. It would also enhance the policy community's understanding of the water-quality challenges in the Indus basin and prepare mitigation and adaptation strategies accordingly.
- **Increase Cooperation:** Both the countries can come together and amend the dispute resolution process to make it more efficient and agreeable to both parties.
 - Focus should be shifted from river management to holistic basin management with sustainability and equitable water distribution for all stakeholders as the priority

Conclusion:

- For the last half a century, this treaty has remained as the benchmark for transboundary water sharing practices. By including climate change as an aspect in this equation can take the agreement to a higher level.

6) BUILDING FARMER'S TRUST ON GOVERNMENT INITIATIVES

(GS-III: Issues related to Direct and Indirect Farm Subsidies and Minimum Support Prices; Public Distribution System - Objectives, Functioning, Limitations, Revamping; Issues of Buffer Stocks and Food Security; Technology Missions; Economics of Animal-Rearing)

Background:

- In the last few years many farm protests had taken place in different parts of the country. Government measures like Farm Laws fail to build trust in the minds of the farmers.
- In this context, Agri-Scientist Ashok Gulati has given a set of recommendations to bridge this trust deficit with farmers and to put agriculture in the country on a fast and sustainable track.

Steps to build the trust of the Farmers:

- **Establish Farmers' Council:** Creating a council with representatives from each state, including one owner cultivator and one tenant farmer. This council should meet regularly to discuss issues and provide direct feedback.
- **Establish Agri-Ministers' Council:** Form a council comprising agricultural ministers from each state, modelled after the GST council. This council should collaborate with the Farmers' Council to ensure cohesive and comprehensive policy-making.
- **Increase Funding and Support for Climate-Resilient Agriculture:** Increase funding for the Indian Council of Agricultural Research (ICAR) from less than Rs 10,000 crore to about Rs 15,000 crore to focus on climate-resilient and climate-smart agriculture.
 - Ensure that climate-resilient seed varieties and innovations are transferred from research labs to farmers' fields through effective extension services.

- **Strengthen Crop Insurance Schemes:** Continue to enhance the Pradhan Manthri-Fasal Bima Yojana scheme by incorporating advanced technologies for accurate yield estimation and weather monitoring.
 - Study and address the reasons behind high premium rates in certain states to bring the all-India agri insurance premium rates below 7%.
- **Leverage Technology for Implementation:** Expand the use of technology-based yield estimation systems (YES-TECH) and Weather Information Network and Data Systems (WINDS) to reduce human intervention and increase transparency.
- **Install All-Weather Stations (AWS):** Ensure the installation and maintenance of AWS for continuous monitoring and accurate data collection.
- **Revitalise Agricultural Extension Services:** Revive and strengthen agricultural extension programs to educate farmers on climate-smart practices and new technologies.
 - Provide training and resources to extension workers to improve their effectiveness in disseminating information and best practices.
- **Farmer Participation in Research:** Involve farmers in research and development processes to ensure that innovations are practical and beneficial.

Conclusion:

- These measures can help the government build a stronger foundation of trust with farmers, ensuring that agricultural policies are effective, transparent, and responsive to the needs of the farming community.

7) INDIA'S PROGRESS IN DEVELOPMENTAL GOALS

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

Background:

- In 2015, the UN adopted the Sustainable Development Goals (SDGs) which were soon recognised as important metrics in assessing the progress of nations. With 2030, the target year, drawing closer, India's progress in the SDGs should be understood particularly in light of its population dynamics.

Specific progress:

- **Reduction in Fertility Rates:** India's Total Fertility Rate (TFR) decreased from 3.4 in 1992 to 2 in 2021, dropping below the replacement level of 2.1. This reflects a transition toward smaller family norms and population stabilisation.
- **Increase in Life Expectancy:** Improved living conditions and medical infrastructure have led to a rise in average life expectancy, contributing to a healthier and longer-living population.
- **Reduction in Poverty:** The proportion of the population living below the poverty line reduced significantly from 48% in 1990 to 10% in 2019, with programs like the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) playing a critical role.
- **Agricultural Self-sufficiency:** Through the Green Revolution, India became self-sufficient in crop production, averting a potential food crisis and reducing hunger levels. The proportion of the population suffering from **hunger decreased from 18.3% in 2001 to 16.6% in 2021.**
- **Improvements in Health:** The **Maternal Mortality Rate (MMR)** decreased from 384.4 in 2000 to 102.7 in 2020. The mortality rate for children under five saw significant declines.
 - The **Infant Mortality Rate (IMR)** reduced from 66.7 deaths per 1,000 live births in 2000 to 25.5 deaths per 1,000 live births in 2021, indicating better healthcare coverage and quality.

Way Forward:

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- **Policies to match current demand:** For India to achieve the SDGs, the changing population dynamics has to be acknowledged while forming policies.
- **Focus on Non Communicable Diseases:** NCDs, which incur high out-of-pocket expenditures, are catastrophic for some families. India needs a stronger safety net to save these families from slipping into utter poverty.
- **Gender Equal Approach:** A gender equal approach and empowerment of vulnerable women can solve most issues and propel India's progress in the SDGs.
- India still has a long journey to cover in order to meet all the targets of the SDGs. This will require multi-sectoral collaboration and political will.
- India's progress in SDGs is directly proportional to the well-being of its population and the route to progress lies in a better understanding of its population dynamics and addressing the issues.

8) FOOD INFLATION

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

Background:

- Food inflation is the rate at which food prices increase over time. In India, it is a significant part of the Consumer Price Index (CPI).
- After 2020, the fall of CPI has been restricted due to the high level of food inflation.

Role of Food inflation in CPI:

- **High Weightage in CPI:** Food accounts for nearly **40% of the CPI basket**, making it a major determinant of overall inflation. As such, high food prices directly contribute to elevated headline inflation.
- **High consumption of food products:** Because food is purchased frequently, high food prices influence inflation expectations among consumers. Continuous food inflation can lead to an expectation of continued price increases, putting upward pressure on wages and non-food prices, thus sustaining overall inflation.
- **Climate Change and Food Inflation:** The increasing frequency of climate-related shocks, such as heatwaves, unseasonal rains, and erratic monsoons, has made food production more volatile, leading to more frequent and severe food price spikes. This adds to the difficulty of controlling overall inflation.
- **Structural Risks:** Without addressing the structural issues in agriculture, such as improving irrigation, storage, and promoting climate-resistant crops, food inflation is likely to remain a persistent issue. These structural challenges limit the effectiveness of monetary policy in controlling overall inflation.

Measures to ease Food inflation:

- **Agricultural Irrigation Improvements:** Expand irrigation coverage beyond the current 57% to reduce dependency on unpredictable monsoons. This can help in stabilising crop yields.
- **Cold Storage Facilities:** Public and private investments should be channelled into cold storage and food processing infrastructure thus helping in reduction of food wastage, especially for perishable items, thereby smoothing price fluctuations.
- **Transportation Upgrades:** Improve transportation networks to ensure faster and more efficient movement of agricultural produce from farms to markets, reducing post-harvest losses.
 - Eg: Bharatmala Pariyojana and Kisan Rail schemes.

- **Agricultural Research and Development (R&D):** Increase investment in agricultural R&D, which currently stands at around 0.5% of agricultural GDP, to innovate new farming techniques and resilient crops.
 - Encourage the development and widespread adoption of crop varieties that are resistant to heat, drought, and other climate-related stresses.
- **Crop Insurance Expansion:** Strengthen crop insurance schemes to protect farmers against income losses due to adverse weather conditions, reducing the pressure to raise prices after poor harvests.
- **Improved Weather Forecasting:** Invest in advanced weather forecasting systems to give farmers more accurate and timely information, helping them plan better and reduce the impact of weather shocks.
 - Develop and implement comprehensive plans for managing droughts and heatwaves, including water conservation measures and emergency relief for affected farmers.
- **Buffer Stock Management:** Enhance the management of food grain buffer stocks to release supplies when prices surge, thereby stabilising the market.
- **Regulating Hoarding and Speculation:** Implement stricter regulations to prevent hoarding and speculative trading in essential commodities, which can drive up prices artificially.
- **Crop Diversification:** Promote diversification of crops to reduce dependency on a few staple crops, which are more vulnerable to price volatility due to weather conditions.

Conclusion:

- Food inflation impacts overall inflation dynamics in India. This can affect the most vulnerable sections of society, and also pose a significant challenge to RBI's inflation targeting.
- The policy focus should be to help both farmers and the consumers, not at the cost of one another.

