

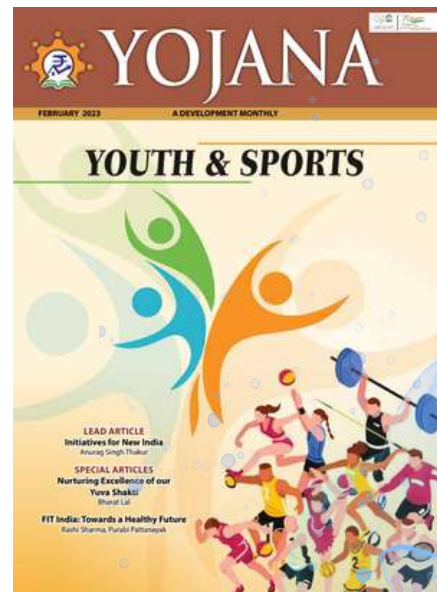
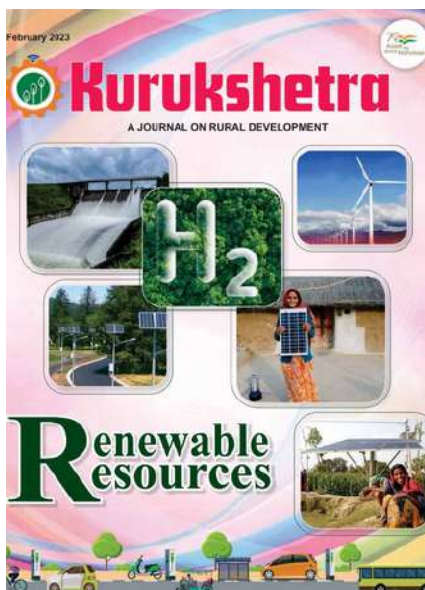
OFFICERS' Pulse

February 2023 - AT A GLANCE



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DownToEarth **Business Standard**



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The **PULSE** of UPSC at your fingertips.

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Schemes

1) VAIBHAV Fellowship Scheme

What's in the news?

- The **Ministry of Science & Technology** has launched the **VAIBHAV Fellowship Scheme for the Indian Diaspora abroad**.
- The Fellowship aims at **improving the research ecosystem of India's Higher Educational Institutions** by facilitating academic and research collaborations between Indian Institutions and the best institutions in the world through mobility of faculty/researcher from overseas institutions to India.
- The best of Diaspora minds will collaborate with domestic minds to deliver world class projects and products.
- The fellowship offers the Indian diaspora an opportunity to work for a **minimum of one month to a maximum of two months a year** with a research institution or an academic institution in India.

2) Samarth Scheme

About the Scheme

- "Samarth" (Scheme for Capacity Building in Textiles Sector) Scheme is a **demand driven and placement-oriented umbrella skilling programme** of the **Ministry of Textiles**. The scheme was launched in 2017.
- Samarth aims to **incentivize and supplement the efforts of the industry in creating jobs in the organized textile and related sectors**, covering the entire value chain of textiles, excluding Spinning and Weaving.

- The training programme and course curriculum have been rationalized keeping in view the technological and market demand of the domestic and international economies.
- The scheme is implemented through **Implementing Partners (IPs)** comprising of Textile Industry/ Industry Associations, State government agencies and Sectoral Organizations of Ministry of Textiles.

Why in News?

- About 1.50 lakh persons were imparted skill training under the Samrath Scheme.

3) Revamped Distribution Sector Scheme

About the Scheme

- The Scheme seeks to **improve the operational efficiencies and financial sustainability of all DISCOMs/ Power Departments excluding Private Sector DISCOMs**.
- It provides **conditional financial assistance** to DISCOMs for strengthening of supply infrastructure.
- The assistance will be based on meeting **pre-qualifying criteria** as well as upon achievement of basic minimum benchmarks by the DISCOM evaluated on the basis of an agreed evaluation framework tied to financial improvements.
- The Scheme has a major focus on **improving electricity supply for the farmers and for providing daytime electricity to them through solarization of agricultural feeders**.
- A key feature of the Scheme is to enable **consumer empowerment**

by way of **prepaid smart metering** to be implemented in Public-Private-Partnership (PPP) mode. Smart meters would allow consumers to monitor their electricity consumption on a routine basis instead of monthly basis, which can help them in usage of electricity as per their own needs and in terms of the resources available.

- The duration of the scheme is **5 years** i.e. from FY 2021-22 to FY 2025-26.

Implementation

- Implementation of the Scheme would be based on the **action plan worked out for each state** rather than a “one-size-fits-all” approach.

Nodal Agencies

- **Rural Electrification Corporation (REC)** and **Power Finance Corporation (PFC)** have been nominated as nodal agencies for facilitating implementation of the Scheme.

Scheme Objectives

- **Reduction of AT&C (Aggregate Technical & Commercial) losses** to pan-India levels of **12-15%** by 2024-25.
- **Reduction of cost-revenue gap to zero** by 2024-25.
- **Developing Institutional Capabilities** for Modern DISCOMs.
- **Improvement in the quality, reliability, and affordability of power supply** to consumers through a financially sustainable and operationally efficient Distribution Sector.

Components

- Major components of the scheme includes
 - **Prepaid Smart Meters for all consumers except Agricultural consumers**

- **Funding for feeder segregation for unsegregated feeders**
- **Modernization of Distribution system in urban areas**
- **Rural and Urban area System strengthening.**

Why in News?

- More than 20.46 crores pre-paid smart consumers meters have been sanctioned under the Revamped Distribution Sector Scheme.

4) DAY-NRLM

About

- Aajeevika-National Rural Livelihoods Mission (NRLM) was launched by the **Ministry of Rural Development (MoRD)** in 2011.
- Aided in part through investment support by the **World Bank**, the scheme aimed at helping the rural poor by enabling them to increase household income through sustainable livelihood enhancements and improved access to financial services.
- NRLM has the mandate of reaching out to 100 million rural poor in 6 lakh villages across the country.
- In 2015, the program was **renamed Deendayal Antyodaya Yojana-National Rural Livelihoods Mission (DAY-NRLM)**.
- NRLM rests on **three major pillars – universal social mobilization, financial inclusion and livelihood enhancement.**

Implementation

- It works towards **bringing at least one member (preferably a woman) from all poor families into the Self Help Group (SHG) network.**
- The SHGs and their federations offer their members **microfinance services** such as – savings, credit,

bank linkages, insurance, remittances, equity etc. They also offer **collectivization and group activities**. The SHGs offer **social security and social action** in various fronts including health, nutrition, food, gender, convergence etc., directly or through their federations.

- NRLM facilitates the SHGs to open and operate bank accounts and bank linkages. It also facilitates access to insurance to members. It encourages individual members too to open bank accounts.
- As the **Institutions of the Poor (IoP)** mature, they are facilitated to take up livelihoods/income-generating activities.
 - *SHGs, their federations at the village, cluster levels and beyond, and other collectives of the poor constitute IoP.*
- DAY-NRLM adopts a **demand driven approach**, enabling the States to formulate their own State specific poverty reduction action plans.

Beneficiaries

- NRLM's priority is to reach out to the poorest, most vulnerable and marginalized. It **begins with targeting women** and they are considered as representatives of their households.
- In case of **extremely vulnerable persons** like Persons with Disabilities (PwDs), elders etc., NRLM mobilizes **both men and women**.
- The NRLM Target Households (NTH) are identified through the **Participatory Identification of Poor (PIP)**. The PIP is a community-driven process where the Community Based Organisations (CBOs) themselves identify the poor in the village using participatory tools. The list of

poor identified by the CBO is vetted by the Gram Sabha.



Why in the news?

- The Ministry of Rural Development has signed Memorandum of Understanding (MoU) with several private organisations to strengthen State capacities and establish innovative models under DAY-NRLM.

5) NashaMukt Bharat Abhiyaan

About the Campaign

- The 'Nasha Mukht Bharat Abhiyaan' or the 'Drugs-Free India Campaign' was launched by the **Ministry of Social Justice and Empowerment**, the Nodal Ministry for Drug Demand Reduction, in 2020.
- The initiative focuses on 272 districts in 32 states & UT's which are identified as **most vulnerable in terms of usage of drugs** in the country.
- These vulnerable districts were identified on the basis of findings from the Comprehensive National Survey and the inputs provided by the Narcotics Control Bureau (NCB).

Three-Pronged Approach

- Nasha Mukht Bharat Campaign is a **three-pronged attack** combining

the **supply curb** by the Narcotics Control Bureau, **Outreach and Awareness and Demand Reduction effort** by the Ministry of Social Justice & Empowerment and **treatment** through the Health Department.

Components of the Campaign

- Awareness generation programmes;
- Focus on Higher Educational institutions, University Campuses and Schools;
- Community outreach and identification of dependent population;
- Focus on Treatment facilities in Hospital settings; and
- Capacity Building Programmes for Service Providers.

Why in News?

- The Ministry of Social Justice and Empowerment has established 25 new Addiction Treatment Facilities (ATFs) under the Nasha Mukta Bharat Abhiyaan.

6) Saansad Adarsh Gram Yojana

About the Scheme

- Saansad Adarsh Gram Yojana (SAGY) is a **rural development programme** broadly focusing upon the **development in the villages** which includes social development, cultural development and spread motivation among the people on social mobilization of the village community. The programme was launched by the **Ministry of Rural Development** in 2014.
- Under SAGY, **each Member of Parliament adopts a Gram Panchayat and guides its holistic progress giving importance for social development at par with infrastructure.**
- By involving villagers and leveraging scientific tools, a **village**

development plan is prepared under the leadership of a Member of Parliament. The distinct feature of this Yojana is that it is:

- **Demand Driven**
- **Inspired by Society**
- **Based on People's Participation.**

Objective of SAGY

- To trigger processes which lead to a **holistic development of the identified Gram Panchayats;**
- To **substantially improve the standard of living and quality of life** of all section of the population through -
 - Improved basic amenities
 - Higher productivity
 - Enhanced human development
 - Better livelihood opportunity
 - Reduced disparities
 - Access to right and entitlements
 - Wider social mobilization
 - Enriched social capital;
- To **generate models of local level development and effective local government** which can motivate and inspire neighboring Gram Panchayats to learn and adapt;
- To **nurture the identified Adarsh Grams as schools of local development** to train other gram panchayats.

Activities in an Adarsh Gram

- Activities in an Adarsh Gram would include:
 - Personal Development
 - Social Development
 - Human Development
 - Economic Development
 - Environmental Development
 - Social Security
 - Basic amenities & services
 - Good Governance.

Why in News?

- The government has identified 1949 Gram Panchayats under Saansad Adarsh Gram Yojana (SAGY) during the last five years.

Initiatives

1) UMANG

About UMANG

- Unified Mobile Application for New-age Governance (UMANG) is a Government of India's all-in-one single unified secure platform for **accessing over 1,200 central and state government services in multiple Indian languages**. It was launched in 2017.
- UMANG is developed by the **Ministry of Electronics and Information Technology (MeitY)** and **National e-Governance Division (NeGD)** to drive Mobile Governance in India.
 - NeGD is an autonomous business division under MeitY established to proactively support central ministries/departments/state governments in propagation of their e-Governance initiatives.*
- UMANG includes services such as AADHAAR, Digi Locker, Bharat Bill Payment System, PAN, EPFO services, PM- KVVY services, AICTE, CBSE, tax and fee or utilities bills payments, education, job search, tax, business, health, agriculture, travel, Indian railway tickets bookings, birth certificates, e-District, e-Panchayat, police clearance, passport, other utility services from private companies and much more.

Why in News?

- The India Meteorological Department has launched seven of its services (Current Weather, Nowcast, City Forecast, Rainfall Information, Tourism Forecast, Warnings and Cyclone) with 'UMANG' mobile App for use by the public.

- The IMD has also developed mobile App '**MAUSAM**' for weather forecasting, '**Meghdoot**' for Agromet advisory dissemination and '**Damini**' for lightning alert.

2) Jal Shakti Abhiyan - Catch the Rain 2023 campaign

What's in the news?

- President Droupadi Murmu has launched the Jal Shakti Abhiyan - Catch the Rain 2023 campaign in New Delhi.
- It is a part of efforts to **turn conservation of water into a mass campaign** in the run-up to the monsoon season.
- The theme of the campaign is "**Source sustainability for drinking water**".
- The campaign aims to nudge the states and stake-holders to create appropriate **Rain Water Harvesting Structures (RWHS)** suitable to the climatic conditions and sub-soil strata before monsoon.
- Under this campaign, drives to make check dams, water harvesting pits, rooftop RWHS etc; removal of encroachments and de-silting of tanks to increase their storage capacity; removal of obstructions in the channels which bring water to them from the catchment areas etc; repairs to step-wells and using defunct bore-wells and unused wells to put water back to aquifers etc are to be taken up with the active participation of people.

3) Vibrant Villages Programme

What's in the news?

