

OFFICERS' Pulse

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1) International Year of Millets 2023

(GS2: Issues relating to Poverty and Hunger)

Context

- The **United Nations General Assembly** has declared the year **2023 'International Year of Millets'**.
- It will help in creating awareness throughout the world about the significant role of millets in sustainable agriculture and its benefits as a smart and superfood.

Millets in India

- **India** is poised to become the **global hub for millets** with a production of more than 170 lakh tonnes which makes for **more than 80% of the millets produced in Asia**.
- The earliest evidence for these grains has been found in the **Indus Valley Civilisation** and was one of the first plants to be domesticated for food.
- In India, millets can be clubbed into **major, minor, and pseudo categories**.
 - **Major Millets:** Sorghum (Jowar), Pearl Millet (Bajra), Finger Millet (Ragi/Mandua)
 - **Minor Millets:** Foxtail Millet (Kangani/Kakun), Proso Millet (Cheena), Kodo Millet, Barnyard Millet (Sawa/Sanwa/ Jhangora), Little Millet (Kutki)
 - **Pseudo Millets:** Buck-wheat (Kuttu) and Amaranth (Chaulai)
- The top five states producing Millets are **Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, and Haryana**.

Millets and SDGs

- IYM 2023 aims to contribute to the **UN 2030 Agenda for Sustainable Development**, particularly **SDG 2**

(Zero Hunger), **SDG 3** (Good health and well-being), **SDG 8** (Decent work and economic growth), **SDG 12** (Responsible consumption and production), **SDG 13** (Climate action) and **SDG 15** (Life on land).

1. Climate-resilient Agriculture

SDG 13 (Climate Action) and SDG 15 (Life on Land):

- Millets are often referred to as **climate-resilient crops** because they can grow on **arid lands** with **minimal inputs and maintenance**, are **tolerant or resistant to diseases and pests** and are **more resilient to climate shocks** than other cereals.

2. Fighting Hunger

SDG 2 (End Hunger):

- In **arid areas**, millets are very often the only crops that can be harvested in the **dry season** and are a **crucial part of the household food basket**.
- Millets can help to overcome food scarcity in difficult periods, therefore contributing to the **food security and nutrition** of vulnerable populations.
- Millets can **grow in very poor and fertile soils** in dryland conditions and **do not heavily deplete soil nutrients**. By providing **land cover** in arid areas, they **reduce further soil degradation** and help **support biodiversity and sustainable land restoration**.

3. Healthy Diet

SDG 3 (Good Health and Well-Being):

- Millets are **good sources of minerals, dietary fibre, antioxidants and protein**. With a **low glycaemic index**, they are a good option for people with high-blood sugar.
- Millets are also **gluten-free** and an **excellent and cost-effective source of iron** for iron-deficient diets.

- With their high levels of fibre content, vitamins, minerals, phytochemicals, and antioxidants, they can help **fight many modern-day, lifestyle diseases** like cancer, diabetes, and cardiovascular problems.

4. Opportunities to Smallholder Farmers

SDG 8 (Decent Work and Economic Growth):

- The production of millets and the demand for them has declined as other cereals such as wheat, maize or rice became a dietary preference.
- By promoting millets and regaining market opportunities, **additional sources of revenue** can be created for smallholders.

5. Diversity of the Global Food System

SDG 8 (Decent Work and Economic Growth) and SDG 12 (Sustainable Consumption and Production):

- Millets account for **less than 3% of the global grains trade**. With the need to improve the resilience of global trade and its ability to respond to sudden changes in the foodgrain market, millets are a valuable option to **increase output diversity and mitigate risks related to production shocks**.

Way Forward

- Supporting farmers, creating an enabling environment for industry and startups, and increasing awareness among consumers are key to the future of millets.

2) Broadening Outreach of Cooperatives

(GS2: Development Processes and the Development Industry — the Role of NGOs, SHGs, various groups and associations, donors, charities, institutional and other stakeholders)

Context

- 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**.
- The **International Labour Organization** defines cooperative as an **autonomous association of persons united voluntarily** to meet their **common economic, social and cultural needs and aspirations** through a jointly owned and democratically controlled enterprise.