9) INDIA-RUSSIA RELATIONS

(GS-II: Effect of Policies and Politics of Developed and Developing Countries on India's interests, Indian Diaspora)

Background:

- India had a close partnership with the Soviet Union from the **1971 Indo-Soviet Friendship treaty**. This friendship came to a dull phase after the disintegration of the Soviet Union in 1991.
- Development of India-Russia relations has been a key pillar of India's foreign policy. The relationship was revived with the signing of the "**Declaration on the India-Russia Strategic Partnership**" in 2000.
- From there, India-Russia ties have acquired a qualitatively new character with enhanced levels of cooperation in almost all areas, including political, security, defence, trade and economy, science & technology, culture, and people-to-people ties.
- In 2010, the Strategic Partnership was elevated to the level of "**Special and Privileged Strategic Partnership.**"
- The **Inter-governmental Commission** is a mechanism for regularly monitoring bilateral progress across the sectors of trade and economic cooperation between the two countries which was set up by an **Agreement on intergovernmental Commission on Trade, Economic, Scientific and Technological Cooperation** signed in 1992.
- The **India-Russia Intergovernmental Commission (IRIGC)** has two divisions –

- the **Trade, Economic, Scientific, Technological and Cultural Cooperation** (IRIGC-TEC) co-chaired by the EAM from India and First Deputy Prime Minister from Russia; and
- the **Military & Military-Technical Cooperation** (IRIGC-M&MTC) headed by the Defence Ministers of the two countries.
- **Trade Volume:** As per figures of the Department of Commerce, in **FY 2023-24**, bilateral trade has reached an all-time high of **\$ 65.70 billion** [India's exports: USD 4.26 billion; and India's imports: USD 61.44 billion].
 - Major items of **export** from India include pharmaceuticals, organic chemicals, electrical machinery and mechanical appliances, iron & steel.
 - Major items of **import** from Russia include oil and petroleum products, fertilisers, mineral resources, precious stones and metals, vegetable oils, etc.
- **Defence Ties:** India has longstanding and wide-ranging defence cooperation with Russia which is guided by the IRIGC-M&MTC mechanism, headed by the Defence Ministers of both countries.
 - India & Russia bilateral exercise **INDRA** was last held in 2021.
 - They also participate in multilateral exercises such as **Vostok 2022** held in September 2022 in Russia.
 - Bilateral projects include the supply of **S-400**, licensed production of **T-90 tanks** and **Su-30 MKI, supply of MiG-29** and **Kamov helicopters, INS Vikramaditya** (formerly Admiral Gorshkov), production of Ak-203 rifles in India and **BrahMos missiles**.
 - India-Russia military technical cooperation has evolved over time from a **buyer-seller** framework to one involving **joint research** and development, co-development and joint production of advanced defence technology and systems.
- **Science & Technology:** Technological cooperation has played a key role in the bilateral India-Russia partnership, especially in the early days after India's independence.
 - Today, India & Russia work together on **basic sciences, materials science, mathematics** and cutting-edge areas like India's **manned spaceflight program (Gaganyaan)**, nanotechnologies and quantum computing.
 - India's only nuclear power plant established with another country is the Kudankulam Nuclear Plant in Tamil Nadu.
- **Education:** Indian students are enrolled in various courses in disciplines such as engineering, economics, sciences and other subjects in other universities.
 - Medical students comprise the largest group among Indian students studying in Russia.
 - Indology is taught in several Russian universities apart from Indian languages such as Hindi, Sanskrit & Pali.
- **Cultural Cooperation:** India and Russia have deep and historic cultural linkages. Writers like **Leo Tolstoy & Alexander Pushkin** had a profound influence on Indian literature and thought.
 - The **Jawaharlal Nehru Cultural Centre (JNCC), Moscow**, maintains close cooperation with leading Russian institutions.
 - Prominent Russian universities and institutions teach Indian languages.
 - Yoga and Indian cinema are popular in Russia with frequent events and film screenings across the country.

Opportunities in India-Russia Relations for India

- **Enhanced Trade and Economic Cooperation:** Potential to diversify trade beyond oil, focusing on sectors like agriculture, automobiles, and technology.

- Developing new payment mechanisms to avoid sanctions and reviving the rupee-ruble trade.
- **Strategic Connectivity Projects:** Strengthening efforts on maritime and land connectivity projects like the **International North-South Transport Corridor and the Chennai-Vladivostok maritime corridor**. These projects can boost trade and enhance strategic connectivity between the two countries.
- **Bilateral Investment:** Highly one sided trade is not sustainable in the long run. Encouraging Russian investment in Indian infrastructure and industry is a good way to address this issue.
 - Joint production initiatives under the 'Make in India' program, particularly in the defence sector, to ensure the supply of military equipment and spares can be explored.
- **Diplomatic Leverage:** India's strong ties with Russia can serve as a counterbalance to China's influence in Eurasia.
 - India's method of maintaining a neutral stance and fostering good relations with both Russia and Western countries can enhance India's strategic positioning globally.
- **Multilateral Engagements:** Active cooperation in multilateral forums like BRICS, SCO, and the G20 to address global challenges and promote a multi-polar world order. These platforms can be used to advance mutual interests and strengthen diplomatic ties.
- **Peace Advocacy:** India can use its unique position to mediate and promote peace efforts in conflict areas like Ukraine. India's **emphasis on dialogue and diplomacy** can enhance its image as a responsible global player committed to peace.

Recent Challenges in India-Russia Relations:

- **Ukraine Conflict:** India's stance on the Ukraine war, advocating for peace and dialogue, contrasts with Russia's ongoing military actions. Prime Minister Modi's remarks on the death of innocent children and the need for peaceful resolution highlight India's diplomatic balancing act.
- **Western Sanctions:** The wide-ranging Western sanctions on Russia have complicated trade and financial transactions between India and Russia. Payments and trade imbalances have emerged, with India's imports from Russia, especially oil, significantly outweighing its exports.
- **Military Cooperation:** Delays in the delivery of military equipment and spares due to sanctions on Russia's access to critical technologies like semiconductor chips.
 - There is also some uncertainty about Russia's ability to fulfil defence commitments, including the timely supply of the S-400 missile system.
- **Russia-China Relations:** Moscow's growing closeness with Beijing raises concerns for India, given the ongoing India-China border tensions. India's challenge is to ensure that its relationship with Russia does not weaken in the face of Russia's alignment with China.
- **Economic and Trade Issues:** The significant trade imbalance, with Russia benefiting more from the trade relationship due to India's large-scale oil imports.

Conclusion:

- India-Russia relations continue to navigate a complex geopolitical landscape marked by both challenges and opportunities.
- Prime Minister Modi's July, 2024 visit to Russia underscores the enduring importance of this bilateral relationship, highlighting significant progress in trade, strategic connectivity, and multilateral cooperation.
- India aims to strengthen strategic partnership with Russia, ensuring resilience and mutual growth in spite of global challenges.

10) CENTRALISED EXAMINATIONS AND THE ISSUES ASSOCIATED

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

Background:

- Qualifying examinations conducted for a nation as a whole, testing the abilities of students coming from different curricula and backgrounds can be called as centralised examinations.
- In India, examinations like National Eligibility cum Entrance Test (NEET) and University Grants Commission–National Eligibility Test (UGC-NET) can be considered as centralised.
- In 2017, the Government of India established the **National Testing Agency (NTA)** to conduct entrance examinations for professional courses.
- The NTA conducts more than 15 entrance examinations for various higher education institutions including the Common University Entrance Test (CUET) for central university admissions and the postgraduate admissions in medical and University Grants Commission (UGC) courses.
- The issues in the NEET 2024 have raised questions on the efficacy of various centralised examinations.

Issues with Centralised Examinations:

- **Malpractice and Security Concerns:** Conducting exams in pen-and-paper mode increases the risk of malpractice at various stages, from setting the paper to its printing, distribution, and delivery.
 - There have been instances of question paper leaks, compromising the integrity of the exams.
- **Arbitrary measures to address issues :** There have been arbitrary decisions, such as the awarding of grace marks and conducting re-examinations for a select few, leading to distrust among students and stakeholders.
 - The ranking change due to arbitrary marking affects students' admissions, particularly to government institutions where rank is critical.
- **Impact on the School System:** The focus on national-level entrance exams has rendered school-leaving exams redundant, leading to the rise of 'dummy' schools and a thriving coaching industry.
 - The growth of coaching centres has undermined the value of formal schooling, focusing solely on entrance exam preparation.
- **Administrative issues in NTA:** NTA has competency and manpower inadequacies in addressing the huge burden associated in conducting these centralised examinations.

Solutions to address the issues in Centralised examinations:

- **Digital Examinations:** Transition from pen-and-paper to fully electronic mode to reduce risks of malpractice.
- **Stringent Security Protocols:** Implement robust security measures, including encrypted question papers, secure transmission, and biometric verification at examination centres.
- **Competent Leadership:** Appoint qualified and experienced professionals in educational testing and administration to lead the NTA.
- **Independent Oversight:** Establish an independent body to oversee examination processes and ensure transparency and accountability.
- **Standard Operating Procedures (SOPs):** Develop and strictly adhere to SOPs for setting, printing, distributing, and conducting examinations.
 - Conduct re-examinations promptly and fairly in the event of any malpractice or paper leaks.
- **Decentralise Examination Processes:** Allow states to conduct their own entrance exams for state-level institutions while maintaining a central standard template.

- The central government can set guidelines to ensure uniform standards and quality across state-level exams.
- **Revitalise the School System:** Incorporate School Marks: Reintroduce a percentage of school-leaving marks into the final score of entrance examinations to emphasise the importance of school education.
- **Regulate Coaching Centres:** Implement regulations to ensure that coaching centres complement rather than replace formal schooling.
- **Leverage Technology:** Use artificial intelligence and machine learning to detect and prevent cheating, ensure fair grading, and manage large-scale data securely.
- **Online Grievance Redressal:** Establish an online system for students to report issues and grievances, ensuring timely and effective resolution.
- **Feedback Mechanism:** Create a feedback mechanism for students, teachers, and other stakeholders to continually improve the examination process.