- The Union Cabinet has approved the Centrally Sponsored Scheme - "Vibrant Villages Programme" (VVP) - which aims at **comprehensive development of villages of blocks on the northern border** to improve the quality of life of people living in identified border villages.
- This will help in encouraging people to stay in their native locations in border areas and **reversing the outmigration** from these villages **adding to improved security of the border**.
- The scheme will provide **funds for development of essential infrastructure and creation of livelihood opportunities** which will help in achieving inclusive growth and retaining the population in the border areas. In the first phase **663 Villages** will be taken up in the programme.
- The scheme aids to identify and develop the **economic drivers based on local natural human and other resources** of the border villages on the northern border and development of growth centres on "**Hub and Spoke Model**" through promotion of social entrepreneurship, empowerment of youth and women through skill development and entrepreneurship.
- Border villages will be provided with all **basic amenities** including modern housing and good roads; water and electricity supply; good education, health and communication facilities; access to Doordarshan channels, etc.

4) Unified Payments Interface

About UPI

- Unified Payments Interface (UPI) is India's mobile based, fast payment system that facilitates customers to make round the clock payments instantly using a **Virtual Payment Address** created by the customer.
- This **eliminates the risk of sharing bank account details by the remitter**.
- UPI supports both **Person to Person and Person to Merchant payments** as also it **enables a user to send or receive money**.
- It was developed by the **National Payments Corporation of India (NPCI)**, an RBI regulated entity.

How is it unique?

- Immediate money transfer through mobile device **round the clock 24*7 and 365 days**.
- **Single mobile application for accessing different bank accounts**.
- **Single Click 2 Factor Authentication** – Aligned with the Regulatory guidelines, yet provides for a very strong feature of seamless single click payment.

Why in News?

- India's real-time retail payment system UPI and its equivalent network in **Singapore** called **PayNow**, were integrated recently to enable **faster remittances** between the two countries at a competitive rate.
 - *PayNow is a fast payment system in Singapore. It enables peer-to-peer funds transfer service, available to retail customers through participating banks and Non-Bank Financial Institutions (NFIIs) in Singapore.*

What is the UPI-PayNow linkage?

- Cross-border retail payments are generally **less transparent and more expensive** than domestic transactions.
- The UPI-PayNow linkage is a significant milestone in the development of infrastructure for cross-border payments between India and Singapore and closely aligns with the **G20's financial inclusion priorities of driving faster, cheaper and more transparent cross-border payments.**
- The UPI-PayNow linkage will enable users of each of the two fast payment systems to make **instant, low-cost fund transfers on a reciprocal basis without a need to get on board the other payment system.**
- It will also help the **Indian diaspora in Singapore**, especially migrant workers and students, through the **instantaneous and low-cost transfer of money** from Singapore to India and vice-versa.
- Of the **total inward remittances** to India in 2020-21, the **share of Singapore stood at 5.7 per cent**,

according to the **RBI Remittance Survey, 2021.**

Related Information

About NPCI

- NPCI was incorporated in 2008 as an **umbrella organization for operating retail payments and settlement systems in India.**
- It is an initiative of the **RBI and Indian Banks' Association (IBA)** under the provisions of the **Payment and Settlement Systems Act, 2007**, for creating a robust Payment & Settlement Infrastructure in India.
- It has been incorporated as a **"Not for Profit" Company** under the **Companies Act 2013.**
- It has changed the way payments are made in India through a bouquet of retail payment products such as **RuPay card, Immediate Payment Service (IMPS), Unified Payments Interface (UPI), Bharat Interface for Money (BHIM), BHIM Aadhaar, National Electronic Toll Collection (NETC Fastag)** and **Bharat BillPay.**

Environment

1) National Clean Air Program

About NCAP

- The National Clean Air Programme (NCAP) was launched in 2019 by the **Ministry of Environment Forest and Climate Change (MoEF&CC)** as a time-bound, national level strategy to **tackle the air pollution crisis** in the country in a comprehensive manner.
- The national level target of **20 per cent to 30 per cent reduction of PM2.5 and PM10 concentration by 2024** was proposed under the NCAP, taking **2017 as the base year** for the comparison of concentration.
- To begin with, **city specific action plans** were formulated for **102 non-attainment cities**, which exceed the **National Ambient Air Quality Standards (NAAQS)** for 5 consecutive years.
- Gradually, the **number of cities** identified for implementing mitigation actions under NCAP was **increased to 131**.
- In **2022**, the **NCAP target was revised to a 40 per cent reduction in particulate matter concentration** in cities and the **deadline was extended till 2025-26**.

Why in News?

- Four years after the launch of the National Clean Air Programme and an expenditure of Rs 6,897 crore, data from NCAP Tracker shows that **less polluted cities** like Bengaluru, Mumbai and Chennai are seeing an **increase in pollutants** while the **worst ones marginally improved their air quality**.
 - *NCAP Tracker is a policy tracker with updates on*

NCAP implementation and its effectiveness.

- In Mumbai, the annual average of PM10 rose from 82 micrograms/cubic metre in 2019 to 120. Bengaluru (74 to 75), Nashik (68 to 74), Chennai (55 to 65) and Pune (87 to 92) also saw gradual worsening. PM2.5 levels were also increasing in these cities.
- Recent analysis revealed that there was **marginal improvement among the most polluted cities**. Ghaziabad, the worst performer in 2019, saw a decline in PM2.5 from 117 micrograms/cubic metre to 91/cubic metre in 2022. The trend was observed in Noida (114 to 80), Delhi (108 to 100), Varanasi (91 to 58), Jodhpur (82 to 69) and others. PM10 levels also dipped slightly in many of these cities.
- The **permissible levels of PM2.5 and PM10 as per NAAQS are 40 micrograms/cubic metre and 60 micrograms/cubic metre, respectively**.

About NAAQS

- Ambient air quality refers to the **condition or quality of air surrounding us in the outdoors**. National Ambient Air Quality Standards (NAAQS) are the **standards for ambient air quality set by CPCB** that are applicable nationwide.
- The CPCB has been conferred this power by the **Air (Prevention and Control of Pollution) Act, 1981**.
- NAAQS was adopted in 1982 for the first time in India and it was revised in 1994 and 2009.

- The current standards (2009) comprise the following 12 pollutants:
 - Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), PM₁₀, PM_{2.5}, Lead (Pb), Carbon Monoxide (CO), Ammonia (NH₃), Benzene (C₆H₆), Benzo(a)Pyrene (BaP), Arsenic (As) and Nickel (Ni).

2) Leveraging J&K's lithium reserves

Context

- News of the **discovery of 5.9 million tonnes 'inferred resources' of lithium in the Salal-Haimana area of Reasi district, Jammu & Kashmir**, by the Geological Survey of India has been received as a game-changer in India's impending transition to a green economy.
 - The term 'inferred' refers to the **'preliminary exploration stage'**, the second of a four-step process, according to the Mines and Minerals (Development and Exploration) Act 1957.

Significance of Lithium

- Lithium is a **silvery-white alkali metal** that is the **lightest solid element** and the **backbone of batteries** that power our phones, laptops, pacemakers, solar grids, and most importantly electric vehicles (EVs).
- A **World Bank study** suggests that the **demand for critical metals** such as lithium (Li) and cobalt is **expected to rise by nearly 500% by 2050**.
- India is seeking to secure its critical mineral supplies and build **self-sufficiency in this sector**. As India

currently **imports all of its Li from Australia and Argentina** and **70% of its Li-ion cell requirement from China and Hong Kong**, the lithium reserves in J&K could boost the domestic battery-manufacturing industry.

- If the perceived size of the mineral reserves in J&K is borne out by further exploration, India could jump ahead of China vis-à-vis its Li stockpile. It is being viewed as a huge boost for India's ambition to **expand EV penetration by 30 percent by 2030**.

Geostrategic Concern

- **Critical mineral dependencies** constitute a **major geostrategic concern** in the transition to net-zero carbon energy systems. A **high level of dependence on China** for Li and other crucial metals and their derivatives are also perceived to be **sources of energy security risks**.
- **China currently controls 77% of the global lithium-ion battery manufacturing capacity** and is home to six of the world's 10 manufacturing companies. As a result, the E.U., the U.S., Canada, India, and other major economies have been trying to **leverage alternative supplies** that can challenge China's geopolitical dominance in this area.
- To reduce dependence on China, the Indian government and industry are pushing for a **'Rare Earths Mission' to exploit the country's critical mineral reserves**, which account for **6% of the world's rare-earths' reserves** prior to the discovery of Li in J&K.

Environmental effects of Li mining

- Experts and environmentalists are concerned about the impact of any further mining and development activities in the

fragile and disaster-prone Himalayan region. The **subsidence of Joshimath**, the **2021 Chamoli disaster**, the **disastrous 2015 floods in J&K** are recent warnings of unplanned developments.

- Disasters are not new to the **Himalayas**, which were formed **40–50 million years ago** when the **northward moving Indian plate crashed into the Eurasian plate**.
- **Tectonics are still very active in the region** — every year, the **Indian plate migrates northward by about 5 millimetres**, and the **Himalayas are elevated by about 1 centimetre**.

The continuing movement has resulted in numerous faults, with sheets and slabs of deformed and sheared rocks that are weak and loosely bound.

- The biggest concern expressed by many is the fact that **mining companies do not follow eco-friendly practices**. The Himalayan region between J&K is an **eco-sensitive region**, and mining could lead to **significant loss of biodiversity**.
- The fact that the Himalayas are the **source of so many rivers**, any mining activity is going to **pollute the entire riparian ecosystem**.
- For instance, most of the world's lithium brines are concentrated in a region known as '**The Lithium Triangle**', an **intersection of Chile, Bolivia, and Argentina**. This triangle is believed to contain over **75 percent of the existing known lithium reserves**.
- The most common lithium mining technique in salt flats is through **brine extraction**. Although this

process is **lower in CO2 emissions** than hard rock mining, it requires **excessive land and water use**. Excessive water waste in the salt flat regions of each country affects local communities, particularly when concerns about drought and clean water makes food security an issue.

Way Forward

- If lithium mining projects are going to be pursued, there must be **fair and thorough assessments of its effects on agricultural production**, especially since the sector is already susceptible to Climate Change.
- It is also important to **ensure we extract these materials as responsibly as possible**, otherwise it mitigates the very reason for building these green technologies in the first place.

3) E-waste (Management) Rules, 2022

Context

- The burgeoning problem of managing e-waste is a cross cutting and persisting challenge in an era of **rapid urbanisation, digitalisation and population growth**.
- **India is currently the world's third largest producer of e-waste after the US and China**.
- But e-waste recycling capacity in India stands at a mere 6 lakh tonnes per annum, which is grossly inadequate to cater to the y-o-y increase of 25 per cent in e-waste.

Regulations

- The **first set of e-waste Rules** was notified in **2011** and came into effect in **2012**. An important component of the Rules (2011)

was the introduction of **Extended Producer Responsibility (EPR)**.

- Under EPR compliance, **'producers' are responsible for the safe disposal** of electronic and electric products once the consumer discards them.
- **E-waste rules 2016**, which were amended in **2018**, were comprehensive with additional focus on collection, compliance and governance aspects.
- In **2022**, the Ministry of Environment, Forest and Climate Change further notified a **new set of e-waste rules (E-Waste (Management) Rules, 2022)**, which will come into force from **April 1, 2023**.

Highlights of the E-waste (Management) Rules, 2022

- The rules define **'e-waste' as electrical and electronic equipment**, including solar photo-voltaic modules or panels or cells, whole or in part discarded as waste, as well as rejects from manufacturing, refurbishment and repair processes.
- The new rules are **applicable to every manufacturer, producer, refurbisher, dismantler and recycler of e-waste**.
- All the manufacturers, producers, refurbishers and recyclers are required to **register on a portal developed by the Central Pollution Control Board (CPCB)**.
- No entity shall carry out any business without registration and also not deal with any unregistered entity.
- Every producer of Electrical and Electronic Equipment (EEE) and their components shall **ensure that their products do not contain lead, mercury, and other**

hazardous substances beyond the maximum prescribed concentration.

- Producers of notified EEE, have been given **annual E-Waste Recycling targets** based on the generation from the previously sold EEE or based on sales of EEE as the case may be. Target may be made stable for 2 years and starting from **60% for the year 2023-2024 and 2024-25; 70% for the year 2025-26 and 2026-27 and 80% for the year 2027-28 and 2028-29 and onwards**.
- The rules provide for imposition and collection of **'Environmental compensation'** on companies that don't meet their target.
- The rules also lay out a system of companies securing **Extended Producer Responsibility (EPR) certificates**. These certificates certify the quantity of e-waste collected and recycled in a particular year by a company and an organisation may **sell surplus quantities** to another company to help it meet its obligations.
- It also provides for **recognition and registration, skill development, monitoring, and ensuring the safety and health of workers** involved in dismantling and recycling e-waste.
- Provisions for **environment compensation and verification & audit** have been introduced.

Concerns

- The **informal sector**, which plays a crucial role in e-waste handling, draws **no recognition** in the new rules. The informal sector is the 'face' of e-waste disposal in India as **95% of e-waste is channelised to the sector**. Therefore, they also hold **immense potential to improve**

the state of e-waste management.