Cooperative movement in India

- 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 in India was to help farmers overcome the burden of debt and help them sell their products easily to get maximum profit.
- Globally, there are more than 30 lakh cooperatives that engage more than 12 percent of the world's population. India has 8.55 lakh Cooperatives and about 13 crore people are directly associated with them.
- Some of the largest cooperatives in India are -- Gujarat Cooperative Milk Marketing Federation popularly referred as **Amul**, **Indian Farmers Fertiliser Cooperative (IFFCO)** and **Krishak Bharati Cooperative Limited (KRIBHCO)**.

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 (PACS)** 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 **MultiState Cooperative Societies Act** that allowed for registration of societies with operations in more than one state.

- The **Banking Regulation (Amendment) Act, 2020** was passed 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.

Role of Co-operatives in Rural Areas

- Co-operative sector plays a vital role in the process of socio-economic development of a country like India where **more than two third of the population and 72.4 percent of the workforce reside in rural areas**.
- The cooperatives play a major **self-help role in rural areas**, particularly where private entrepreneurs hesitate to make investments and public authorities are not able to provide the required services due to paucity of funds.
- The cooperative societies engaged in the rural sector provide **adequate, affordable and timely credit** for the production, processing, storage and marketing of agricultural crops and other allied products.
- They not only **inculcate the habit of saving** but also **enable the communities to pool together their resources** to solve their common socio-economic problems.
- They are instrumental in providing **opportunities for productive employment, income generation** as well as **offering health care, education, improved sanitation, roads and market access**.
- They encourage '**Production by Masses**' instead of mass production, which is essential for inclusive and sustainable growth of the economy.
- The contribution of cooperatives in the country's economy is immense.

The cooperative sector provides 20 percent of the **total agricultural credit** in the country. It contributes 10 percent of **milk production**, 21 percent of **fish production**, 25 percent of **fertiliser production** and 31 percent of total **sugar production**. Apart from this, nearly 13 percent **procurement of wheat**, 20 percent of **paddy** and 35 percent **distribution of fertiliser** is carried out by the cooperative sector.

Challenges

- It has been witnessed that in many cases the members of cooperative societies are **not actively involved in their functioning** as they are not well informed about the rules and regulations of the society and objectives of the cooperative movement.
- A large number of cooperative societies are **not economically viable**, hence have become defunct.
- The **participation of scheduled-castes, scheduled tribes, women and other vulnerable sections of the society is low**.
- It has also witnessed that the **top posts of chairman and vice-chairman** of the society are usually occupied by the **richer farmers** who manipulate the organisation for their own benefit at the cost of the poor.
- Moreover, the co-operative movement has been suffering from **inadequacy of trained, skilled and experienced personnel**.

Government Initiatives

- Recognising the significance of the co-operative sector, the **National Cooperative Development Corporation (NCDC)** was established by an Act of Parliament in 1963, to speed up cooperative movement in the country.

- Assistance is provided under '**Central Sector Integrated Scheme on Agricultural Cooperation**' (CSISAC) through NCDC. Under the scheme, a **subsidy varying from 15 percent to 25 percent** is provided to the cooperatives depending on the category of state of their operation.
- To encourage youth towards cooperatives, '**Yuva Sahakar Cooperative Enterprise Support and Innovation Scheme**' was launched in 2018. The scheme aims at providing **mentorship and financial assistance** to the enterprising youth to establish start-ups in different types of business activities under the cooperative sector.
- In order to give renewed impetus to the cooperative movement in the country, the Union Government has created the **Ministry of Cooperation** in 2021, for realizing the vision of '**Sahkar se Samriddhi**' (Prosperity through Cooperation).
- It aims at providing a separate administrative, legal and policy framework for strengthening the cooperative movement in the country.

Way Forward

Finance:

- Cooperatives can come up with innovative business ideas to set up new business entities and to expand existing units. The foremost challenge before them is to avail **timely, adequate and affordable finance**, along with services to effectively use such resources.
- **Collateral free loans ensuring timely availability, accessibility and affordability** are important. An **exclusive fund for cooperatives** to achieve this can be considered.

Procurement and Marketing:

- Marketing of products and services have remained a challenge for the cooperatives. Recently, cooperatives have been allowed to register on the **Government e-Marketplace (GeM)** as **'buyers'**.
- The objective of this initiative is to enable cooperatives to procure goods and services from 40 lakh vendors on the GeM portal, thereby improving transparency in the procurement system and helping cooperatives to make some savings.
- A **preference policy for cooperatives as 'sellers'** may ensure the much needed boost to them.