Conclusion:

- India's future depends on providing quality education and gainful employment to its aspiring youth. For this to happen, ensuring a fair examination system is imperative.

11) POST HARVEST LOSSES IN AGRICULTURE

(GS-III: Major Crops - Cropping Patterns in various parts of the country, - Different Types of Irrigation and Irrigation Systems; Storage, Transport and Marketing of Agricultural Produce and Issues and Related Constraints; E-technology in the aid of farmers)

Definition:

- **Post-harvest loss** includes the food loss across the food supply chain from harvesting of crops until its consumption.
- The losses can broadly be categorised as weight loss due to spoilage, quality loss, nutritional loss, seed viability loss, and commercial loss.
- Magnitude of post-harvest losses in the food supply chain vary greatly among different crops, areas, and economies.
- India's post-harvest losses amount to approximately **₹1,52,790 crore annually**, according to a Ministry of Food Processing Industries 2022 study.
- The biggest loss is from perishable commodities, which include livestock produce such as eggs, fish and meat (22%), fruits (19%) and vegetables (18%).

Reasons for high Post Harvest losses in India:

- **Inadequate Proper Storage Facilities:** Insufficient cold storage and temperature-controlled transport options result in high spoilage rates for perishable commodities like fruits, vegetables, meat, fish, and dairy products.
- **Inadequate Transportation Network and Infrastructure:** Poor connectivity and slow transportation methods hinder the efficient movement of produce, leading to delays and spoilage.
 - About 97% of fruits and vegetables are transported by road, which is less efficient and more prone to delays and spoilage compared to rail transport.
- **Multiple Handling Points:** Inefficient handling and multiple transfer points during transportation, especially in rail transport, increase the chances of spoilage and damage to the product.
- **Low Productivity and Quality Standards:** Suboptimal farming practices and an inability to meet the quality standards required for both domestic and international markets contribute to higher losses.

- **Large number of Small and Marginal Farmers (SMFs):** With 86% of Indian farmers being small and marginal, they struggle to achieve economies of scale and lack assured market connectivity, leading to higher post-harvest losses.
- **Insufficient Staffing and Training:** Shortages of trained personnel for efficient loading, unloading, and handling of agricultural produce during transit lead to increased damage and losses.

Government Measures to reduce Post harvest losses:

- **Agriculture Infrastructure Fund (AIF)** by Department of Agriculture & Farmers Welfare (DA&FW) provides medium and long term loan facility for investment in viable projects for post-harvest market infrastructure including **warehousing facility and community farming assets** through interest subvention and financial support.
- **Mission for Integrated Development of Horticulture (MIDH)** is for holistic development of horticulture sector to increase the post harvest management infrastructure and reduce post-harvest losses in the country, under which **financial assistance** is provided for various horticulture activities including setting up of pack houses, cold storages, reefer transport, ripening chamber, primary processing etc.
- **Agricultural Marketing Infrastructure (AMI)** a subscheme of Integrated Scheme for Agricultural Marketing (ISAM) under which assistance is provided for construction of warehouses in the rural areas in the States to enhance the storage capacity for agriculture produce.
- **Pradhan Mantri Kisan Sampada Yojana (PMKSY)** by the Ministry of Food Processing Industries (MoFPI) is implemented with the objective of **reducing post-harvest losses** of horticulture and non-horticulture produce and providing remunerative price to farmers for their produce.
- **Kisan Rail Scheme** by the Ministry of Railways is implemented to enable the **speedy movement of perishables** including fruits, vegetables, meat, poultry, fishery and dairy products from production surplus regions to consumption or deficit regions.
- **Pradhan Mantri Fasal Bima Yojana (PMFBY)** and Restructured Weather Based Crop Insurance Scheme (RWBCIS), provide financial support and **claims** against the crop yield losses due to natural risks/ calamities, adverse weather conditions, pests and diseases etc. Both the schemes are voluntary for States and farmers.
- **Training Programmes:** The Indian Council of Agricultural Research(ICAR) regularly conducts training & skill development programmes for reduction of losses during storage of different commodities.

Measures Needed for reducing Post Harvest losses:

- **Investing in Adequate Storage Facilities:** Develop and expand climate-controlled and cold-storage facilities to prevent spoilage, pests, and diseases.
 - This includes both **on-farm storage solutions** like metal drums and hermetic bags, as well as **centralised storage facilities** that can be shared by multiple farmers.
 - Support farmers and traders in acquiring **cooling equipment** to maintain the quality of fresh produce like fruits, vegetables, fish, meat, and milk. Establishing a robust cold chain network can significantly reduce spoilage due to heat.
- **Private Sector involvement:** Private sector should be encouraged to involve in the creation of storage and transportation of agricultural goods.
- **Improving Access to Finance:** Enhance access to financial resources for small-scale farmers and cooperatives to invest in post-harvest facilities and equipment.
- **Reliable Market linkages:** Linking farmers to reliable markets ensures they have a steady stream of buyers, encouraging investments in loss-reducing activities and equipment.

- **Improving Harvesting Methods:** Ensure crops are harvested at the right stage of maturity using suitable methods to prevent losses from premature or delayed harvesting. **Training farmers** on optimal harvesting techniques is crucial.
- **Enhancing Handling and Transportation:** Implement effective strategies for handling and transportation, including proper packing, ventilation, and labelling of produce. Investing in better transportation infrastructure and vehicles designed for carrying agricultural produce can reduce damage during transit.
- The **sorting and grading** stage is also one of the most key stages when the agricultural produce is being packaged and marketed. There is a need to have higher standards for post-harvest handling and grading.
 - This helps in identifying damaged or low-quality produce, following which the produce can be sorted, which is essentially the removal of bad crops from healthy ones. The continuous check on quality control invariably helps in reducing post-harvest loss.
- **Upgrading Grain Drying Equipment:** Provide farmers with access to improved grain drying equipment and shelters to protect against rainfall. This will help reduce mould damage and contamination, thereby preserving grain quality and quantity.

Conclusion:

- Food security and nutritional security are everyday concerns for crores of Indian citizens and wastage of crops increases the negative effects of this situation. Measures given above can help in reducing post harvest losses.
- Concerted efforts by all the involved stakeholders is required for proper working of these measures.

12) RISING TERROR ATTACKS IN JAMMU

(GS-III: Role of External State and Non-state Actors in creating challenges to Internal Security)

Background:

- 2024 has seen a significant shift in Pakistan's proxy war tactics, moving the focus from Kashmir to a strategically vital zone in Jammu.
- This area, extending from Poonch to Kathua and encompassing the mountainous tracts of the Pir Panjal South to the Kishtwar range, has become a new hotspot for terrorist activities.
- Pakistan's actions aim on reviving terrorism and fomenting antipathy against the Indian state in this region, which has seen a chain of attacks over the last two years.

Reasons for increasing terror attacks in Jammu:

- **Strategic Shift by Pakistan Post-2019:** After the abrogation of Article 370, Pakistan's relevance in Kashmir diminished, prompting it to shift focus to the Jammu region to regain influence and maintain momentum in its proxy war.
- **Geographical Advantage:** The terrain of the Jammu region, including jungles, heights, and rocky areas of the Pir Panjal and Kishtwar range, offers numerous hideouts for terrorists.
 - These areas are also in close proximity to the Line of Control (LoC) and the international border (IB), facilitating easier infiltration and exfiltration compared to the more monitored urban and village areas of Kashmir.
- **Support System:** There is a basic support system in place within the region, likely involving paid over-ground workers (OGWs) who help stock hideouts and provide sustenance to terrorists, aiding their operations.
- **Intelligence Gaps:** The build-up of terrorist strength in Jammu division hideouts has largely gone unnoticed due to gaps in the intelligence grid, making it difficult for security forces to preempt and counter these threats effectively.

- **Infiltration Tactics:** A trickle of infiltration over an extended period has allowed terrorists to gradually accumulate strength without attracting significant attention from security forces.
- **Comparison with Kashmir:** Unlike the approaches to hideouts in Kashmir, which have become difficult to maintain due to successful counter-terrorism efforts and operations against terror funding by agencies like the NIA, the Jammu region remains relatively easier for terrorists to operate in.
- **Political Aims of Pakistan:** Pakistan aims to reactivate its proxy war in all of J&K to stay relevant and disrupt the impending assembly elections in the region, thereby destabilising the political environment and creating conditions unfavourable for electoral processes.

Measures to reduce terror incidents in Jammu region:

- **Strengthen Intelligence Networks:** Refurbish intelligence networks and integrate the Special Operations Group (SOG) with Rashtriya Rifles (RR) to leverage their strengths.
 - **SOG** is the special anti insurgency force of the **Jammu and Kashmir Police**.
 - **Rashtriya Rifles** is the world's largest counter-insurgency force, with around 70,000 personnel deputed from the **army's** various units. It operates in different areas of Jammu and Kashmir.
- **Enhance Military Operations:** Revisit unit drills, sub-tactical operations, and large-scale operations to disrupt terrorist logistics, similar to Operation Sarp Vinash (a successful anti-terrorist operation from the early 2000s).
- **Foster Community Relations:** Establish and reiterate a sound relationship with the local populace to garner support for counter-terrorism efforts.
- **Deploy Adequate Troops:** Ensure additional troops are deployed efficiently to strengthen the security grid and prevent infiltration.
- **Political Participation:** Conducting elections for the legislature of Jammu and Kashmir, despite security challenges, can contribute to restoring normalcy. The historically high percentage of polling during the Union Parliamentary elections 2024 is a good sign to start with.