- In the hierarchical process of e-waste collection, segregation and recycling in the informal sector, it is the **last stage that poses a major concern where e-waste is handed over to the informal dismantlers/recyclers.**
- The **rest of the stages** (collection of mixed waste, segregation of e-waste, clustered accumulation of e-waste according to their type) **do not involve any hazardous practices** and should in fact be **strategically utilised for better collection of e-waste.**

Way Forward

- In order to ensure the efficient implementation of the law,

stakeholders must have the **right information and intent to safely dispose of e-waste.**

- There is a need for simultaneous and consistent efforts towards **increasing consumer awareness, building capacity of stakeholders, improving existing infrastructure, and adopting green procurement practices.**
- This should be supplemented by establishing a **robust collection and recycling system** on the ground, making it responsive to meet legislative requirements.

Agriculture

1) Nano Urea

What is a nano urea liquid?

- Nano urea is **urea in the form of a nanoparticle containing nitrogen particles of 20–50 nanometres in size**. It provides nitrogen to plants in **liquid form** as an alternative to conventional urea.
- A **500ml bottle of nano urea is equivalent to a 45kg bag of conventional urea**.

Who developed nano urea liquid?

- The **Indian Farmers Fertiliser Cooperative Limited (IFFCO)**, a cooperative society, has **developed and patented nano urea liquid technology**.
- IFFCO is producing indigenously-developed nano urea at its Nano Biotechnology Research Centre in Kalol (a city in Gandhinagar district of Gujarat) on a commercial scale.
- IFFCO will **transfer the technology** of Liquid Nano Urea to public sector fertiliser companies to increase production rapidly.
- In the **non-urea fertiliser category** too, there are plans to develop and produce nano stuff such as **Nano-DAP (Diammonium phosphate), Nano-Zinc, Nano-Boron etc.**

What are the benefits of nano urea liquid?

- Nano urea liquid will help in **reducing the use of chemical fertilizers to save the environment** because the **imbalanced use of fertilizers is deteriorating the health of the soil**. It is also causing **air and water pollution**.

- Nano Urea can be a game-changer as it will **cut down the use of conventional urea up to 50%**.
- While **conventional urea** has an **efficiency of about 25 per cent**, the **efficiency of liquid nano urea can be as high as 85-90 per cent**.
- Conventional urea fails to have the desired impact on crops as it is often **applied incorrectly**, and the nitrogen in it is vaporised or lost as gas. A lot of nitrogen is also **washed away during irrigation**.
- Liquid nano urea is **sprayed directly on the leaves and gets absorbed** by the plant. Unutilized nitrogen is stored in the plant vacuole and is slowly released for proper growth and development of the plant.
- It will also help in **direct savings, reduce transportation costs, and make storage much easier**.

Self-Reliance in Production

- India is the **second-largest consumer and the third-largest producer of urea** in the world. The country annually consumes around 33 million tonnes of urea, of which almost **70% is domestically produced, while the rest is imported from other countries**.
- India is hoping to end its reliance on imported urea by increasing the production of nano urea.

Reduction in Subsidy Burden

- To make fertilisers affordable to farmers, the Centre controls the **maximum retail price (MRP) of urea** at a low level unrelated to the cost of production and distribution, which is higher. The excess of cost over MRP is **reimbursed to the manufacturer as a subsidy**.

Retail prices of **non-urea fertilisers** such as Di-ammonium Phosphate (most widely used one after urea), Muriate of Potash (MoP) are **decontrolled** and are determined by manufacturers, while the Centre gives a **fixed subsidy** each year.

- **Two-thirds of India's fertilizer subsidy burden** — estimated at around ₹2.50 trillion — goes into **ensuring that farmers get urea**, the most commonly used fertilizer, at a **reasonable cost**.

- New nano-urea plants are expected to offset the burden of mounting fertiliser subsidies.

Why in News?

- The Government of India recently announced a **Rs. 5 lakh grant to villages** that would use **100 percent Nano Urea** instead of conventional urea bags.

Flora & Fauna

1) Extinction of Elephants could affect atmospheric carbon

About Elephants

- There are two species of elephants, **African and Asian**, and while they are similar in physiology, they are too biologically different to interbreed.
- According to IUCN, the **Asian elephant** is classified as **endangered** with less than 60,000 remaining worldwide. The IUCN has declared **African Forest and Savanna (or bush) elephants** as 'critically endangered' and 'endangered' respectively.

Elephants in India

- **India has the largest population of Asian elephants** in the world. **More than 60% of wild Asian elephants** are in India.
- India has **33 Elephant Reserves** covering more than 75,000 sq km across the country.
 - **Project Elephant** was launched by the Government of India in the year 1991-92 as a Centrally Sponsored Scheme to provide financial and technical support to major elephant bearing States in the country for protection of elephants, their habitats and corridors.
 - A similar initiative is the **Monitoring the Illegal Killing of Elephants (MIKE)** programme that tracks trends in information related to the illegal killing of elephants from across Africa and Asia, to monitor

effectiveness of field conservation efforts. The MIKE Programme was established by the **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** in 1997.

- Among the states, **Karnataka** has the highest number of elephants (6,049), followed by **Assam** (5,719) and **Kerala** (3,054).

Why in News?

- A recent study has revealed that if the critically endangered African Forest elephants become extinct, the **rainforest of central and west Africa**, the second largest rainforest on earth, would **lose between six and nine percent of their ability to capture atmospheric carbon**.
- Within the forest, some trees have **light wood** (low carbon density trees) while others make **heavy wood** (high carbon density trees). Low carbon density trees grow quickly, rising above other plants and trees to get to the sunlight. Meanwhile, high carbon density trees grow slowly, needing less sunlight and being able to grow in shade.
- Elephants and other megaherbivores affect the abundance of these trees by **feeding more heavily on the low carbon density trees**, which are more palatable and nutritious than the high carbon density species. This **"thins" the forest**, much like a forester would do to promote growth of their preferred species. This thinning

reduces competition among trees and provides more light, space and soil nutrients to **help the high carbon trees to flourish**.

- Due to these preferences, elephants are **directly tied to influencing carbon levels** in the atmosphere. **High carbon density trees store more carbon** from the atmosphere in their wood than low carbon density trees, helping combat global warming.
- Elephants are also **excellent dispersers of the seeds of high carbon density trees**. They do a tremendous amount of work maintaining the diversity of the forest.

2) Pangolin

About Pangolin



- It is a small toothless, sticky-tongued creature which thrives on ants and termites, and lives in hollow trees and burrows.
- When threatened, the pangolin **curls up into a tight ball**, exposing its scales to prevent attack by predators. But these scales have been the reason why pangolins have reached endangered status.
- Pangolins are reported to be **among the most trafficked wild mammals** globally with demand primarily in Asia and in growing amounts in Africa for their meat and scales.

- **8 species of pangolins** can be found across Asia and Africa. All of these have shown decline in their population.
- Asian pangolins:
 - Chinese pangolin (*Manis pentadactyla*) – Critically Endangered
 - Sunda pangolin (*Manis javanica*) – Critically Endangered
 - Philippine pangolin (*Manis culionensis*) – Critically Endangered
 - Indian pangolin (*Manis crassicaudata*) – Endangered
- African pangolins:
 - White-bellied pangolin (*Phataginus tricuspis*) – Endangered
 - Giant pangolin (*Smutsia gigantea*) – Endangered
 - Ground pangolin (*Smutsia temminckii*) – Vulnerable
 - Black-bellied pangolin (*Phataginus tetradactyla*) – Vulnerable
- The **Convention on International Trade in Endangered Species (CITES)** has listed **all eight species of pangolins in Appendix I** of the Convention to end their international commercial trade.
- **World Pangolin Day** is celebrated every 3rd Saturday of February each year.

Distribution in India

- India is home to two species – **Indian pangolin** and **Chinese pangolin**. Indian pangolins are found in Bangladesh, India, Nepal, Pakistan, and Sri Lanka. Chinese pangolins are found in Bangladesh, Bhutan, China, Hong Kong, India, Lao People's Democratic Republic, Myanmar, Nepal, Taiwan, China, Thailand, and Vietnam.

- In India, both Indian pangolins and Chinese pangolins are listed in **Schedule I of the Wildlife (Protection) Act, of 1972**. Therefore hunting, trade, or any other form of utilisation of the species or their body parts and derivatives is banned.

Why in News?

- A recent report released jointly by the **World Wide Fund for Nature India (WWF India)** and **TRAFFIC** has noted that over 1,200 pangolins were poached and trafficked in India over the past four years from 2018 to 2022.
- **India** reports a significant number of pangolin trafficking incidents. They are poached mainly for international markets in **China and Southeast Asia** for their scales, which are used as an ingredient in traditional medicines and are believed to cure various ailments.

Concerns

- There is an imperative need to focus on pangolins, strengthen their protection and conservation for their future survival.
- Pangolins, which act as **both predators and prey**, have a **huge ecological significance**. They feed on insects and help regulate their population.
- Pangolins are **“ecosystem engineers”** that build burrows that help circulate soil organic matter, increase soil moisture and aeration, and affect plant

community succession through their burying behaviour.

- The burrows made by pangolins also get utilised as shelters by other species within their ecosystem. Over 30 species have been reported to use the burrows made by Chinese pangolins, including mammals, birds, reptiles, and invertebrates, for different purposes.

Related Information

About WWF India

- Established as a Charitable Trust in 1969, WWF India set out with the aim of **reducing the degradation of Earth's natural environment** and building a future in which humans live in harmony with nature.
- It is one of the leading conservation organizations in the country.

About TRAFFIC

- TRAFFIC is a leading **non-governmental organisation** working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.
- Founded in 1979, it is a **joint program of the World Wide Fund for Nature (WWF) and the International Union for Conservation of Nature (IUCN)**.
- TRAFFIC's goal is to ensure that trade in wild plants and animals is not a threat to the conservation of nature.

Economy

1) What are Vostro accounts and how do they facilitate trade?

Context

- India has given nine banks approval to open “vostro” accounts to help facilitate trade in rupees with Russia.

What is a Vostro account?

- A Vostro account is an account that a **domestic bank holds for a foreign bank in the domestic bank's currency** — which, in the case of India, is the rupee.
- When an Indian importer wants to make a payment to a foreign trader in rupees, the **amount will be credited to this Vostro account**, and when an Indian exporter needs to be paid for supplying goods or services, this **Vostro account will be deducted**, and the amount will be **credited to the exporter's account**.
- The **exchange rate** between the Indian currency and those of trading partners is **market-determined**, and **settlement takes place in rupees**.

Benefits

- When countries import and export goods and services, they have to **settle payments in a foreign currency**. Since the **US Dollar** is the **world's reserve currency**, **most of the trade occurs in US dollars**. Here, both the parties involved have to incur the **conversion expenses** and bear the **risk of foreign exchange rate fluctuations**.
- With the help of a Vostro account, instead of paying and receiving US dollars, the **invoice will be made in Indian rupees if the counterparty has a Rupee Vostro account**.

- This could **largely reduce the net demand for foreign exchange** for the settlement of current account related trade flows. Further, the use of INR in cross-border trade is expected to **mitigate currency risk for Indian businesses**.
- It also **reduces the need for holding foreign exchange reserves and dependence on foreign currency**, making the Indian economy **less vulnerable to external shocks**.
- Further, in the longer term **promote INR as an international currency** once the rupee settlement mechanism gains traction.

2) Promotion of Co-operative Banks

About Co-operative banks

- Co-operative banks are financial entities **established on a co-operative basis and belonging to their members**. This means that the **customers of a co-operative bank are also its owners**.
- These banks provide a wide range of regular banking and financial services.

Cooperative movement in India

- By definition, cooperatives are organisations formed at the grassroots level by people to **harness the power of collective bargaining towards a common goal**. The aim of the co-operative movement was to help farmers overcome the burden of debt and help them sell their products easily to get maximum profit.
- In **agriculture**, cooperative dairies, sugar mills, spinning mills etc are formed with the pooled resources of farmers who wish to process their produce.

- In **banking and finance**, cooperative institutions are spread across rural and urban areas. **Village-level primary agricultural credit societies (PACSS)** formed by farmer associations are the best example of grassroots-level credit flow. These societies anticipate the credit demand of a village and make the demand to the district central cooperative banks (DCCBs).

Structure of co-operative banks in India

- Broadly, co-operative banks in India are divided into two categories - **urban and rural**.
- The rural co-operative credit system in India is primarily mandated to ensure flow of credit to the **agriculture sector**. It comprises **short-term and long-term co-operative credit structures**.
 - The short-term co-operative credit structure operates with a **three-tier system** - **Primary Agricultural Credit Societies** at the village level, **Central Cooperative Banks (CCBs)** at the district level and **State Cooperative Banks (StCBs)** at the State level.
 - Meanwhile, the long-term institutions are either **State Cooperative Agriculture and Rural Development Banks (SCARDBs)** or **Primary Cooperative Agriculture and Rural Development Banks (PCARDBs)**.
- **Primary Cooperative Banks (PCBs)**, also referred to as **Urban Cooperative Banks (UCBs)**, cater to the financial needs of customers in urban and semi-urban areas. UCBs are of two kinds- **multi-state**

and those operating in a **single state**.

What laws govern cooperative societies?