Mentoring:

- **Effective cooperation and coordination amongst cooperatives** would mutually benefit their business initiatives and maximise community development through adequate expansion of member-driven cooperative activities.
- **Bigger cooperatives can mentor the weaker and smaller ones** and ensure that these units retain their competitiveness in the market.

Other Focus Areas:

- It is urgent to **infuse efficiency, accountability, transparency** in the entire system and adopt **modern technology and professionalism**.
- Nearly **two third of total cooperative societies are located only in seven states** viz. Maharashtra, Gujarat, Andhra Pradesh, Telangana, Uttar Pradesh, Madhya Pradesh and Karnataka.
- In order to ensure their growth in an egalitarian manner, it is necessary to promote the cooperatives in the lagging states particularly the **Union Territories**

and North-East States of the country.

- **Diversification of their activities** by including some new sectors such as, real estate, power, healthcare, insurance, communication, tourism and other services is needed for their revitalisation.
- There is also a need to promote the **brand of cooperatives** through upgradation and value addition in the products and services delivered by them.
- The Government needs to evaluate the **training needs of cooperatives**, along with designing and imparting training programmes to ensure that they come at par with the current business environment.

3) STEMM the Gap

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

Context

- Despite policy measures to encourage women in science, social and institutional hurdles hinder their progress.

Global Scenario

- According to the UN, **less than 30 percent of researchers globally are women**.
- Women are further provided with **fewer research funds** in comparison to their male counterparts.
- **Out of 959 recipients of the Nobel prizes so far, only 61 have been women**.
- Countries with a fairly good ratio in terms of an equal number of female and male researchers are: **South Africa and Egypt**, with 45 percent female researchers each, and **Cuba**, at 49 percent.

Indian Context

- According to the Department of Science and Technology (DST), as of 2018, **women made up only 18.7 percent of the country's researchers.**
- In India, **about 43 percent of women constitute the graduate population in STEMM** (science, technology, engineering, mathematics, and medicine), **but only 14 percent of women join academic institutions and universities.**
- Further, **only 21 of the 574 recipients of the Shanti Swarup Bhatnagar awards**, awarded by CSIR to honour work by researchers in Science & Technology, were women.

Systemic Social Gaps

- While measures to promote women in STEMM work well in principle, **systemic biases** act as deterrents.
- Some women give up on higher education or career due to the **ingrained notion of being caregivers.**
- **Lack of role models, pressures to conform to societal norms and trappings of domesticity** are major obstacles.

National Initiatives

- **Gender Advancement for Transforming Institutions (GATI)** is a pilot project under the **Department of Science & Technology** to promote gender equity in science and technology. In the first phase of GATI, 30 educational and research institutes have been selected with a focus on women's participation in leadership roles, faculty, etc
- **Knowledge Involvement Research Advancement through Nurturing (KIRAN)** was launched in 2014-15, with the aim of providing career

opportunities to unemployed women scientists and technologists, especially those who had a break in their career.

- The **Vigyan Jyoti Scheme** launched by the **Department of Science & Technology** is intended to create a level-playing field for meritorious girls in high school to pursue Science, Technology, Engineering and Mathematics in their higher education.
- **Women technology parks** act as a single window hub for convergence of diversified technologies, leading to socio-economic development of women through capacity building and adoption of location-specific technologies.
- Women Technology Parks are being set up by the government to **promote the development and adaptation of appropriate technologies, transfer of proven technologies and demonstration of live technology models** to promote women's employment.

Way Forward

- There is a need to create a **gender-neutral culture of research** in institutions and industries.
- There is an **immediate need to invest in supporting infrastructure and incentivize institutions to promote gender equity** to bridge the persisting gender imbalance in STEM majors.
- More women in STEM would improve and create a meaningful impact on society and national needs.