Conclusion:

- Without significant punitive measures and a new counter-terror strategy against Pakistan, the escalation of its terrorist activities within J&K is inevitable.
- It is necessary that the security agencies gather the support of local communities to undertake carefully planned operations to dismantle terrorist networks, restore peace, and reinforce social cohesion in this strategically vital region.

13) HEAT STRESS AND EMPLOYMENT

(GS-I: Important Geophysical Phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc., geographical features and their location-changes in critical geographical features and in flora and fauna and the effects of such changes)

Background:

- Heat stress includes a series of conditions where the **body is under stress from overheating**. Heat-related illnesses include heat cramps, heat exhaustion, heat rash, or heat stroke, each with its own symptoms and treatments.
- In recent periods, climate change and environmental degradation have significantly affected the safety and the health of workers worldwide.

Impacts of Heat Stress on Employment:

- **Reduction in Working Hours:** Heat stress can lead to a decrease in total working hours, as workers may need to take more breaks or reduce their working pace to avoid heat-related illnesses.
 - The ILO study (2019) estimated that Heat stress is projected to reduce total working hours worldwide by 2.2 percent and global GDP by US\$2,400 billion in 2030.
- **Decrease in Productivity:** High temperatures can impair both **cognitive and physical capabilities**, resulting in lower productivity. Workers may operate at a slower pace, and there is a higher likelihood of errors and accidents.
- **Increased Risk of Fatalities and Injuries:** Workers in sectors like agriculture and construction are particularly vulnerable to heat-related injuries and fatalities, which can lead to a loss of experienced workforce and additional costs for businesses.
- **Job Losses:** In some regions, particularly those heavily reliant on outdoor and manual labour, heat stress may result in job losses.
- **Economic Impact:** Heat stress is projected to cause significant economic losses. For example, the global GDP loss due to heat stress is projected to reach \$2,400 billion by 2030.
- **Disproportionate Impact on Vulnerable Workers:** Informal workers and those in precarious employment situations are more likely to continue working despite hazardous conditions due to financial constraints, increasing their risk of heat-related health issues.
- **Regional Disparities:** The impact of heat stress on employment varies significantly by region. Areas with hotter climates, such as southern Asia and sub-Saharan Africa, are expected to experience more substantial reductions in labour productivity and working hours.
- **Gender Disparities:** Women, especially those working in heat-exposed sectors like agriculture, may face specific health risks, including pregnancy-related complications, which can further limit their work capacity and employment opportunities.
- **Impact on Subsistence and Small-Scale Farmers:** Heat stress can reduce the productivity of farmers, affecting household food security and leading to economic hardship for those reliant on agricultural income.

Measures to overcome the impacts:

Immediate Measures:

- **Adjusting Work Schedules:** Implementing cooler work hours, such as early morning or late afternoon shifts, to avoid the hottest parts of the day.
- **Providing Rest Breaks:** Ensuring regular breaks in cool, shaded areas to help workers recover from heat exposure.
- **Access to Hydration:** Providing adequate drinking water to prevent dehydration among workers.
- **Cooling Infrastructure:** Investing in infrastructure that provides cooling, such as air-conditioned rest areas or shaded workspaces.
- **Heatwave Alerts:** Developing and implementing early warning systems to alert employers and workers about impending heatwaves or extreme temperature events, allowing for timely preventive actions.
- **Health Checks:** Regular monitoring of workers' health, especially those working in high-heat environments.
- **On-Site Medical Facilities:** Providing access to medical facilities and first aid for immediate treatment of heat-related illnesses.
- **Support for Vulnerable Workers:** Providing financial assistance or social safety nets for workers who are unable to work due to heat stress, particularly in the informal sector.

Long term Measures:

- **Worker Education:** Informing workers about the risks of heat stress and teaching them how to recognize the symptoms of heat-related illnesses.
- **Management Training:** Training supervisors and managers to identify heat stress and implement appropriate safety measures.
- **Strengthening Occupational Safety Standards:** Implementing and enforcing regulations to protect workers from excessive heat, such as mandatory rest periods, hydration breaks, and access to medical care.
- **Protective Legislation:** Developing laws and policies that mandate protections for workers, particularly those in high-risk sectors like agriculture and construction.
- **Improved Building Standards:** For indoor workers, ensuring that workplaces are designed to mitigate heat exposure through proper ventilation and insulation.
- **Insurance and Compensation:** Ensuring that workers have access to health insurance and compensation for heat-related injuries or illnesses.
- **National Guidelines and Action Plans:** Developing comprehensive national action plans to address heat stress, including specific measures for vulnerable populations.
- **Green Employment Opportunities:** Encouraging the development of green jobs that are less exposed to heat stress, such as those in renewable energy, which also contribute to environmental sustainability.

Conclusion:

- Every year is becoming the hottest year on record in recent times. This scenario along with increasing heat wave incidents call for a sustainable action against heat stress.

14) CONCEPT OF EMPLOYMENT LINKED INCENTIVE

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

Definition:

- Employment Linked Incentive (ELI) is a proposed policy framework aimed at directly incentivizing companies based on the number of new jobs they create.
- Unlike traditional incentive schemes like Production Linked Incentives (PLI), which reward companies based on their production output, ELI focuses purely on employment.
- The idea is to provide financial incentives to companies for each new payroll job they add, irrespective of the industry they belong to or the nature of their production.

Benefits of ELI:

- **Direct Focus on Job Creation:** ELI directly targets the creation of new jobs, encouraging companies to hire more employees. This ensures that the benefits of the incentives are felt immediately in terms of employment numbers.
- **Sector independent:** Unlike PLI, which can be specific to certain industries, ELI does not discriminate between sectors. This flexibility ensures that job creation incentives are available across all industries, avoiding the pitfalls of misallocation or cronyism associated with picking specific sectors for incentives.
- **Adaptation to Modern Economic Realities:** ELI recognizes the changing nature of work and the economy, particularly in light of automation and technology-driven productivity gains. By focusing on job creation rather than production, it adapts to an economic environment where higher productivity does not necessarily mean more jobs.
- **Prevention of Wage Manipulation:** The incentives under ELI are proposed to be standard per new employee, not tied to the wage level. This design prevents companies from manipulating employee wages to maximise their incentives and ensures fair treatment across different pay levels.

- **Utilisation of Existing Infrastructure:** ELI can be implemented using India's existing Aadhaar-based payroll and bank-account infrastructure. This setup helps prevent issues like duplicate entries or the reporting of non-existent employees (ghost employees) to claim incentives.
- **Potential for Social Stability:** By creating more jobs, ELI helps address the critical issue of unemployment, which is essential for social harmony and stability. It can mitigate the social and economic impacts of jobless growth, such as increased inequality and social unrest.
- **International Precedents:** Similar programs in countries like the US, UK, Germany, and Australia provide a precedent for the effectiveness of employment incentives. These programs have been used to support job creation and reduce unemployment, suggesting that ELI could be a viable policy tool in India.

Conclusion:

- ELI represents a shift from traditional growth metrics to prioritising employment. It aims to address the limitations of policies like PLI by directly targeting job creation, ensuring a broader distribution of economic benefits across the workforce.

15) FISCAL CONSOLIDATION

(GS-III: Government Budgeting)

Background:

- Union Finance Minister Nirmala Sitharaman announced during her Budget speech that the Centre would reduce its fiscal deficit to 4.9% of gross domestic product (GDP) in 2024-25. She further added that the fiscal deficit would be reduced to below 4.5% of GDP by 2025-26.
- These goals put India in a path of fiscal consolidation. **Fiscal consolidation** describes **government policy intended to reduce deficits** and the accumulation of debt.
- **Fiscal deficit** refers to the **shortfall in a government's revenue** when compared to its **expenditure**. When a government's expenditure exceeds its revenues, the government will have to borrow money or sell assets to fund the deficit.
- The fiscal deficit should not be confused with the national debt. The **national debt** is the **total amount of money that the government** of a country **owes its lenders** at a particular point in time.
- The national debt is usually the amount of debt that a government has accumulated over many years of running fiscal deficits and borrowing to bridge the deficits.
- In order to fund its fiscal deficit, the government mainly borrows money from the bond market where lenders compete to lend to the government by purchasing bonds issued by the government.
- The **Fiscal Responsibility and Budget Management Act (FRBM Act)**, establishes financial discipline to reduce fiscal deficit.
- The FRBM Act aims to introduce transparency in India's fiscal management systems. The Act's long-term objective is for India to achieve fiscal stability and to give the Reserve Bank of India (RBI) flexibility to deal with inflation in India.