- The functioning of Cooperative Banks is guided by the **Cooperative Societies Act of the respective states**.
- While the administrative control of the cooperatives are with the states, its banking functions are regulated by the **Reserve Bank of India** under the Banking Regulation Act, 1949.
- In 2002, the Centre passed a **Multi-State Cooperative Societies Act** that allowed for registration of societies with operations in more than one state.
- The **Banking Regulation (Amendment) Act, 2020** was passed in 2020 to **bring all urban cooperative banks and multi-state cooperative banks under the direct supervision of the RBI**, following public scandals in certain banks and claims of mismanagement.
- The **National Cooperative Development Corporation (NCDC)**, a statutory Corporation under the Ministry of Agriculture & Farmers Welfare, works for the promotion of the cooperative movement in India. It is tasked with planning, promoting, coordinating and financing cooperative development programmes at the national level.

Why in News?

- The Union Cabinet has approved setting up of **2 lakh new Primary Agricultural Credit Societies (PACS)** and **dairy-fishery cooperatives** in uncovered villages and panchayats over the next five years to strengthen cooperative movement in the

country and deepen its reach to the grassroots levels.

- PACS are **village level cooperative credit societies** that serve as the **last link in a three-tier cooperative credit structure** headed by the State Cooperative Banks (SCB) at the state level. Credit from the SCBs is transferred to the district central cooperative banks, or DCCBs, that operate at the district level. The
- The attraction of the PACS lies in the **last mile connectivity** they offer. PACS have the **capacity to extend credit with minimal paperwork within a short time.**
- Primary dairy cooperative societies are engaged in **procurement of milk from farmers, providing milk testing facilities, cattle feed sale and extension services** to members.

- Primary fishery cooperative societies provide **marketing facilities, assist in procuring fishing equipment, fish seed and feed, besides credit facilities** to members.

Significance

- At present, there are around 63,000 functional PACS out of nearly 99,000 PACS across the country. There are still 1.6 lakh panchayats without PACS and nearly 2 lakh panchayats without any dairy cooperative society.
- The Cabinet decision would help in providing farmer members with requisite **forward and backward linkages to market their produce, enhance their income, and obtain credit facilities and other services at the village level itself.**
- The establishment of new PACS/dairy/fishery cooperative societies would **generate employment opportunities in rural areas.**

Organisations

1) BIMSTEC

Context

- India recently hosted the meeting of the governing board of BIMSTEC Energy Centre (BEC) in Bengaluru.
- The forum is aimed at coordinating, facilitating, and strengthening cooperation in the energy sector in the BIMSTEC region by promoting experience sharing and capacity building.

About BIMSTEC

- BIMSTEC is a multilateral regional organisation established with the aim of **accelerating shared growth and cooperation between littoral and adjacent countries in the Bay of Bengal region**.
- It has a total of **seven member countries**- five from South Asia, including Bangladesh, Bhutan, India, Nepal, and Sri Lanka, and two from Southeast Asia, including Myanmar and Thailand.
- It was founded in 1997 with the adoption of the **Bangkok Declaration**. BIMSTEC's headquarters is situated in **Dhaka**.
- The aim of the regional grouping was to revive the connectivity and common interests of the members of the Bay of Bengal region. The regional group constitutes a **bridge between South and South East Asia** and represents a reinforcement of relations among these countries.
- The **BIMSTEC Charter** was signed and adopted during the Fifth BIMSTEC Summit held in Sri Lanka in March 2022.

BIMSTEC Countries



Significance of BIMSTEC

- The BIMSTEC region hosts **22% of the world population or 1.68 billion people**; and a **GDP of nearly 3 trillion**.
- For India, BIMSTEC aligns with its **'Act East' policy** for greater regional cooperation in southeast Asia. It could also be seen as aligning with India's larger goal to **gain trade and security prominence in the Indian Ocean region** and to cater to the **concept of the 'Indo-Pacific' region**, a major focus of **Quad countries**.
- Another important factor for India in becoming a prominent leader in the Bay and maintaining peace and security is **China making inroads in the Indian Ocean Region** over the years. Besides, China today is involved in a widespread drive to build infrastructure in South and Southeast Asian countries, it has projects under its **Belt and Road Initiative (BRI)** in all BIMSTEC members except India and Bhutan.
- The idea of BIMSTEC also gained prominence at a time when the **need for an alternative regional-global organisation** is increasingly being felt because of the **dormant nature of South Asian Association for Regional**

Cooperation (SAARC) which has not met since 2014.

- BIMSTEC is also important owing to the **land and maritime trade potential** of the member countries.

Challenges and setbacks

- The first and major challenge is **lack of efficiency and sluggish pace of BIMSTEC's progress.**
- The current Bay of Bengal region is **one of the least integrated areas in the world.** The **share of all BIMSTEC countries in world trade is less than 4 per cent.** The BIMSTEC **intra-regional trade was at \$70 billion** in 2021, significantly lower than **ASEAN's \$600 billion**, where exports were over \$111 billion.
- While BIMSTEC members have **not adopted a Free Trade Agreement yet**, they are involved in multiple bilateral and multilateral free trade, preferential trade and economic cooperation agreements with other countries. A **comprehensive BIMSTEC FTA** can help to reduce barriers to trade and investment and assist the business to join global supply chains.
- **Maritime cooperation** is key to safe and secure trade. Bay of Bengal countries together shall work for maritime safety and security at the sea in cases of search and rescue, humanitarian assistance, coastal surveillance, among others. Regional cooperation in maritime connectivity will **ease the burden to trade and investment barriers.**
- Presently, BIMSTEC hovers around at **political and bureaucratic levels.** For wider acceptability and entrenchment, it is vital to take the grouping to the level of the people through **track**

1.5, track 2 and track 3 diplomacy.

- **Track 1 Diplomacy** refers to **official diplomacy**, where communication is directly between or among governments.
- **Track 1.5 Diplomacy** occurs when government representatives and non-governmental experts engage in dialogue or meetings together in **less formal ways** than Track 1 diplomacy.
- **Track 2 Diplomacy** denotes a **purely unofficial channel** for dialogue between non-governmental experts, without direct governmental involvement.
- **Track 3 Diplomacy**, also known as '**people-to-people**' diplomacy, takes place at the grass-roots level and does not involve official actors.

Way Forward

- BIMSTEC countries not only differ in their size, geography, population, resource endowment and level of development, they also vary in **financial resources, technical skills and development capacity.**
- In the spirit of solidarity and common purpose, the more advanced members must support the less developed ones so that the benefits of regional integration are spread among all the members.

2) Geological Survey of India

About GSI

- The Geological Survey of India (GSI) was set up in **1851** as a Government of India organization

under the **Ministry of Mines** primarily to **find coal deposits for the Railways**. Over the years, GSI has grown into a **repository of geo-science information** required in various fields in the country.

- Its main functions relate to **creating and updating of national geoscientific information and mineral resource assessment**.
- GSI's chief role includes providing objective, impartial and up-to-date geological expertise and geoscientific information of all kinds, with a focus on policy making decisions, commercial and socio-economic needs.

- GSI also emphasises on **systematic documentation** of all geological processes derived out of surface and subsurface of India and its offshore areas.
- GSI, headquartered in **Kolkata**, has **six regional offices** located in Lucknow, Jaipur, Nagpur, Hyderabad, Shillong and Kolkata and state unit offices in almost all states of the country.

Why in News?

- The Geological Survey of India has taken up 23 mineral exploration projects in the North Eastern India in 2022-23 to further encourage exploration activities in the mineral rich region.

Science and Technology

1) CAR- T cell Therapy

Context

- The three major forms of treatment for any cancer are **surgery** (removing the cancer), **radiotherapy** (delivering ionising radiation to the tumour), and **systemic therapy** (administering medicines that act on the tumour).
- Surgery and radiotherapy have been refined significantly over time – whereas advances in systemic therapy have been unparalleled.
- A new development on this front, currently holding the attention of many researchers worldwide, is **CAR T-cell therapy**.

Chemo and immunotherapy

- **Systemic therapy's earliest form** was **chemotherapy**. When administered, chemotherapy preferentially acts on cancer cells as they have rapid unregulated growth and poor healing mechanisms. Chemotherapeutic drugs have **modest response rates** and **significant side-effects** as they affect numerous cell types in the body.
- The next stage in its evolution was **targeted agents**, a.k.a. **immunotherapy**: the drugs bind to specific targets on the cancer or in the immune cells that help the tumour grow or spread. This method often has **fewer side-effects** as the impact on non-tumour cells is limited. However, it is **effective only against tumours that express these targets**.

What are CAR T-cells?

- **Chimeric antigen receptor (CAR) T-cell therapies** represent a quantum leap in the

sophistication of cancer treatment. Unlike chemotherapy or immunotherapy, which **require mass-produced injectable or oral medication**, CAR T-cell therapies **use a patient's own cells**.

- They are **modified in the laboratory to activate T-cells, a component of immune cells**, to attack tumours. These modified cells are then **infused back into the patient's bloodstream** after conditioning them to multiply more effectively.
- The cells are **even more specific** than targeted agents and directly activate the patient's immune system against cancer, making the treatment **more clinically effective**. This is why they're called '**living drugs**'.

Where is it used?

- As of today, CAR T-cell therapy has been approved for **leukaemias** (cancers arising from the cells that produce white blood cells) and **lymphomas** (arising from the lymphatic system). These cancers occur through **unregulated reproduction of a single clone of cells**: following the cancerous transformation of a single type of cell, it produces millions of identical copies. As a result, the **target for CAR T-cells is consistent and reliable**.
- CAR T-cell therapy is also presently used among patients with cancers that have returned after an initial successful treatment or which haven't responded to previous combinations of chemotherapy or immunotherapy.
- Its **response rate is variable**. In certain kinds of leukaemias and

lymphomas, the efficacy is as high as 90%, whereas in other types of cancers it is significantly lower.

- The **potential side-effects are also significant**, associated with **cytokine release syndrome** (a widespread activation of the immune system and collateral damage to the body's normal cells) and **neurological symptoms** (severe confusion, seizures, and speech impairment).

How widespread is its use?

- The **complexity of preparing CAR T-cells** has been a major barrier to their use.
- The **technical and human resources** required to administer this therapy are also considerable. Treatments in the US **cost more than a million dollars**. Trials are underway in India, with companies looking to indigenously manufacture CAR T-cells at a fraction of the cost.

2) Dengue Vaccine

About Dengue

- Dengue is a **mosquito-borne viral infection**.
- Dengue virus is transmitted by **female mosquitoes** mainly of the species **Aedes aegypti** and, to a lesser extent, **Ae. albopictus**.
- These mosquitoes are **also vectors of chikungunya, yellow fever and Zika viruses**.
- Dengue is found in **tropical and sub-tropical climates** worldwide, mostly in urban and semi-urban areas.
- The virus responsible for causing dengue is called **dengue virus (DENV)** which belongs to the **Flaviviridae family**. There are **four DENV serotypes**, meaning that it is possible to be infected four times.

Signs and symptoms

- Dengue is a severe, **flu-like illness** that affects infants, young children and adults, but **seldom causes death**.
- Symptoms usually last for 2–7 days, after an incubation period of 4–10 days after the bite from an infected mosquito.

Treatment

- There is **no specific treatment** for dengue fever.
- Fever reducers and pain killers can be taken to control the symptoms of muscle aches and pains, and fever.
- In 2021, **India** reported 110,473 dengue cases, ranking **fourth among the worst-affected nations**.

Why in News?

- In a significant development in DNA vaccination research, **India's first and only DNA vaccine candidate for dengue has shown promising results**.
- In preliminary trials on mice, the candidate generated a robust immune response and improved survival rates after exposure to the disease.
- The DNA vaccine candidate has been in development since 2019 by scientists from the National Centre for Biological Sciences (NCBS), Bengaluru, in collaboration with nine institutions in India, Africa and the US.

Challenges

- Developing an effective vaccine against dengue is **tricky** because it is **caused by four closely related viruses—DEN-1, DEN-2, DEN-3 and DEN-4—called serotypes**. Each one interacts differently with antibodies in human blood.

- A person infected with DEN-1 is then protected against it for life, but not against the other three serotypes. An ideal vaccine must target all serotypes.
- Further, DNA vaccines generate a **weaker immune response**. This means that one must take **high doses or multiple boosters**.

Antibody-dependent enhancement

- There is another concern with dengue viruses—**antibody-dependent enhancement (ADE)**. Typically, vaccines trigger production of antibodies that prevent the virus from binding to cells at later exposure. But with dengue, antibodies **help the virus replicate and cause severe disease**.
- This happens because antibodies generated after vaccination or natural infection may be of low quality and quantity and bind to the virus, resulting in a virus-antibody complex that attaches itself to immune cells. Once inside the cells, the virus makes multiple copies, increasing the viral load.
- ADE may have contributed to the partial failure of **Dengvaxia**, the **first and only approved dengue vaccine**, which contains a **live attenuated (weakened) virus**.
- The World Health Organization says Dengvaxia proved effective and safe in clinical trials in people with prior infection, but increased disease severity among those who got their first natural infection after the shot.
- The US Food and Drug Administration recommends Dengvaxia for children above nine years and those with prior infection. India has not approved it.