4) A Wild Thought

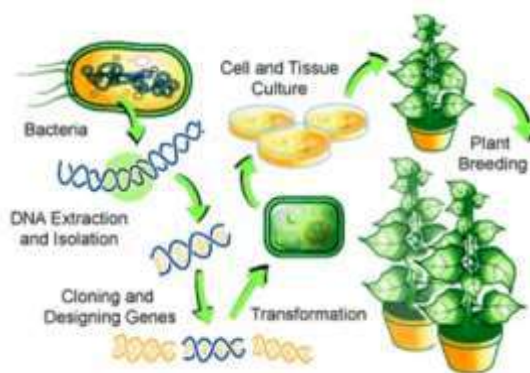
(GS3: Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment)

Context

- Genetically engineered (GE) trees are a new frontier of plant biotechnology. While the US intends to release GE trees in the wild, experts have warned of its possible environmental impacts.

Genetically Engineered Trees

- A genetically modified tree is a tree whose **DNA has been modified using genetic engineering techniques**.
- It may also mean **extracting DNA from another organism's genome and combining it with the DNA of that individual**.
- GE trees can help in **fighting climate change** by sequestering more carbon, **boost biofuel production, help in growing more timber, pulp etc.**



Global Scenario

- While **the US** is the only country that is considering the introduction of GE tree varieties in the wild, many others have been experimenting with GE tree varieties for **commercial plantations**.
- In 2002, **China** allowed the commercial plantations of two varieties of GE insect-resistant poplar trees. The country has

planted about 1.4 million GE poplar trees on 300-500 hectares.

- While China is the only country where commercial plantations of GE trees has started, the US, Germany and Canada are also conducting field tests for GE poplar varieties.

Indian Context

- The **Rubber Research Institute of India**, a Union government research centre based in **Kerala**, received clearance for field trials of a GE variety of rubber tree in 2010, but had to abort its plans after the Kerala government did not allow the trials.
- In 2021, the research institute under the Rubber Board received **clearance from the Assam government** to carry out the field trials.
- The GE variety has been modified by inserting additional copies of the **gene Mnsod** (manganese containing superoxide dismutase) which enables the plant to **tolerate extreme climatic stress**.
- Further, the GE rubber variety will **allow non-traditional rubber states** such as Assam and Mizoram to **cultivate better quality rubber**.

Environmental Concerns of GE Trees

- GE trees pose a **high risk of contaminating other trees, along with the animal and insect species** that rely on them.
- GE trees can **negatively alter soil structure and degrade productive forest, farmland, and other ecosystems**.
- GE tree plantations **require high amounts of greenhouse gas-emitting chemicals**, notably synthetic nitrogen fertilizer, which is responsible for around 60 percent of total global nitrous oxide emissions.

- GE trees could become **potentially invasive**, thereby causing a threat to native biodiversity and endemic species.
- Experiments conducted on GE crops show that **engineering resistance to one pathogen often leaves plants more susceptible to other pathogens or stresses, or reduces plant growth** significantly. Over time pathogen resistance becomes **less effective or not effective** at all.
- There are also **concerns over the lack of information** on how a GE tree will behave as it ages.
- The **impact of GE trees on indigenous communities** is another concern put forward by experts. Large areas of forests are owned and inhabited by indigenous people and the biodiversity **fuels local economies** and holds **cultural significance** with sacred sites that form the identities of the indigenous communities. But the transgenic material from GE trees holds the potential to **fundamentally reshape the shared environment**.

Way Forward

- The lack of current policy addressing GE trees could lead to innumerable environmental and socioeconomic harms.
- Government research in GE Trees is crucial to break the private sector monopoly.

5) Income inequalities in India (GS2: Issues relating to Poverty and Hunger)

Context

- Three decades after its tryst with economic liberalisation, India remains a **country of contradictions** — where massive growth and prosperity co-exist

with lingering poverty and deprivation.

- India's growth remains impressive, beating the expectations of economists and policymakers around the world. Between 2011-12 and 2019-20, **India grew by an average of 5.4 per cent annually**, clearly positioning itself among the **fastest-growing emerging economies in the world**.
- Yet, **various forms of inequalities** — income-based, gender-based and region-based inequalities, and inequalities affecting the historically disadvantaged social groups — are a by-product of this rapid growth.
- **“Survival of the Richest: India story”** report by **Oxfam**, a confederation of independent charitable organizations, highlights the widening inequality in India.