Measures for Fiscal Consolidation in Budget 2024-25:

- **Prudent Revenue and Expenditure Management:** Despite rise in tax revenues in recent years, the budget has allocated additional resources towards fiscal consolidation rather than solely increasing expenditures. This cautious approach helps in reducing the deficit.
- **Rationalisation of Tax Expenditures:** The budget proposes a review of the Income Tax Act to simplify the tax code and reduce litigation, potentially leading to more efficient tax collection and compliance, thereby improving fiscal outcomes.

- The budget proposes to introduce a ‘**Vivad se Vishwas, 2024**’ scheme to reduce the amount of revenue locked in litigation.
- **Utilisation of RBI Surplus:** The budget uses the surplus received from the Reserve Bank of India to support fiscal consolidation efforts. This includes managing expenditures and reducing the fiscal deficit.
- **Limiting Borrowings:** The budget maintains a restraint on borrowings by Central Public Sector Enterprises (CPSEs), keeping it flat at 1.1% of GDP. This control helps manage the overall public sector deficit.
- **Recalibration of Tax Rates and Duties:** Proposals for rationalising GST rates and recalibrating customs duties aim to optimise tax revenues and reduce market distortions, contributing to a more stable fiscal environment.
- **Debt Management:** A focus on reducing the central government's debt-to-GDP ratio from 58.2% to 56.8%. The government aims to place sovereign debt on a declining path as a percentage of GDP, ensuring better fiscal health.
- **Primary Deficit Control:** The primary deficit (fiscal deficit excluding interest payments) is projected to be only 1.4% of GDP for FY25, reflecting disciplined fiscal management.

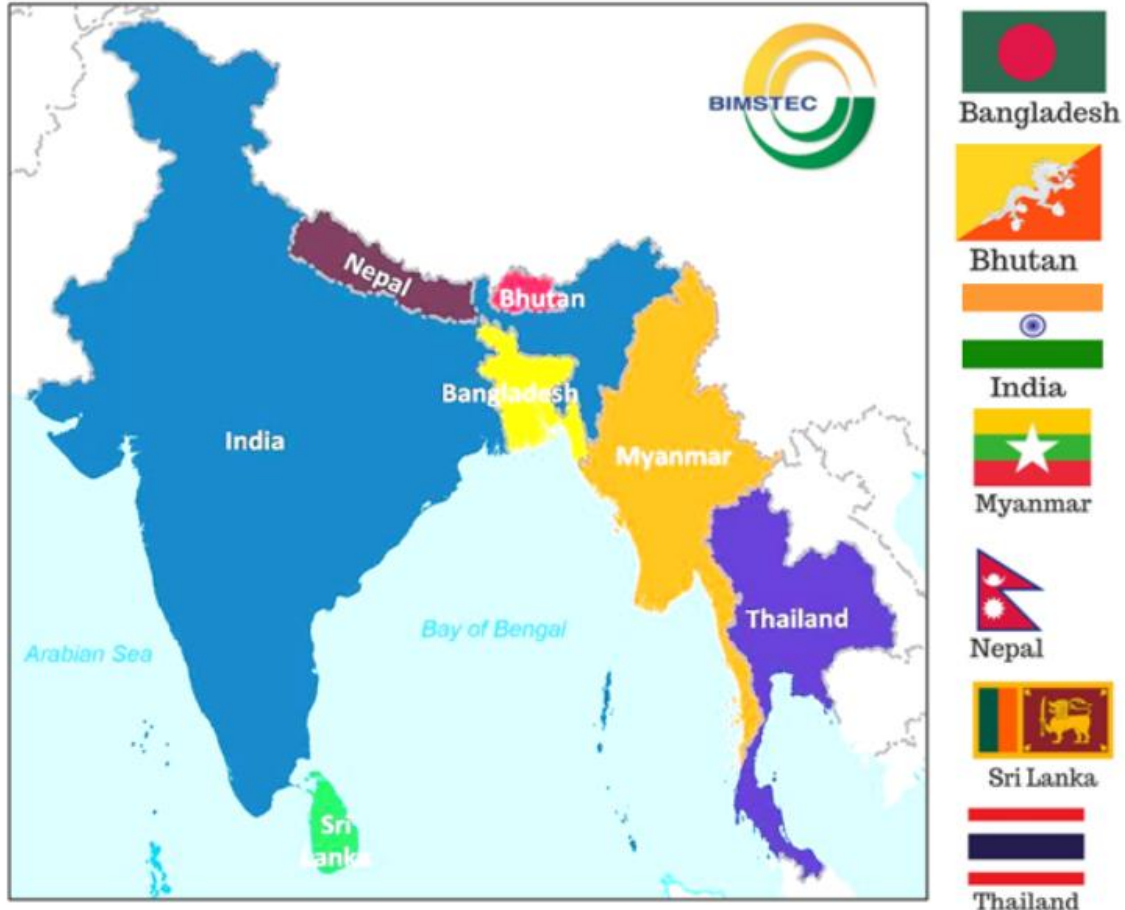
Conclusion:

- Putting the economy in the path of fiscal consolidation can help in forming a base for long term economic growth.

16) BIMSTEC AND INDIA

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

About BIMSTEC:



- The **Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)** is a regional organisation that was established on 06 June 1997 with the signing of the Bangkok Declaration.
- Initially known as BIST-EC (Bangladesh-India-Sri Lanka-Thailand Economic Cooperation), the organisation is now known as BIMSTEC and comprises seven Member States with the admission of Myanmar on 22 December 1997, and Bhutan and Nepal in February 2004.
- The main aim of the regional group was the **promotion of economic cooperation between countries bordering the Bay of Bengal.**
- BIMSTEC is a **five-tiered** organisation:
 - The **Summit** comprising the **Heads of State or Government of the Member States**
 - The **Ministerial Meeting** comprising the **Ministers dealing with foreign relations** of the Member States
 - The **Sectoral Ministerial Meetings** comprising the Ministers of line ministries responsible for carrying out the activities of the respective sectors
 - The **Senior Officials' Meeting** consisting of the Foreign Secretaries/ Secretaries/ appropriate Senior officials nominated by the BIMSTEC Member States
 - The **BIMSTEC Permanent Working Committee (BPWC)** comprises senior officials of the respective National Focal Points.
- **National Focal Points (NFP)** are established within the Ministries of External/ Foreign Affairs/ Foreign Relations of each Member State to serve as the points of contact for all BIMSTEC related communications and coordination between the BIMSTEC Secretariat and Member States.

Significance of BIMSTEC for India:

- **Enhanced Regional Connectivity:** BIMSTEC connects South Asia and Southeast Asia, facilitating better trade, investment, and infrastructure development. This connectivity is vital for India's economic integration with neighbouring regions and enhances access to markets.
- **Countering China's Influence:** The Bay of Bengal is strategically crucial, especially with China's Belt and Road Initiative (BRI) expanding in the region. BIMSTEC offers India a platform to promote alternative connectivity and infrastructure projects, adhering to international norms and standards.
- **Economic and Sustainable Development:** BIMSTEC focuses on areas such as trade, investment, connectivity, energy, counter-terrorism, and the Blue Economy. This collaboration supports India's economic and developmental goals, leveraging shared regional resources and expertise.
- **Strategic Alternative to SAARC:** BIMSTEC provides India with a platform to engage with regional neighbours **without the obstructionist role of Pakistan**, which has been a hindrance in SAARC. This is particularly important after India's efforts to isolate Pakistan following the 2016 Uri attack.
- **Support for India's Foreign Policy Goals:** BIMSTEC aligns with India's strategic policies on regional engagement and cooperation. It helps India strengthen ties with its eastern neighbours and engage more with Southeast Asia, complementing its broader foreign policy objectives.
 - BIMSTEC provides a framework for India to promote peace and stability in the region, countering security threats like terrorism and organised crime. It also offers a venue for discussing non-traditional security challenges, including maritime security and disaster management.

- **Historical and Cultural Ties:** BIMSTEC nations share historical and cultural connections, which the organisation aims to develop on. This aspect helps strengthen cultural diplomacy and people-to-people ties, supporting India's soft power in the region.
- **Building Institutional Mechanisms:** Through regular summits and meetings, BIMSTEC aims to develop robust institutional mechanisms for cooperation. This helps India and other member states coordinate policies and initiatives more effectively.

Way forward:

- This year marks a decade of India's Act East and Neighbourhood First policies, and the thrust on BIMSTEC is a manifestation of New Delhi's efforts to continue supporting collaborative growth for national and regional well-being.
- Forthcoming Summit of BIMSTEC has the potential to push forth a bold vision for the region's economical, technological and social growth.

17) PERILS IN THE USE OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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

Background:

- **Artificial Intelligence** is the field of developing computers and robots that are capable of behaving in ways that mimic human capabilities and sometimes go beyond it.
 - AI-enabled programs can analyse data to provide information or automatically start actions without human interference.
- **Machine learning** is a **pathway to artificial intelligence**. This subcategory of AI uses algorithms to automatically **learn insights and recognize patterns from data**, applying that learning to make increasingly better decisions.