- For the DNA vaccine candidate, the research team plans to test for ADE in future trials.

What are DNA vaccines?

- DNA vaccines use **engineered DNA to induce an immunologic response in the host** against bacteria, parasites, viruses, and potentially cancer. DNA vaccines use small, circular DNA molecules, called **plasmids**, to introduce a gene from a bacterium or virus to trigger an immune response.
- They are often referred to as the **third-generation vaccines**. They exhibit several advantages over traditional strategies in terms of **safety, stability, ease of manufacturing, etc.**
- The world's first DNA vaccine—**ZyCoV-D**, developed by Ahmedabad-based pharmaceutical firm **Zyklus Cadila**—was approved in 2021 for **emergency use against COVID-19**. The vaccine consists of a plasmid that carries a gene that codes for the SARS-CoV-2 spike protein.
- Globally, **DNA vaccines** are being developed for diseases like **tuberculosis and chikungunya**.

3) Sickle cell anaemia

Context

- Sickle cell anaemia (SCA), a genetic blood disorder, found mention in the Budget this year. Finance Minister Nirmala Sitharaman said that the government will work in “mission mode” to **eliminate the condition by 2047**.
- **India is the second-worst affected country in terms of predicted births with SCA — i.e. chances of being born with the condition.**

What is sickle cell anaemia?

- It is an **inherited genetic disease**. Haemoglobin which is tasked with carrying oxygen to all parts of the body has **four protein subunits — two alpha and two beta**. In some people, **mutations in the gene** that creates the beta subunits **impact the shape of the blood cell and distort it to look like a sickle**, similar to the letter C.
- A round red blood cell can move easily through blood vessels because of its shape but sickle red blood cells **end up slowing and even blocking the blood flow**. Moreover, sickle cells **die early**, resulting in a **shortage of red blood cells that deprive the body of oxygen**.
- These obstructions and shortages may cause **chronic anaemia, pain, fatigue, acute chest syndrome, stroke, and a host of other serious health complications**.

Prevalence

- The disease burden from Sickle Cell anaemia in India is **prevalent in tribal populations**. Tribes like Pawara, Bhil, Madia, Gond and Pardhan from Maharashtra have a very high prevalence.
- Sickle cell anaemia is **most prevalent in the central India belt** covering states like Gujarat, Maharashtra, Chhattisgarh, Orissa and parts of Bengal. There are **pockets in the south, Tamil Nadu, Kerala and parts of Telangana**.

Why is Sickle Cell anaemia under-diagnosed?

- There is a **lack of screening awareness and inadequate screening centres/facilities** in tribal and rural areas. Also,

failure to access primary healthcare is a concern.

Treatment

- Sickle cell anaemia is a **genetic disorder, making complete “elimination” a challenge** that requires a major scientific breakthrough.
- The only cure comes in the form of **gene therapy and stem cell transplants — both costly and still in developmental stages**.
- In gene therapy, the DNA inside the haemoglobin gene is edited to stop the disease while in stem cell transplants, the bone marrow affected by sickle cell anaemia is replaced with healthy bone marrow from a donor. Both interventions are currently being tested in **clinical trials** globally.
- **Blood transfusion**, wherein red blood cells are removed from donated blood and given to a patient, is also a trusted treatment in the absence of permanent cures. But challenges include a **scarcity of donors, fears around safe supply of blood, risk of infection etc**.

4) Polio Vaccination

Polio

- Polio, or poliomyelitis, is a disabling and life-threatening disease caused by the **poliovirus**.
- The virus **spreads from person to person** and can infect a person's spinal cord, causing **paralysis**.
- Poliovirus is **very contagious**. It is transmitted by person-to-person spread mainly through the faecal-oral route or, less frequently, by a common vehicle (e.g. contaminated water or food) and multiplies in the intestine, from where it can invade the nervous system.
- The incubation period is usually 7–10 days but can range from 4–

35 days. **Up to 90% of those infected are either asymptomatic or experience mild symptoms** and the disease usually goes unrecognized.

- There is **no cure for polio**, it can only be prevented by **immunization**.

Types and Vaccines

- There are **three wild types of poliovirus (WPV) – type 1, type 2, and type 3**. There are two vaccines used to protect against polio disease, **oral polio vaccine and inactivated poliovirus vaccine**.
 - The oral polio vaccine (OPV) involves a **weakened poliovirus which is orally administered**. It is used in many countries to protect against polio disease and has been essential to the eradication effort.
 - Inactivated Poliovirus Vaccine (IPV) involves an **inactivated (killed) poliovirus administered via injection**.

Vaccine-derived poliovirus (VDPV)

- When a child is immunized with **oral polio vaccine**, the weakened vaccine-virus replicates in the intestine for a limited period, thereby **developing immunity** by building up antibodies.
- During this time, the vaccine-virus is also **excreted**. In areas of **inadequate sanitation**, this excreted vaccine-virus can spread in the immediate community, before eventually dying out.
- On rare occasions, if a **population is seriously under-immunized**, the vaccine-virus can genetically change into a form that can paralyse – known as a **vaccine-derived poliovirus (VDPV)** which causes Vaccine derived Polio.

- VDPV are usually observed in children with **primary immunodeficiency**. Such children are unable to mount an immune response and are, therefore, unable to clear the intestinal vaccine virus infection.

Eradication of Polio

- Of the 3 strains of wild poliovirus, **wild poliovirus type 2 was eradicated in 1999 and wild poliovirus type 3 was eradicated in 2020**.
- As of 2022, endemic **wild poliovirus type 1 remains in two countries: Pakistan and Afghanistan**.

Why in the news?

- The West Bengal government announced that it was introducing an additional dose of injectable polio vaccine as part of the Universal Immunisation Programme (UIP) for children.
- The State, considered among high risk areas for polio, announced that this dose will be given at nine months, in addition to the existing doses in the current UIP.

5) ALMA Telescope

What is ALMA?

- The Atacama Large Millimetre/submillimetre Array (ALMA) is a cutting-edge **radio telescope** that is designed to **study celestial objects at millimetre and submillimetre wavelengths**. It is located in the **Atacama Desert of northern Chile**.
- The telescope is an **international collaboration** between various organisations, including the European Southern Observatory (ESO), the US National Science Foundation (NSF), the National Institutes of Natural Sciences

(NINS) of Japan, and the Republic of Chile.

About the Telescope

- ALMA is one of the world's most powerful radio telescopes, consisting of **66 high-precision antennas** that work together as a single instrument.
- One of ALMA's key properties is its **extraordinary sensitivity**, which allows it to **detect extremely faint radio signals** that would otherwise be undetectable.
- It observes millimetre and submillimetre waves, which are a **form of electromagnetic radiation with wavelengths longer than those of visible light**. These waves are emitted by a **variety of astronomical sources**, including cold gas and dust in interstellar clouds, young stars and their surrounding disks, and distant galaxies.



Why is ALMA located in Chile's Atacama Desert?

- ALMA is situated at an **altitude of 16,570 feet (5,050 metres)** above sea level on the **Chajnantor plateau in Chile's Atacama Desert** as the **millimetre and submillimetre waves** observed by it are very susceptible to atmospheric

water vapour absorption on Earth.

- Moreover, the **desert is the driest place in the world**, meaning **most of the nights here are clear of clouds and free of light-distorting moisture** — making it a perfect location for examining the universe.

What are some of the notable discoveries made by ALMA?

- In 2014, ALMA provided **detailed images of the protoplanetary disc surrounding HL Tauri** — a very young T Tauri star in the constellation Taurus, approximately 450 light years from Earth.
- In 2015, the telescope helped scientists **observe a phenomenon known as the Einstein ring**, which occurs when light from a galaxy or star passes by a massive object en route to the Earth, in extraordinary detail.
- More recently, as **part of the Event Horizon Telescope project**, a large telescope array consisting of a global network of radio telescopes, it provided the **first image of the supermassive black hole** at the centre of our own Milky Way galaxy. The image was unveiled by scientists in 2022.

Why in News?

- To maintain its cutting-edge capabilities, the ALMA telescope is set to receive software and hardware upgrades. The upgrades are expected to improve the telescope's sensitivity, allowing it to collect more data and produce sharper images.

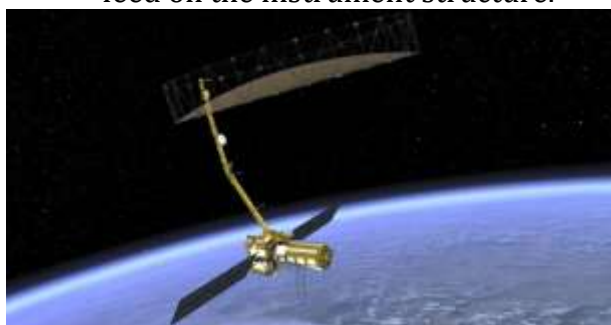
6) NISAR

What's in the news?

- The Indian Space Research Organisation (ISRO) has received the **NISAR (NASA-ISRO Synthetic Aperture Radar) satellite** from the U.S. space agency NASA.

What is NISAR?

- NISAR is an **Earth-observation satellite jointly developed by NASA and ISRO** under a partnership agreement signed in 2014.
- The 2,800 kilograms satellite consists of **both L-band and S-band synthetic aperture radar (SAR) instruments**, which makes it a **dual-frequency imaging radar satellite**.
- While NASA has provided the L-band radar, GPS, a high-capacity solid-state recorder to store data, and a payload data subsystem, ISRO has provided the S-band radar, the GSLV launch system and spacecraft.
- Another important component of the satellite is its large **39-foot stationary antenna reflector**. Made of a gold-plated wire mesh, the reflector will be used to focus the radar signals emitted and received by the upward-facing feed on the instrument structure.



What is the mission?

- Once launched into space, NISAR will **observe subtle changes in Earth's surfaces**, helping researchers better understand the

causes and consequences of such phenomena.

- NISAR will map the entire globe in **12 days** and provide **spatially and temporally consistent data** for understanding changes in Earth's ecosystems, ice mass, vegetation biomass, sea level rise, groundwater and natural hazards, including earthquakes, tsunamis, volcanoes and landslides.
- Synthetic Aperture Radar refers to a **technique for producing high-resolution images**. Because of the precision, the radar can penetrate clouds and darkness, which means that it **can collect data day and night in any weather**.
- NISAR is expected to be launched in **January 2024** from Satish Dhawan Space Centre into a near-polar orbit. The satellite will operate for a **minimum of three years**.

7) Svalbard Global Seed Vault

About the Vault

- The Svalbard Global Seed Bank is located in **Svalbard in a Norwegian archipelago** (an area of ocean containing many islands) in the **Arctic Ocean**.
- Svalbard is found **north of mainland Europe, halfway between continental Norway and the North Pole**.
- The vault was launched in **2008** as a **backup for the world's national and regional gene banks** that store the genetic code for thousands of plant species. The objective of the Seed Vault is to **safeguard as much of the world's unique crop genetic material as possible**, while also avoiding unnecessary duplication.
- It has seed samples from nearly every country in the world, and

played an essential role between 2015 and 2019 in rebuilding seed collections damaged during the war in Syria.

- The whole of humanity relies on the genetic diversity of crops maintained in the world's gene banks, and the Seed Vault is the **last line of defence against the loss of that diversity**.
- For instance: The world used to cultivate over 6,000 different plants but U.N. experts say we now get about **40% of our calories from three main crops - maize, wheat and rice** - making food supplies vulnerable if climate change causes harvests to fail.
- Svalbard also serves as a **backup for plant breeders to develop new crop varieties** more resistant to climate change.



Why in News?

- The Svalbard Global Seed Vault, built to protect the world's food stock from disasters ranging from nuclear war to global warming, added 19,500 rare seed variety samples from across the world to its collection, taking its total stash to more than 1.2 million.

Reports and Indices

1) Gross Domestic Climate Risk Report

What's the news?

- The **Cross Dependency Initiative (XDI)**, a global organisation specialising in climate risk analysis for regions, banks and companies, has released a report, titled "**Gross Domestic Climate Risk**".
- The index calculated the '**physical climate risk**' to built environments such as buildings and properties across 2,600 States and provinces globally in 2050.
 - Physical risk refers to **vulnerability from eight climate change events**: heat waves, coastal flooding (and sea level rise), extreme wind, forest fire, soil movement (or other drought-related hazards), free thaw, riverine and surface flooding.
 - The report compared the risk across territories based on **modelled projections of damage**, using global climate models, local weather and environmental data.
- Together, the index assigned an **Aggregated Damage Ratio (ADR)** to each region, which signifies the total amount of damage a region's built environment would sustain in 2050. A **high ADR signifies more peril**.

Highlights of the Index

- **Nine out of 50 regions in the world facing high climate risk**

to a fragile physical infrastructure fall in India.

- **Bihar** (22nd spot), **Uttar Pradesh** (25th), **Assam** (28th), **Rajasthan** (32nd), **Tamil Nadu** (36th), **Maharashtra** (38th), **Gujarat** (48th), **Punjab** (50th) and **Kerala** (52nd) are among the most vulnerable in the country, with the index identifying the economic capital **Mumbai** to be at notable risk as well.
- Overall, **India, China and the U.S.** are **home to 80% of the most vulnerable cities and centres of economic activity** around the world.
- The **most damage posed** to built infrastructure globally is caused by **riverine and surface flooding or flooding combined with coastal inundation**.
- Since extensive built infrastructure generally overlaps with high levels of economic activity and capital value it is **imperative that the physical risk of climate change is appropriately understood and priced**.

Similar Reports

- The **Climate Risk Index** (released by Germany-based think tank **Germanwatch**), which ranked countries based on their vulnerability to fatalities and economic losses, found **India to be the seventh-worst hit due to extreme weather events in 2019**.
- Another report in **2022** by the **Centre for Science and Environment** found **India recorded the most extreme weather events in 2022**; there was a disaster on 247 out of 273

days between January 1 and September 30.

2) Global Innovation Index

About the Index

- Global Innovation Index (GII) is co-published annually by **Cornell University**, **INSEAD Business School**, and the **World Intellectual Property Organization (WIPO)**, a specialized agency of the United Nations.
- **GII ranks global economies according to their innovation capabilities**, using **80+ indicators**.
- The metrics include institutions, human capital and research, infrastructure, market sophistication and business sophistication, knowledge and technology outputs and creative outputs.
- Over the years, the **GII** has established itself as a policy tool for various governments and helped them to reflect upon the existing status quo.

GII 2022

- The Global Innovation Index 2022 which was released in 2022 tracked global innovation trends against the background of COVID-19 pandemic, slowing productivity growth and other evolving challenges.
- The **GII** revealed the most innovative economies in the world, **ranking the innovation performance of 132 economies**.

Highlights of the Index

- **Switzerland, the United States, Sweden, the United Kingdom and the Netherlands** are the world's most-innovative economies as per **GII 2022**.
- **Emerging economies** are showing consistently strong performance, with **India** jumping

to the **40th position**. India, for the **first time**, made it to the **top 40 countries** at the Index. In the 2021 Index, India was placed at 46th position.



- **India is the innovation leader in the lower middle-income group.** It continues to lead the world in ICT services exports and holds top rankings in other indicators, including venture capital receipt value, finance for startups and scaleups, graduates in science and engineering, labor productivity growth and domestic industry diversification.
- The report noted that despite the COVID-19 pandemic, the **research and development (R&D) and other investments that drive worldwide innovative activity continued to boom** in 2021, however challenges are emerging in translating innovation investments into impact.

Why in News?

- Union Minister Dr Jitendra Singh said that having leapfrogged from 81st (in 2015) to 40th in the Global Innovation Index 2022, the country must aspire to be in the **top 25 in the near term and in the top five by 2047**.

Polity

1) Real Estate (Regulation & Development) Act, 2016

About the Act

- The real estate (regulation and development) Act 2016 was enacted with the main purpose to establish the state level regulatory authorities called **Real Estate Regulatory Authority** for **regulation and promotion of the real estate sector**.
- The Act has the following objectives:
 - To protect the interest of the allottees (buyers) and ensure their responsibility;
 - To maintain transparency and reduce the chances of fraud;
 - To implement Pan-India standardization and bring about professionalism;
 - To enhance the flow of correct information between the home buyers and the sellers;
 - To impose greater responsibilities on both the builders and the investors;
 - To enhance the reliability of the sector and thereby increase confidence amongst the investors.
- **Residential real estate projects**, with some exceptions, need to be **registered with RERAs**. Promoters cannot book or offer these projects for sale without registering them. **Real estate agents** dealing in these projects also need to **register with RERAs**.
- On registration, the promoter must upload details of the project on the website of the RERA. These include the site and layout plan,

and schedule for completion of the real estate project.

- **70% of the amount** collected from buyers for a project must be maintained in a separate bank account (*escrow account*) and must only be used for construction of that project.
- As per RERA, a promoter is responsible for **rectification of a structural defect or any other defect** in workmanship, quality or provision of services in the project for **five years** from the date of handing over possession, without further charge.
- The Act establishes state level tribunals called **Real Estate Appellate Tribunals**. Decisions of RERAs can be appealed in these tribunals.

Why in News?

- The central government has directed various state real estate regulatory authorities to ensure strict compliance with the Real estate (regulation and development) Act 2016.

2) What is a 'corrupt act' according to the RPA 1951?

Context

- Recently, the Supreme Court observed that no one in India votes for a candidate based on their educational qualifications and, thus providing **false information about an electoral candidate's qualifications cannot be considered a "corrupt practice"** under Sections 123 (2) and Section 123 (4) of the Representation of People's Act, 1951.

Representation of the People Act, 1951

- The Representation of the People Act 1951 is responsible for

regulating elections in India, which includes setting criteria for membership in houses, implementing measures to prevent corrupt activities, and outlining procedures for resolving disputes related to elections.

- This act is crucial in **maintaining a functional Indian democracy** as it prevents individuals with criminal backgrounds from serving in representative bodies, promotes transparency and accountability of candidates, and prohibits corrupt practices like bribery and booth capturing.
- **Only political parties that are registered under section 29A of the RPA Act, 1951 are permitted to receive electoral bonds**, which helps to ensure transparency in funding for elections.

Corrupt practices under RPA

- The Representation of the People Act, 1951 **defines 'corrupt practices' under Section 123** of the Act. It includes **bribery, undue influence, spreading false information, and promoting enmity or hatred between different groups for election purposes** as corrupt practices.
- **Section 123 (2) of the Act** deals specifically with **undue influence**. It defines it as any **direct or indirect interference or attempts to interfere** with the free exercise of electoral rights by a candidate or his agent, or any other person with the consent of the candidate or his election agent. This could include **threats of injury, social ostracism, or expulsion from any caste or community**.
- **Section 123 (4) of the Act** extends the ambit of "corrupt

practices" to the **intentional publication of false statements** which can prejudice the outcome of the candidate's election.

- The Act also provides for the **disqualification of elected representatives on specific grounds**, including corrupt practices, failure to declare election expenses, holding interests in government contracts or works, or holding an office of profit under the government.

What are the previous judgements?

- In 2017, a seven-judge constitution bench of the apex court in '**Abhiram Singh v C.D. Commachen**' held that an **election will be annulled if votes are sought in the name of a candidate's religion, race, caste, community, or language**, as per **Section 123 (3)** which prohibits the same.
- In 2022, the top court directed a three-judge bench to look into pleas for reconsidering its 2013 judgment in '**S. Subramaniam Balaji vs State of Tamil Nadu**', where the court held that **promises of freebies** cannot be termed a corrupt practice. However, the matter is still yet to be decided.

3) Controller General of Accounts **Who is a Controller General of Accounts (CGA)?**

- A CGA is the **Principal Advisor on Accounting matters to the Union Government**.
- He is responsible for establishing and managing a **technically sound Accounting System**.
- He is responsible for preparation and submission of the accounts of the Union Government and also

responsible for exchequer control and internal audits.

- CGA derives his mandate from **Article 150** of the Constitution.

Duties and responsibilities of CGA

- General principles of Government accounting relating to **Union or State Governments** and form of accounts, and framing or revision of rules and manuals relating thereto;
- Reconciliation of cash balance of Union Government with Reserve Bank in general and, in particular, of Reserve Deposits pertaining to Civil Ministries or Departments;
- Overseeing the maintenance of adequate standards of accounting by **Central Civil Accounts Offices**;
- Consolidation of monthly accounts, preparation of review of trends of revenue realization and significant features of expenditure etc and preparation of annual accounts (including Summary, Civil Appropriation Accounts) showing under the respective heads, the annual receipts and disbursements

for the purpose of the Union Government;

- **Administration** of Central Treasury Rules and Central Government Account (Receipt and Payment Rules 1983);
- **Coordination and assistance** in the introduction of management accounting system in Civil Ministries or Departments;
- **Cadre management** of Group 'A' (Indian Civil Accounts Service) and Group 'B' Officers of the Central Civil Accounts Offices;
- **Matters relating to the Central Civil Accounts staff** belonging to Group 'C' and 'D';
- **Disbursement of Pension** through Public Sector Banks (PSBs) in respect of Central Civil Pensioners, Freedom Fighters, High Court Judges, Ex-M.P.s and Ex-Presidents.

Why in News?

- S.S. Dubey took charge as the 28th Controller General of Accounts (CGA), Ministry of Finance.

International Relations

1) New START

About the Treaty

- The New Strategic Arms Reduction Treaty (New START) was signed in 2010 by **Russia and the United States** and entered into force in **2011**.
- New START replaced the 1991 START I treaty, which expired in 2009, and superseded the 2002 Strategic Offensive Reductions Treaty (SORT).
- New START caps the United States and Russia each at no more than 700 deployed intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs) and nuclear-capable bombers and no more than 1,550 deployed strategic warheads.
- The Treaty also allows for **verification inspections and information-sharing**.
- The two countries had to meet the treaty's central limits on strategic offensive arms by 2018, and to then stay within those limits for the period the treaty remained in force. The US and Russia Federation subsequently agreed to **extend the treaty till 2026**.

Why in News?

- Days before the first anniversary of the beginning of the war in Ukraine, Russian President Vladimir Putin announced that **Russia is suspending its participation in the New START**, the last remaining major military agreement with the United States.

2) AUKUS

What's in the news?

- **Australia, the United Kingdom and the United States** unveiled plans to **provide Australia with**

nuclear-powered attack submarines in the early 2030s to counter China's ambitions in the Indo-Pacific.

- The arrangement was made through the **Australia-United Kingdom-United States (AUKUS) enhanced security partnership**.
- Beijing has reacted strongly to the naval deal, accusing the three nations of "walking further and further down the path of error and danger".

What is AUKUS?

- AUKUS is a 2021 **defence deal between Australia, the UK and the US**, which was struck to **help Australia deploy nuclear-powered submarines in the Pacific region**.
- Officially, the deal was made to emphasise upon the countries' **"shared commitment to a free-and-open Indo-Pacific region"**. In effect, it seeks to **combat China's ambitions in the region**.

The Indo-Pacific region

- The region stretches from the **western or the Pacific coastline of the United States to the Indian Ocean**. It hosts **more than half of the world's population** and some of the biggest economies, accounting for **60% of the global GDP and two-thirds of global economic growth**. The strategic region covers **65% of the world's ocean and about 25% of its land area**.
- China has been an aggressive player in the South Pacific and Indian Oceans, staking territorial claims across the resource-rich region. China's increasing aggression against **Taiwan and in**

the South China Sea has been of particular note.

- While China's territorial ambitions have elicited strong reactions from across the West, Australia, a traditional centre of influence in the Pacific, has been most directly impacted. Crucially, unlike Australia, **China has multiple nuclear-capable submarines.**

How will nuclear submarines help Australia?

- **Conventional diesel-engine submarines** have batteries that keep and propel the vessel underwater. The life of these batteries can vary from a few hours to a few days. While newer **Air-Independent Propulsion (AIP) submarines** have **additional fuel cells that increase the submarine's endurance**, these are **used only at strategic times** and can **only be replenished in port**. Both conventional and AIP subs **need to come to the surface** to recharge their batteries using the diesel engine.
- **Nuclear-powered submarines**, on the other hand, have an **internal nuclear reactor**, giving them **near infinite endurance** to operate and **stay submerged** – effectively, a nuclear submarine only needs to port/surface when it is out of food and other essential supplies for the crew. Typically, nuclear subs are also **faster than conventional submarines.**
- This allows them to reach far out into the ocean and launch attacks on the enemy, an important capability for **blue water navies** (maritime forces capable of operating in the deep waters of the open oceans).
- It will give the Royal Australian Navy the capability to go into the South China Sea to protect its assets and conduct patrols, a capability which it currently does not possess.

Art & Culture

1) Keeladi Excavation

Context

- The excavations from **Keeladi** prove that an **urban civilisation** existed in **Tamil Nadu** in the **Sangam age** on the **banks of the Vaigai River**.

How is Keeladi linked to the Sangam age?

- Keeladi is a tiny hamlet in the Sivaganga district in **south Tamil Nadu**. It is located along the **Vaigai River**.
- The **Sangam age** is a period of history in **ancient Tamil Nadu** which was believed to be from the **third century BCE to the third century CE**.
- Excavations by the Archaeological Survey of India (ASI) and Tamil Nadu State Archaeology Department (TNSDA) have **pushed the Sangam age further back**. In 2019, a TNSDA report dated the unearthed artefacts from Keeladi to a **period between sixth century BCE and first century BCE**.
- A recent ASI report has **pushed the Sangam age to 800 BCE** based on the latest archaeological findings.
- Keeladi could also provide **crucial evidence for understanding the missing links of the Iron Age** (12th century BCE to sixth century BCE) to the **Early Historic Period** (sixth century BCE to fourth century BCE) and **subsequent cultural developments**.

Are there links to the Indus Valley?

- The unearthed Keeladi artefacts have led academics to describe the site as **part of the Vaigai Valley Civilisation**. The findings have also invited **comparisons**

with the Indus Valley Civilisation while acknowledging the **cultural gap of 1,000 years** between the two places. Till now, the gap is filled with **Iron Age material** in south India, which serve as residual links.