Perils in the use of AI & ML:

- **AI Bias:** AI models are becoming prone to biases, often due to skewed or unrepresentative training data, which can lead to discriminatory outcomes.
- **Misinformation:** AI systems can propagate misinformation, either unintentionally through flawed models or deliberately through data manipulation. This can be a problem during critical events like elections.
- **Privacy Breaches:** The use of sensitive data in AI models heightens the risk of privacy breaches, with unauthorised access or misuse of personal information.
- **Data Poisoning:** There is a risk of data poisoning, where malicious actors deliberately introduce manipulated data into AI systems, leading to biased or adversarial outputs.
- **Data Management Challenges:** The continuous processing and churning of vast amounts of data create challenges in effectively correcting, updating, and erasing sensitive data from AI models.
 - The complex nature of ML models, like the Large Language Models (LLMs) and deep neural networks, makes it difficult to manage and control the data processed by these systems.
- **High Computational Costs:** Addressing issues like data errors or biases through methods such as retraining AI models can lead to inflated computational costs and delays.
- **Lack of Regulation and Standards:** The absence of clear regulatory frameworks or uniform standards for AI use across different jurisdictions creates challenges in ensuring ethical and responsible AI deployment.
- **Geopolitical and Transboundary Implications:** The global nature of AI development and its transboundary implications make it challenging to establish uniform governance and regulatory standards across different countries.

Measures taken in India to regulate AI & ML:

- The NITI Aayog released the **National Strategy for Artificial Intelligence**, which featured AI research and development guidelines focused on healthcare, agriculture, education, “smart” cities and infrastructure, and smart mobility and transformation.
- The **Digital Personal Data Protection Act, 2023** which is India’s data privacy law can be leveraged to address some of the privacy concerns concerning AI platforms.
- India is a member of the **Global Partnership on Artificial Intelligence (GPAI)**. This partnership aims to work as a vital branch of the initiative, GPAI’s Experts produce deliverables that can be integrated into Members’ national strategies to ensure the inclusive and sustainable development of AI.

Measures needed to regulate AI & ML:

- **Development of Machine Unlearning (MUL) Techniques:** Develop and implement Machine Unlearning algorithms to allow AI models to effectively **delete false, outdated, or sensitive data**, thereby improving data management and reducing biases.
- **Promotion of Ethical AI Practices:** Encourage companies to adopt ethical AI practices, including transparency in AI decision-making processes and regular audits of AI models to detect and mitigate biases and other issues.
- **Enhanced Regulatory Frameworks:** Governments should create and enforce clear regulatory guidelines for AI usage, including provisions for data privacy, bias reduction, and misinformation control, similar to the EU’s AI Act addressing data poisoning.
- **Investment in AI Research and Development:** Increase investments in AI R&D to develop more robust, fair, and secure AI models, particularly focusing on reducing biases and improving data handling capabilities.

Conclusion:

- Different stakeholders such as the Governments, Corporates and People should come together to address technical and regulatory considerations to ensure effective implementation of AI & ML in this evolving landscape.

18) SENIOR CITIZEN CARE IN INDIA

(GS-I: Effects of Globalization on Indian society)

Background:

- India’s rising population of older people is getting less focus due to the hype surrounding the demographic dividend.
- The number of persons above 60 years is set to more than double from 100 million in 2011 to 230 million in 2036, making up nearly 15 percent of the total population.
- This is projected to further rise to 319 million by 2050, nearly one-fifth of the total population.
- **Declining fertility rates and increasing life span** are driving this change. The average household size in India has reduced from 5.94 in 2011 to 3.54 in 2021.

Difficulties faced by Senior Citizens:

- **Chronic Illnesses and Healthcare Needs:** Many older adults suffer from chronic illnesses, requiring ongoing care that is often not adequately addressed by the current healthcare system.
 - This puts economic strain on the senior citizens and the family which supports them.
- **Gender Disparities:** Women, who typically outlive men and are often younger than their husbands, face particular challenges, including widowhood and vulnerability in old age. The policy needs to address the specific needs of older single women to ensure they can live independently and with dignity.
- **High Cost of Care:** The cost of hiring caregivers for home-based care is substantial, making it inaccessible for many senior citizens, particularly those from lower-income backgrounds.

- **Shortage of Trained Caregivers:** There is a shortage of well-trained and empathetic caregivers, which affects the quality of care provided to senior citizens.
- **Lack of Standardization in Home Care:** Home care practices are not well-defined or standardised, leading to variability in the quality of care that older adults receive.
 - Caregivers often report **mistreatment by families**, highlighting the need for better working conditions and protections for those providing home-based care.
- **Dependency on Private Sector:** The bulk of home-based care services is provided by the private, for-profit sector, which prioritises profit over the quality of care.
- **Delayed Legislative Action:** The Maintenance and Welfare of Parents and Senior Citizens (Amendment) Bill, 2019, which seeks to regulate home-based care, has not yet been passed, delaying necessary reforms that could improve the situation for senior citizens.

Recommendations to improve Senior Citizen care:

- **Affordable Insurance mechanisms** accessible to lower middle class people, who do not come under Government poverty net but can be pushed into poverty in case of serious health disorder.
 - This should also ensure **insurance coverage for home-based care**, making it more accessible and affordable for senior citizens.
- **A Comprehensive Policy on Senior citizen care:** Formulate and implement a comprehensive policy that defines standards for home-based care services, including the registration of care providers, establishing transparency and accountability measures, and creating grievance redressal mechanisms.
- **Strengthen Training and Support for Caregivers:** Streamline and enhance vocational training programs for caregivers to ensure they are well-equipped to meet the needs of senior citizens.
- **Targeted Support for Vulnerable Older Women:** Develop specific programs aimed at supporting older single women, who are particularly vulnerable due to longer life expectancy and the likelihood of widowhood.
- **Adopt Best Practices** from East Asian Countries, who have developed proper mechanisms to protect their ageing population.

Conclusion:

- While the focus on making India's youth population "future ready" is welcome, it should not overshadow an equally critical group that needs attention.
- The experience of countries like Japan shows that systems to care for older people are essential for the younger population to contribute to the country's economy.
- Besides, it is a **society's moral and ethical responsibility** to care for its people beyond their prime, reciprocating their lifetime of physical, social, emotional, and economic investment in the society.

19) FOOD PROCESSING INDUSTRY IN INDIA

(GS-III: Food Processing and Related Industries in India- Scope' and Significance, Location, Upstream and Downstream Requirements, Supply Chain Management)

Definition:

- Food processing involves transforming raw agricultural products into consumable food items, adding value and extending shelf life.

Potential and Opportunities of Food Processing Industry:

- **Food Production capacity:** India is the largest producer of goods like Milk, pulses and second largest producer of rice, wheat, sugarcane and many vegetables and fruits. This capacity gives a chance to process varied types of foods.

- **Varied Products:** India has a diverse food production basket, which also enhances the chances to produce various food products.
- **Limited Processing food consumption:** At present less than 10% of the agricultural output of India is processed. This gives opportunities to expand the industry.
- **Huge Market:** India has a large and growing population. With rising economic ability, working population and increasing nuclear family setup, the supply of processed food becomes essential for the needs of this market.
- **Economic growth:** Food processing industry's growth can contribute to the growth of a country's Gross Domestic Product(GDP).
- **Employment Opportunities:** Food processing sector can provide gainful employment to the people of the country. It is a labour intensive sector and can help in reducing poverty and unemployment.
- **Nutrient Security:** This sector helps in food fortification, which can help in addressing the nutrient deficiency of the people.
 - **Food fortification** refers to the process by which nutrients are added artificially to the food products in the processing stage. Eg: Vitamins in cooking oil.
- **Rising Demand for healthier foods:** In today's fast paced world, demand for nutrient rich food is increasing. Enhanced economic ability of the people also strengthens this demand.

Challenges faced by Food Processing Industry:

- **Post Harvest Wastage:** The national-level study conducted by Central Institute of Post-Harvest Engineering and Technology (CIPHET) estimated that nearly 4.65-5.99% of cereals are wasted, and nearly 4.58-15.88% of fruits and vegetables are wasted.
 - Among pulses, the losses increased from an earlier estimate of 4.3-6.1% in 2010 to 6.36-8.41% in 2015. Overall losses also increased in milk, meat, poultry and marine fisheries. The study also estimated that the value of the post-harvest losses is at Rs 92,651 crores.
- **Gaps in Supply chain:** There exist gaps in supply chain infrastructure which means inadequate primary processing, storage and distribution facilities. Inadequate link between production and processing due to lack of processable varieties.
 - **Logistics time and cost** in India is higher in comparison to China and other competing countries.
- **Subsistence Agriculture:** Around 80% of the farmers are small and marginal farmers and a significant part of them take up agriculture for subsistence activity which leads to little farm produce directed at the market and low-capacity utilisation.
- **Quality and Safety Standards:** Lack of focus on quality and safety standards, and not having enough of product development and innovation.
- **Outdated Technology:** Many small and medium enterprises (SMEs) use outdated processing techniques, which reduce efficiency and product quality. The high cost of adopting advanced technology and automation is a barrier for many businesses, especially SMEs.
- **Credit Constraints:** Small and medium enterprises often face difficulties in accessing finance due to stringent lending norms and collateral requirements. The cost of borrowing is relatively high, making it difficult for businesses to invest in expansion and modernization.
- **Seasonal Production:** The availability of raw materials is often seasonal, leading to irregular production cycles and **underutilization of processing capacity** during off-seasons. The seasonal nature of agricultural produce also results in **price volatility**, affecting the profitability of food processors.