- However, some of the symbols found in pot sherds of Keeladi bear a **close resemblance to Indus Valley signs**. A lot of digging and study has to be done to establish the links between these two civilisations.
- TNSDA affirms that Keeladi has **all the characteristics of an urban civilisation**, with brick structures, luxury items and proof of internal and external trade. It comes across as an industrious and advanced civilisation and has given evidence of urban life and settlements in Tamil Nadu during the Early Historic Period. Keeladi has also **added to the credibility of Sangam Literature**.

What has been unearthed so far?

- In the eight rounds of excavations, over 18,000 artefacts have been unearthed from the site.
- Unearthing heaps of pottery suggest the **existence of a pottery making industry**, mostly made of locally available raw materials. Over 120 potsherds containing **Tamil Brahmi inscriptions** have been found. Keeladi, along with other Tamil Nadu sites which have over a thousand inscribed potsherds, clearly suggest the **long survival of the script**.
- Spindle whorls, copper needles, terracotta seal, hanging stones of the yarn, terracotta spheres and earthen vessels to hold liquid suggest **various stages of a**

weaving industry. There also existed a **dyeing industry and a glass bead industry.**

- Gold ornaments, copper articles, semi-precious stones, shell bangles, ivory bangles and ivory combs reflect the **artistic, culturally rich and prosperous**

lifestyle of the Keeladi people.

Agate and carnelian beads suggest **import through commercial networks** while terracotta and ivory dice, gamesmen and evidence of hopscotch have been unearthed revealing their **pastime hobbies.**

SUMMARY OF UNION BUDGET 2023-24 FROM THE PERSPECTIVE OF UPSC CSE

Introduction

- Union Minister for Finance and Corporate Affairs Nirmala Sitharaman has presented the Union Budget 2023-24.
- The government's efforts since 2014 have ensured for all citizens a better quality of living and a life of dignity and the **per capita income has more than doubled to Rs 1.97 lakh**.
- In these nine 9 years, the **Indian economy has increased in size from being 10th to 5th largest in the world**.
- Moreover, the **economy has become a lot more formalized** as reflected in the EPFO membership, more than doubling to 27 crore, and 7,400 crore digital payments of Rs 126 lakh crore through UPI in 2022.
- The Finance Minister noted that India's Union Budget for the next fiscal year starting April 1 is the **first budget in Amrit Kaal** or the 25-year-long lead up to India's 100 years of independence from colonial rule.
 - The term Amrit Kaal was first introduced by Prime Minister Narendra Modi during India's 75th Independence Day in 2021. The vision behind Amrit Kaal is to attain certain goals in the coming 25 years.

Vision for Amrit Kaal – an empowered and inclusive economy

- The vision for the Amrit Kaal includes a technology-driven and knowledge-based economy with strong public finances, and a robust financial sector. To achieve this **'jan-bhaagidari' (public**

participation) through 'sabka saath, sabka prayas' (efforts by all) is essential

- The following **four opportunities** can be transformative during Amrit Kaal:

1) Economic Empowerment of Women:

- **Deendayal Antyodaya Yojana-National Rural Livelihood Mission (DAY-NRLM)** has achieved remarkable success by mobilizing rural women into **81 lakh Self Help Groups** and the government will enable these groups to reach the **next stage of economic empowerment** through formation of large producer enterprises or collectives with each having several thousand members and managed professionally.

2) PM Vishwakarma KAushal Samman (PM VIKAS):

- For centuries, **traditional artisans and craftspeople**, who work with their hands using tools, have brought renown for India and they are generally referred to as **Vishwakarma**. The art and handicraft created by them represents the **true spirit of Atmanirbhar Bharat**.
- A **package of assistance** for them has been conceptualized and the new scheme will enable them to **improve the quality, scale and reach of their products, integrating them with the MSME value chain**.
- The components of the scheme will include not only financial support but also access to advanced skill training, knowledge of modern digital techniques and efficient green technologies, brand promotion, linkage with local and

global markets, digital payments, and social security.

- This will greatly benefit the **Scheduled Castes, Scheduled Tribes, OBCs, women and people belonging to the weaker sections.**

3) Tourism:

- The country offers immense attraction for domestic as well as foreign tourists, as there is a large potential to be tapped in tourism. The sector holds huge **opportunities for jobs and entrepreneurship for youth** in particular. Promotion of tourism will be taken up on mission mode, with active participation of states, convergence of government programmes and public-private partnerships.

4) Green Growth:

- India is implementing many programmes for green fuel, green energy, green farming, green mobility, green buildings, and green equipment, and policies for efficient use of energy across various economic sectors.
- These green growth efforts help in **reducing carbon intensity of the economy** and provide for **large scale green job opportunities.**

Priorities of this Budget



- The Finance Minister listed **seven priorities of the Union Budget** and said that they complement each other and act as the **'Saptarishi'** guiding us through the Amrit Kaal.
- They are as follows: 1) Inclusive Development 2) Reaching the Last Mile 3) Infrastructure and Investment 4) Unleashing the Potential 5) Green Growth 6) Youth Power 7) Financial Sector.

Priority 1: Inclusive Development **Digital Public Infrastructure for Agriculture:**

- The Digital Public infrastructure for agriculture will be built as an **open source, open standard and interoperable public good.**
- This will enable inclusive, farmer-centric solutions through relevant information services for crop planning and health, improved access to farm inputs, credit, and insurance, help for crop estimation, market intelligence, and support for growth of agri-tech industry and start-ups.
 - Digital Public infrastructure (DPI) refers to **digital solutions that enable basic functions essential for public and private service delivery**, i.e. collaboration, commerce, and governance. Typical examples include digital identification platforms such as **Aadhaar and Unified Payments Interface (UPI)** in India.

Agriculture Accelerator Fund:

- An Agriculture Accelerator Fund will be set-up to **encourage agri-startups by young entrepreneurs in rural areas**, which will aim at bringing innovative and affordable solutions for challenges faced by farmers.

- It will also **bring in modern technologies** to transform agricultural practices, increase productivity and profitability.

Atmanirbhar Horticulture Clean Plant Programme:

- The Government will launch an Atmanirbhar Clean Plant Programme to **boost availability of disease-free, quality planting material for high value horticultural crops** at an outlay of Rs 2,200 crore.

Global Hub for Millets: 'Shree Anna':

- Describing **millets** as '**Shree Anna**' – the mother of all grains – the Finance Minister said that **India is the largest producer and second largest exporter** of 'Shree Anna' in the world as it grows several types of 'Shree Anna' such as **jowar, ragi, bajra, kuttu, ramdana, kangni, kutki, kodo, cheena, and sama**.
- To make India a global hub for 'Shree Anna', the **Indian Institute of Millet Research, Hyderabad** will be supported as the **Centre of Excellence** for sharing best practices, research and technologies at the international level.

Agriculture Credit:

- The Government will launch a **new sub-scheme of PM Matsya Sampada Yojana (PMMSY)** with targeted investment of **Rs 6,000 crore** to further enable activities of fishermen, fish vendors, and micro & small enterprises, improve value chain efficiencies, and expand the market.
 - The central government launched PMMSY in 2020 to bring about the **Blue Revolution** through sustainable and responsible development of the fisheries sector in India. It is a flagship scheme for

integrated, sustainable, inclusive development of marine and inland fisheries sector in the country.

Health & Education:

- A Mission to **eliminate Sick Cell Anaemia by 2047** will be launched, which will entail awareness creation, universal screening of 7 crore people in the age group of 0-40 years in affected tribal areas, and counseling through collaborative efforts of central ministries and state governments.
- A **National Digital Library for Children and Adolescents** will be set-up for facilitating availability of quality books across geographies, languages, genres and levels, and device agnostic accessibility.

Priority 2: Reaching the Last Mile Aspirational Districts and Blocks Programme:

- Building on the success of the **Aspirational Districts Programme**, the Government has recently launched the **Aspirational Blocks Programme** covering **500 blocks** for saturation of essential government services across multiple domains such as health, nutrition, education, agriculture, water resources, financial inclusion, skill development, and basic infrastructure.

Pradhan Mantri PVTG Development Mission:

- To **improve socio-economic conditions of the particularly vulnerable tribal groups (PVTGs)**, Pradhan Mantri PVTG Development Mission will be launched.
- This will **saturate PVTG families and habitations with basic facilities** such as safe housing, clean drinking water and

sanitation, improved access to education, health and nutrition, road and telecom connectivity, and sustainable livelihood opportunities.

- An amount of **Rs 15,000 crore** will be made available to implement the Mission in the next three years under the Development Action Plan for the Scheduled Tribes.
 - PVTGs constitute the most vulnerable section among tribals and inhabit isolated, remote and difficult areas in small and scattered hamlets/ habitats.
 - The criteria followed for determination of PVTGs are as under:
 - **A pre-agriculture level of technology;**
 - **A stagnant or declining population;**
 - **Extremely low literacy; and**
 - **A subsistence level of economy.**

Bharat Shared Repository of Inscriptions:

- 'Bharat Shared Repository of Inscriptions' will be set up in a **digital epigraphy museum, with digitization of one lakh ancient inscriptions in the first stage.**

Priority 3: Infrastructure & Investment

- Investments in infrastructure and productive capacity have a **large multiplier impact on growth and employment** and in view of this **capital investment outlay** is being **increased steeply** for the third year in a row by **33 per cent to Rs 10 lakh crore**, which would be **3.3 per cent of GDP.**

Support to State Governments for Capital Investment:

- The Finance Minister informed that the Government has decided to

continue the **50-year interest free loan to state governments** for **one more year** to spur investment in infrastructure and to incentivize them for complementary policy actions, with a significantly enhanced outlay of Rs 1.3 lakh crore.

- **The entire 50-year loan to states has to be spent on capital expenditure within 2023-24.** Most of this will be at the **discretion of states**, but a **part will be conditional on states** increasing their actual capital expenditure.

Urban Infrastructure Development Fund:

- The Finance Minister announced that an Urban Infrastructure Development Fund (UIDF) will be established through **use of priority sector lending shortfall** and will be used by public agencies to **create urban infrastructure in Tier 2 and Tier 3 cities.** It will be **managed by the National Housing Bank.**
 - While Tier II cities are those which have a population range of 50,000 to 100,000, Tier III cities are classified as those with a population of 20,000 to 50,000.
- States will be encouraged to leverage resources from the grants of the 15th Finance Commission, as well as existing schemes, to adopt appropriate user charges while accessing the UIDF.
- The Urban Local Bodies may be encouraged to apply appropriate user charges to make the UIDF project self-sustainable.

Priority 4: Unleashing the Potential Centres of Excellence for Artificial Intelligence:

- To realize the vision of **"Make A-I in India and Make A-I work for**

India”, three centers of excellence for Artificial Intelligence will be set-up in top educational institutions.

National Data Governance Policy:

- To **unleash innovation and research** by start-ups and academia, a National Data Governance Policy will be brought out, which will **enable access to anonymized data**.

Other Initiatives:

- An **Entity DigiLocker** will be set up for **use by MSMEs, large business and charitable trusts** for storing and sharing documents online securely, whenever needed, with various authorities, regulators, banks and other business entities.
- On 5G Services, **one hundred labs** for developing applications using 5G services will be set up in engineering institutions to realize a new range of opportunities, business models, and employment potential. The labs will cover, among others, applications such as **smart classrooms, precision farming, intelligent transport systems, and health care applications**.

Priority 5: Green Growth

MISHTI:

- The government has announced the **MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes)** initiative that will **facilitate mangrove plantation along India’s coastline and on salt pan lands**.
- The programme will operate through **convergence between MGNREGS, CAMPA Fund and other sources**.
- This new programme will aim at **intensive afforestation of coastal mangrove forests**.

PM PRANAM:

- The PM PRANAM (Prime Minister Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth) programme will seek to **incentivise states and union territories promoting alternative fertilisers and the balanced use of chemical fertilisers**.

Bhartiya Prakritik Kheti Bio-Input Resource Centres:

- To further facilitate the **adoption of “natural farming,” 10,000 Bio-Input Resource Centres** will be set-up, creating a national-level distributed micro-fertiliser and pesticide manufacturing network.
- This will impact **over 1 crore farmers** over the next three years.

GOBARdhan scheme:

- **500 new ‘waste to wealth’ plants** under GOBARdhan scheme will be established for promoting the circular economy.
 - Galvanizing Organic Bio-Agro Resources (GOBAR)-Dhan was launched by the Government of India in 2018 as a part of the **biodegradable waste management component** under the **Swachh Bharat Mission-Gramin**.
 - The main focus areas of GOBAR-Dhan are to **keep villages clean, increase the income of rural households and generate energy and organic manure from cattle waste**.
 - The scheme focuses on managing and converting cattle dung and solid waste on farms into compost, biogas, and bio-CNG. In addition to keeping the village clean, it provides additional income for farmers and cattle herders.

- The GOBARDhan scheme also aims to **make farmers more self-reliant in converting 'waste to energy.'** For every district, the Government of India provides **technical assistance as well as financial support of up to 50 lakhs** to achieve the safe disposal of cattle and organic waste.