Government Schemes for Food Processing Industry:

- **Pradhan Mantri Kisan SAMPADA Yojana (PMKSY):** A comprehensive scheme with an outlay of ₹6,000 crore, aimed at creating modern infrastructure for food processing and reducing wastage.
 - It includes Mega Food Parks, Integrated Cold Chain, Food Safety and Quality Assurance Infrastructure, and Infrastructure for Agro-processing Clusters.
- **PM Formalisation of Micro Food Processing Enterprises (PMFME):** This scheme provides financial, technical and business support for **upgradation of existing micro food processing enterprises**.
 - The Scheme aims to enhance the competitiveness of existing individual micro-enterprises in the unorganised segment of the food processing industry and **promote formalisation** of the sector.
 - It supports Farmer Producer Organizations (FPOs), Self Help Groups (SHGs) and Producers Cooperatives along their entire value chain.
- **One District One Product:** The PMFME Scheme adopts One District One Product (**ODOP approach**) to reap the benefit of scale in terms of procurement of inputs, availing common services and marketing of products.
 - The ODOP products selected are either a perishable agro-produce, cereal-based product or a food product widely produced, Minor Forest Produce or traditional food products in a district and their allied sectors.
- **Mega Food Parks Scheme:** Establish **large-scale food processing facilities** with modern infrastructure, ensuring **backward and forward linkages** from farm to market. It provides a platform for producers, processors, and retailers, leading to greater efficiency and reduced wastage.
- **Production Linked Incentive (PLI) Scheme for Food Processing:** This scheme aims to diversify **India's export portfolio** by focusing on value-added segments and incentivising manufacturing in specific food product segments. Moreover, the scheme promotes innovative and organic products from SMEs.
- **Agri-Export Policy:** Promote exports of agricultural products by identifying and developing clusters, facilitating logistics, and creating an export-friendly environment.
- **100% FDI in Food Processing:** The government allows 100% Foreign Direct Investment (FDI) under the automatic route in the food processing sector, encouraging foreign investment and technology transfer.
- **Skill Development and Training:** Initiatives like the "National Skill Development Corporation (NSDC)" and sector-specific skill councils offer training programs to create a skilled workforce in the food processing industry.
- **APEDA Initiatives:** APEDA supports exporters through various schemes such as market development assistance, export promotion, and infrastructure development. Programs like SUFALAM to enhance the capabilities of exporters and stakeholders.
- **Food Safety and Standards Authority of India (FSSAI) Initiatives:** FSSAI sets standards and regulations to ensure the safety and quality of food products, fostering consumer confidence and boosting domestic and international market access.
- **Mega Cluster-Based Approach:** Identifying and developing specific clusters for the processing of certain commodities like fruits, vegetables, and spices, which enhances local value addition and increases efficiency.
- **National Bank for Agriculture and Rural Development (NABARD)** has taken initiatives like the Food Processing Fund and Warehouse Infrastructure Fund for providing financial support to development of this sector.
- **National Agricultural Cooperative Marketing Federation of India (NAFED)'s initiatives:** As people increasingly recognise the importance of healthy food, NAFED, which

is an agriculture-based cooperative, has expanded its business towards coming out with healthy food initiatives like Millets, Bharat Atta, Bharat Dal, and Bharat Chawal. These initiatives align with NAFED's dedication to promoting healthy eating at affordable prices.

- **Skill Development Initiatives:** In order to address the skill gap, the MoFPI has been working in close collaboration with the Food Industry Capacity and Skill Initiative (FICSI), the Sector Skill Council (SSC), and the National Institute of Food Technology Entrepreneurship and Management (NIFTEM), an institute under the MoFPI, to regularly guide and assist it in achieving its mandate.

Way Forward:

- Food processing is one of the sectors that has immense potential for transforming the lives of people and contributing to the national economy.
- **Organised state intervention** can help the food processing industry in the region have a good share in the global market.
- The **immediate need** of the region is to create ways to enhance the competitiveness of small units in terms of production, design, packaging, distribution, prices, etc., and provide the necessary technical support.
- **Market forces** are also needed to develop appropriate tools like collective brand promotion to build a market in terms of credit, enabling environment, marketing, and extension services.
- **Technological interventions** like the use of Robotics, Artificial intelligence, Internet of Things should be inculcated into the food processing sector.
- A long-sighted outlook is essential to utilise the raw materials from the food industry and the organised way of producing food products.
- In the last three decades, ready-to-eat meals, juices, ice creams, bakery products, and other convenience foods have become popular in households. This is mainly due to the organised way of production, packaging, distribution, etc., as well as mass educational and industrial development levels.
- With this as the base, the food processing industry should be developed for catering the needs of local and global markets.

20) INTEGRATED FARMING CLUSTERS

(GS-II: Development Processes and the Development Industry — the Role of NGOs, SHGs, various groups and associations, donors, charities, institutional and other stakeholders)

Definition:

- An Integrated Farming Cluster (IFC) comprises two to three adjoining intervention villages covering about 250-300 households. These households are supported with improvement in **two to three livelihood options** (farm and non-farm) with strong backward and forward linkages.
- The IFC strategy lays focus on landless, leased-land farmers, rain-fed farmers and introduces a more comprehensive approach to provide an **end-to-end solution to the livelihoods of the poorest for income enhancement**.
- The approach ensures each targeted household has a basket of income sources to provide a **regular income stream throughout the year**.

Success Story:

- In **Kondagaon block** of Kondagaon district of **Chhattisgarh**, the success of IFC cluster has shown exemplary results in terms of economic gain for 250 households spread across four villages.

- The four commodities identified for intervention were Maize, Vegetables, Non-timber forest produce, and backyard poultry.
- The end-to-end interventions across these commodities have resulted in an increase in income from Rs 1,000 per month to Rs 12,000 per month per member.

Lakhpati Didi Initiative:

- Lakhpati Didi is an initiative of the **Ministry of Rural Development** that strives to **empower women** associated with **Self-Help Groups** to have an annual household income exceeding Rs. 1,00,000 through adopting sustainable livelihood practices.
- A Lakhpati Didi is a Self-Help Group (SHG) member with an annual household income exceeding Rs. 1,00,000.
- Beyond financial success, they inspire through adopting sustainable livelihood practices and achieving a decent standard of life.
- SHGs support this journey with collective action, financial literacy, and skill development, empowering members for entrepreneurial ventures.
- Lakhpati initiative facilitates diversified livelihood activities, by ensuring convergence across all Government departments, Panchayati Raj Institutions, Private sector and Market players. The strategy includes focused planning, implementation and monitoring at all levels.
- IFCs can play an important role in the functioning of this initiative.

21) DECENTRALISED RENEWABLE ENERGY (DRE) SOLUTIONS

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

Definition:

- Decentralised Renewable Energy (DRE) Solutions are **small-scale energy generation units** (structure), at or near the point of use, where the users are the producers—whether individuals, small businesses and/or local communities.
- These production units **could be stand-alone or could be connected** to nearby others through a network to share, i.e., to share the energy surplus.
- These technologies, such as **solar pumps, dryers, and micro-grids**, are creating new job opportunities and improving productivity.

Challenges in DRE sector:

- **Grid Integration and Flexibility:** One of the significant challenges is integrating variable renewable energy (VRE) like solar and wind into the existing power grid.
 - The Central Electricity Authority projects that by 2030, India will have 450 GW of renewable capacity, necessitating advanced grid management and flexibility solutions.
- **Financial Barriers:** Although the cost of renewable technologies has decreased, initial capital investments are still high.
 - Programs like the Production Linked Incentive (PLI) scheme and the initiatives by the Indian Renewable Energy Development Agency (IREDA) provide some relief, but more needs to be done to ensure accessible and affordable financing.
- **Technological and Infrastructure Gaps:** The deployment of decentralised renewable energy (DRE) solutions like mini-grids is hampered by the absence of robust local infrastructure in rural areas.
 - Additionally, there is a need for standardised and high-quality technology to ensure reliability and efficiency.
- **Policy and Regulatory Hurdles:** Although there are numerous policies in place to support renewable energy, inconsistencies, and regulatory hurdles can impede progress.

- For example, **Renewable Purchase Obligations (RPOs)** mandate increasing percentages of renewable energy but require clearer implementation guidelines and enforcement mechanisms across states.

Opportunities in DRE sector:

- **Advancements in Energy Storage:** Energy storage technologies, particularly battery storage, are rapidly advancing and becoming more cost-effective. The integration of battery storage can mitigate the variability of renewable sources, ensuring a stable and reliable power supply.
- **Expansion of DRE Solutions:** Decentralised renewable energy solutions offer a viable path to electrify remote rural areas. Mini-grids and solar home systems can provide reliable electricity to communities not connected to the national grid.
- **Green Hydrogen:** Green hydrogen presents a significant opportunity for India to diversify its energy portfolio. Produced using renewable energy, green hydrogen can be used in various sectors, including transportation and industrial processes.
- **Policy and Institutional Support:** Initiatives like the National Solar Mission and PM-KUSUM are crucial for scaling up renewable energy projects. The government's focus on creating a skilled workforce for green jobs and providing financial incentives through schemes like the PLI is also essential for long-term growth.
- **International Collaboration:** India's leadership in international forums like the International Renewable Energy Agency (IRENA) and the G20 Energy Transitions Working Group enhances its ability to attract global investments and adopt best practices.
 - Collaborative efforts can help overcome technical and financial barriers, accelerating the renewable energy transition.

Conclusion:

- While the path to a fully renewable energy powered rural India is fraught with challenges, the opportunities for innovation, economic growth, and sustainable development are immense.
- By addressing these challenges with strategic policies, technological advancements, and international cooperation, India can pave the way for a resilient and sustainable energy future.

22) CLIMATE CHANGE AND INDIGENOUS CATTLE

(GS-III: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment)

Context

- Climate change poses significant challenges to the **livestock industry**, affecting animal health, productivity, and the overall sustainability of livestock production systems.

Indigenous cattle

- **India** is home to several **indigenous** or **native cattle breeds** that have adapted to the country's **diverse climatic conditions** and are well-suited to **local agricultural practices**.
- Some prominent indigenous cattle breeds in India include,
 - **Gir:** These cattle are primarily raised for milk production. They have a distinctive hump and are well-adapted to tropical climates.
 - **Sahiwal:** They are known for their heat tolerance and resistance to diseases. They are predominantly used for milk production and are well-suited to the arid and semi-arid regions of India.
 - **Red Sindhi:** Originating from the Sindh region, Red Sindhi cattle are valued for their adaptability to various climates, and good milk-producing qualities.

- **Tharparkar:** Well-adapted to arid environments, Tharparkar cattle are primarily used for milk and drought power.

Indian Scenario

- India is the **world leader in milk production** and contributes **24 percent** to global output.
- In India around **8 million people**, most of whom are small and marginal farmers, are engaged in the dairy sector.
- Cattles experience **heat stress** at temperatures above 20 degree Celsius.
- A rise in temperature can lead to decline in milk production in India's Arid and Semi Arid regions by **25 percent by 2085**.

Threats faced by Dairy sector due to climate change

- **Extreme Weather Events:** Increased frequency and intensity of droughts, floods, heatwaves, and storms can disrupt dairy operations, leading to feed shortages, infrastructure damage, and animal losses.
- **Water Scarcity:** Dairy farming is water-intensive, and increased water scarcity due to climate change can limit milk production and increase production costs.
- **Animal Health and Welfare:** Heat stress can increase disease prevalence which can impact animal health, milk production, and reproductive efficiency.
- **Insurance Costs:** The increased risk of losses due to extreme weather events can lead to higher insurance premiums, adding to the financial burden on dairy farmers.

National Initiatives for protecting native cattle breeds

- **Rashtriya Gokul Mission:** It is a flagship program under the **National Programme for Bovine Breeding and Dairy Development**. The mission focuses on the development and conservation of indigenous breeds, with the objective of enhancing milk productivity and improving the livelihoods of farmers. It includes the establishment of **Gokul Grams (livestock centers)** for the conservation and development of indigenous breeds.
- **National Mission on Bovine Productivity :** This mission was launched in 2016 to enhance milk production and productivity in indigenous cattle through various interventions such as **breed improvement, veterinary healthcare, nutrition management, and promoting best management practices**.
- **National Bovine Genomic Centre for Indigenous Breeds :** It is, established under the **Indian Council of Agricultural Research (ICAR)**, and focuses on **genomic research and conservation of indigenous cattle breeds**. It aims to use advanced genomic tools for breed improvement and conservation.
- **Pashu Kisan Credit Card (PKCC):** This initiative provides farmers with a **credit card** for meeting the needs of their animals, including **purchasing feed, veterinary care, and other inputs**.

Way Forward

- The dairy sector needs to adopt climate-resilient practices, such as improved water management, diversified feed sources, and early warning systems that can enhance the dairy sector's adaptability to a changing climate.

23) WESTERN DISTURBANCES

(GS-I: Important Geophysical Phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc., geographical features and their location-changes in critical geographical features and in flora and fauna and the effects of such changes)

Context

- Winter western disturbances have increased significantly in Western and Central Himalayas over the last 70 years.

Western Disturbances

- Western Disturbances are **cyclonic storms** that form over **land**, and they occur mostly in the **Mediterranean region** due to a temperature gradient caused by the **mixing of warm air from the tropics and cold air from the northern polar regions**.
- It is a **non-monsoonal precipitation pattern** driven by the **westerlies**.
- The **moisture** in these storms usually originates over the **Mediterranean Sea, the Caspian Sea and the Black Sea**.
- Western disturbances are more frequent and strong in the **winter season**.

Indian Context

- While the storm systems occur throughout the year, they travel to India mostly between December and April because the trajectory of the **subtropical westerly jet stream**, which transports them, shifts during the **winter months** to the **rim** of the **Himalayas**.
- For the rest of the year, the jet stream travels from above the **Himalayas** to the **Tibetan Plateau and China**.
- The **trajectory** of the jet stream changes as per the **position** of the **Sun**.
- The jet stream appears over **northern India** in October after the **withdrawal of monsoon** and shifts progressively southwards in the winter months.
- It reaches its southernmost position in February and moves out of the subcontinent after May.
- However, in recent times **western disturbances have increased during the months of May, June and July**, where they were rare earlier. This has been attributed to **strengthening of the subtropical jet stream and its delayed northward retreat**.

Factors influencing western disturbances

- **El Nino and La Nina**
 - For the past three years, the world has been in a La Niña phase (cooling of ocean surface temperature in the Pacific Ocean).
 - It **weakens the temperature gradient** for the formation of Western Disturbances as it reduces the temperature of the **hot tropical air**.
 - Western disturbances are generally **weaker** during the **La Niña**, which produces a **drier winter**, while during **El Niño**, they are more **intense**.
- **Subtropical westerly jet stream**
 - It is the **wind system** which brings Western Disturbances to India.
 - The jet stream is **shifting northwards** during **winters**, which reduces **winter precipitation** in northwest and central India, and southwards during summers, increasing the chances of extreme **rainfall events**.

Impact of western disturbances on India

- They bring moderate to heavy rain in **low-lying areas** and **heavy snow** to **mountainous areas** of the Indian Subcontinent.
- They bring **pre-monsoon showers** and **winters** in **Northwest India**.
- They are primarily important for the cultivation of **Rabi crops**.
- Western Disturbances are also the primary source of snowfall that replenishes the **Himalayan glaciers** during winter.
- They can also cause extreme weather events like **floods, flash floods, landslides, dust storms, hail storms**, and **cold waves**, causing damage to life and property.

Conclusion

- In the upcoming years it is essential to strengthen **monitoring systems** and **weather forecast models**.
- There is also a need to build **disaster resilient infrastructure** to withstand climate change calamities in the near future.

MODEL QUESTIONS

1. Examine the causes for rising forest fire incidents in India. Also, discuss the effectiveness of the measures taken by Government to tackle this disaster.
2. Critically analyse the idea of bringing education into the State list from the Concurrent list.
3. Examine the emerging opportunities in India's relationship with the United Kingdom (UK) and discuss the associated challenges.
4. Suggest ways for India to engage with Myanmar in a meaningful way overcoming the internal disarray in the country.
5. The Indus Water Treaty has been a benchmark for transboundary water sharing agreements. At present, the treaty is facing issues due to rocky India-Pakistan relations. Discuss.
6. Reduced trust on the Government initiatives are an important reason for many farm protests in India. In this context, suggest some practical measures to bridge the trust gap.
7. Evaluate India's progress in achieving the Sustainable Development Goals (SDGs) and identify the key challenges and opportunities ahead.
8. Examine the causes of rising food inflation in India and discuss the measures that can be taken to control it.
9. What is the significance of Indo-US defence deals over Indo-Russian defence deals? Discuss with reference to stability in the Indo-Pacific region.
10. Discuss the issues in centralised examination systems and provide suitable solutions to address the same.
11. Post Harvest losses in India amounts to thousands of crore Rupees every year. In this context, examine the Government measures to reduce post harvest losses.
12. Security challenges in Jammu and Kashmir have undergone geographical shift after 2019. Critically analyse.
13. Heat related stress is detrimental to different kinds of employees. Among them, low level employees are worst affected. Elaborate.
14. Assess the validity of Employment Linked Incentives (ELI) as a way to create more jobs.
15. Fiscal Consolidation is the main focus of Budget 2024-25. Analyse.
16. Do you think that BIMSTEC is a parallel organisation like the SAARC? What are the similarities and dissimilarities between the two? How are Indian foreign policy objectives realized by forming this new organisation?

17. What do you understand by the terms Artificial Intelligence (AI) and Machine Learning (ML)? Are there any issues in its use? Examine.
18. Critically examine the effect of globalisation on the aged population in India.
19. What are the challenges and opportunities of the food processing sector in the country? How can income of the farmers be substantially increased by encouraging food processing?
20. Initiatives like Integrated Farming Cluster and Lakhpati Didi are viable means to promote decentralized development. Discuss.
21. Examine in detail the challenges and opportunities in the use of Decentralised Renewable Energy (DRE).
22. In the era of increasing climate change, how can the dairy sector enhance resilience to climate change catastrophes? Discuss
23. In recent times western disturbances are increasing during summer months. Analyze the impacts of strengthening of western disturbances in the Indian subcontinent.