Priority 6: Youth Power

PMKVY 4.0:

- The government announced that **Pradhan Mantri Kaushal Vikas Yojana 4.0 (PMKVY 4.0)** will be launched to skill lakhs of youth within the next three years. On-job training, industry partnership, and alignment of courses with needs of industry will be emphasized.
- The scheme will also cover **new age courses for Industry 4.0 like coding, AI, robotics, mechatronics, IOT, 3D printing, drones, and soft skills.**
 - PMKVY is the flagship scheme of the **Ministry of Skill Development & Entrepreneurship** implemented by **National Skill Development Corporation (NSDC)**. The scheme was launched in 2015.
 - The objective of this programme is to **enable a large number of Indian youth to take up industry-relevant skill training** that will help them in securing a better livelihood.
 - Individuals with prior learning experience or skills will also be assessed and certified under **Recognition of Prior Learning**. Skill training is based on the

National Skill Qualification Framework (NSQF) and industry led standards.

Unity Mall:

- States will be encouraged to set up a Unity Mall in their state capital or most prominent tourism centre or the financial capital for **promotion and sale of their own ODOPs (one district, one product), GI products and other handicraft products**, and for providing space for such products of all other States.

Priority 7: Financial Sector

Credit Guarantee for MSMEs:

- **Revamped credit guarantee for MSMEs** to take effect from Apr 1, 2023 with infusion of Rs 9,000 crore in corpus.
- The scheme would enable **additional collateral-free guaranteed credit of Rs 2 lakh crore** and also **reduce the cost of the credit by about 1 per cent.**

National Financial Information

Registry:

- A National Financial Information Registry will be set up to serve as the **central repository of financial and ancillary information**. This will facilitate **efficient flow of credit, promote financial inclusion, and foster financial stability**.
- A new legislative framework will govern this credit public infrastructure, and it will be designed in consultation with the RBI.

Mahila Samman Savings Certificate:

- A one-time **new small savings scheme, Mahila Samman Savings Certificate**, will be made available for a **two-year period** up to March 2025.
- This will offer **deposit facility upto Rs 2 lakh in the name of**

women or girls for a tenor of 2 years at fixed interest rate of 7.5 per cent with partial withdrawal option.

Fiscal Management

Revised Estimates 2022-23

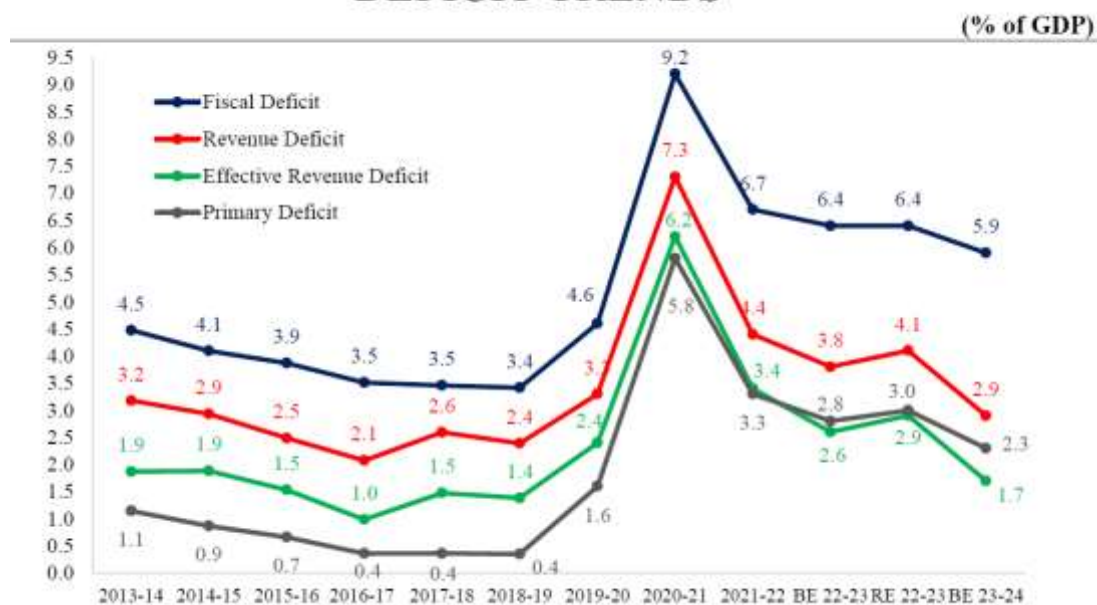
- The **Revised Estimate of the total receipts other than borrowings** is **Rs 24.3 lakh crore**, of which the **net tax receipts** are **Rs 20.9 lakh crore**.
- The **Revised Estimate of the total expenditure** is **Rs 41.9 lakh crore**, of which the **capital expenditure** is about **Rs 7.3 lakh crore**.

- Similarly, the **Revised Estimate of the fiscal deficit** is **6.4 per cent of GDP**, adhering to the Budget Estimate.

Budget Estimates 2023-24

- The **total receipts other than borrowings and the total expenditure** are estimated at **Rs 27.2 lakh crore** and **Rs 45 lakh crore** respectively. The **net tax receipts** are estimated at **Rs 23.3 lakh crore**.
- The **fiscal deficit** is estimated to be **5.9 per cent of GDP**.

DEFICIT TRENDS



- The Government plans to continue the path of fiscal consolidation, reaching a **fiscal deficit below 4.5 per cent by 2025-26** with a fairly steady decline over the period.
- The government has estimated a **nominal GDP growth rate of 10.5% in 2023-24** (i.e., real growth plus inflation).

Expenditure on Subsidies

- In 2023-24, the total expenditure on subsidies is estimated to be **Rs 4,03,084 crore**, a **decrease of 28.3%** from the revised estimate of 2022-23.

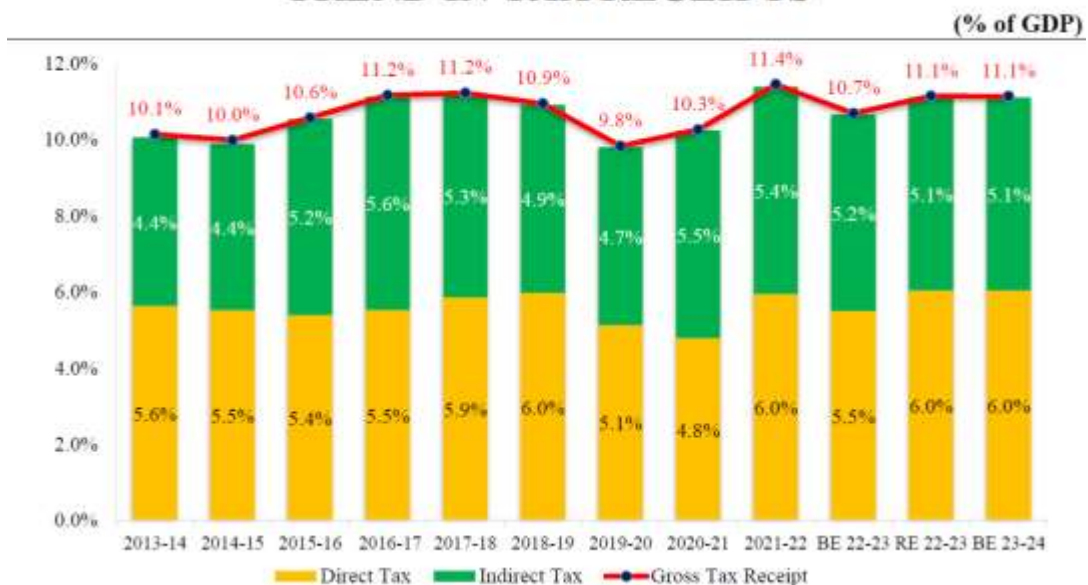
- **Food subsidy:** Allocation to food subsidy is estimated at **Rs 1,97,350 crore** in 2023-24, a **31.3% decrease** over the revised estimate of 2022-23. A higher level of food subsidy was budgeted in 2021-22 and 2022-23 mainly on account providing for **free additional foodgrains** to eligible beneficiaries to mitigate the impact of COVID-19.
- **Fertiliser subsidy:** Expenditure on fertiliser subsidy is estimated at **Rs 1,75,100 crore** in 2023-24. This is a **decrease of Rs 50,120 crore**

(22.3%) from the revised estimate of 2022-23. Fertiliser subsidy for 2022-23 was increased substantially in response to a **sharp increase in international prices** of raw materials used in the manufacturing of fertilisers.

- **Other subsidies:** Expenditure on other subsidies includes **interest subsidies** for various government schemes, **subsidies for the price support scheme** for agricultural produce, and **assistance to ship building research and development**, among others. In 2023-24, the expenditure on these other subsidies is estimated to **decrease by 30%** over the revised estimate of 2022-23.

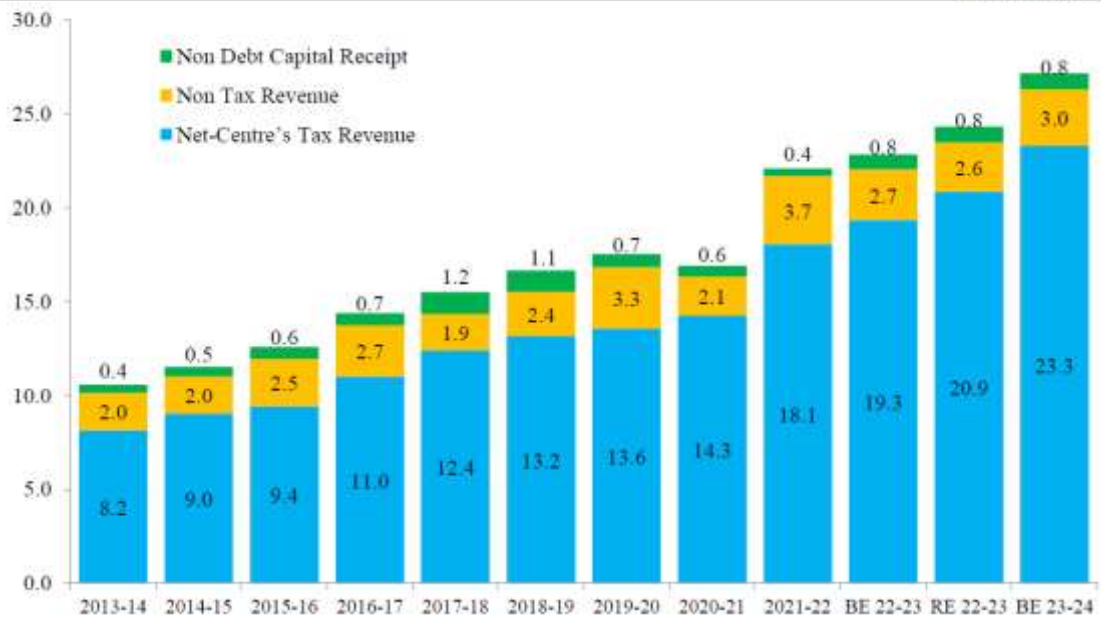


TREND IN TAX RECEIPTS

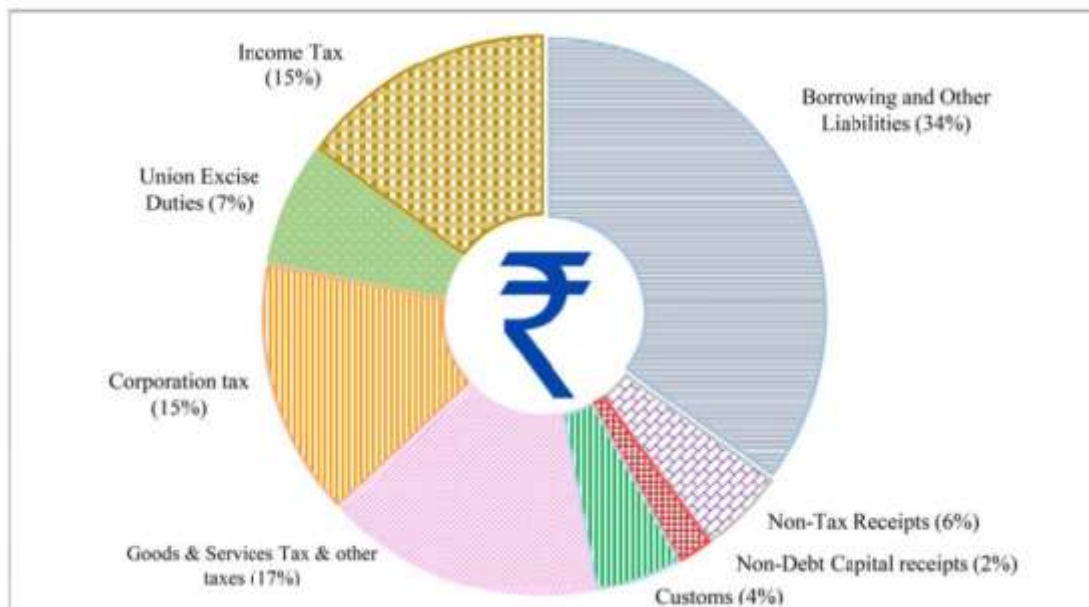


TREND IN NET RECEIPT OF THE CENTRE

(₹ in lakh crore)



Rupee Comes From



Rupee Goes To