Highlights of the Report

- **Top 10 percent of the Indian population holds almost 72 per cent of the country's wealth**. The **bottom 50 percent share just 3 percent**.
- The **number of billionaires had increased** from 102 in 2020 to **166** in 2022. **India** still has the **world's highest number of poor**, about **228.9 million**, and yet is estimated to **produce 70 new millionaires per day**.
- The **tax burden also falls unevenly**. Currently, **indirect taxes**, such as the Goods and Services Tax, form a **large portion of tax revenue** with the **poorest half of the population bearing nearly two-thirds of the GST burden**.
- Moreover, **gender-based discrimination** also persists, particularly in **labour markets**. Studies show that women have been systematically exiting the

workforce over the last five decades, despite rising household incomes and narrowing gender gaps in education, resulting in the “**missing working woman phenomenon**” in India.

- This has exacerbated **gender-based wealth inequalities**. **Indian women’s expected lifetime earnings are only 64 per cent of their male counterparts.**

Measures to Reduce Inequality

1. Progressive Taxation:

- The Oxfam study has chosen to suggest the **re-imposition of a wealth tax** as it gives a scope for social investment like financing primary education in India.
- Oxfam estimates suggest that globally an **additional tax of five per cent** on the world’s multimillionaires and billionaires could raise up to **\$1.7 trillion per year, enough to lift 2 billion out of poverty and fund a plan to fight hunger.**
- The introduction of a three percent wealth tax on India’s billionaires can fund the National Health Mission for 5 years.

2. Decentralized Investment:

- **Investments across geographical areas have to be decentralized to address regional inequalities** within a country.
- **Ensuring strong connectivity and spreading out human capital investments** across the country can help reduce income inequality.

3. Women Entrepreneurship:

- **Promoting women’s entrepreneurship**, particularly in **rural areas** is a critical mechanism to create wealth accumulation opportunities in light of persisting gender gaps.
- For instance, **Bangladesh’s Equity and Entrepreneurship Support Fund (EEF)** helps women in the

Small and medium-sized enterprise (SME) sector in accessing finance and improving product marketing.

4. Limiting Monopoly & Strengthening Regulatory Frameworks:

- Strong regulators put some curbs on the power of monopolies to generate abnormal profits, thereby limiting wealth inequalities.

Conclusion

- The goal of creating a \$5 trillion economy in India by 2025 can be realized only if growth opportunities are spread out, rather than being concentrated among a few cities, enterprises, or social groups.

6) Why we need to focus on mental health

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

Context

- An urgent and well-resourced ‘whole-of-society’ approach protecting, promoting and caring for the mental health of our people is needed.

Mental Health Status in India

- **Suicidal rates:**
 - Suicides rates in India are **amongst the highest** when compared to other countries at the same socio-economic level.
 - According to WHO, **India’s suicide rate in 2019, at 12.9/1,00,000**, was higher than the regional average of 10.2 and the global average of 9.0.
 - Suicide has become the **leading cause of death among those aged 15–29 in India.**

- **Prevalence:**
 - Across the world, the prevalence of some mental health disorders is **consistently higher among women** as compared to men.
 - **People living in poverty are at greater risk** of experiencing mental health conditions.
 - Countries with **greater income inequalities and social polarisation** have been found to have a higher prevalence of mental ill-health.
 - **COVID- an exacerbating factor:**
 - The pandemic has **increased the prevalence of depression by 28 percent and anxiety by 26 percent** in just one year between 2020 and 2021.
 - The large increases have been noted among **younger age groups**, stemming from uncertainty and fear about the virus, financial and job losses, grief, increased childcare burdens, in addition to school closures and social isolation.
 - **Media creates an impact on mental health:**
 - Increased use of certain kinds of social media is also exacerbating stress and mental ill health for young people.
 - Social media **detracts from face-to-face relationships**, which are healthier and **reduces investment in meaningful activities**.
 - It **erodes self-esteem through unfavorable social comparison**.
 - **Socio-economic implications:**
 - People experiencing severe mental health conditions are **more likely to fall into poverty** through loss of employment and increased health expenditure.
 - **Stigma and discrimination** often further **undermine their social support structures**. This **reinforces the vicious cycle of poverty and mental ill-health**.
- Issues Surrounding Treatment of Mental Health**
- Currently, **only 20-30 percent of people with mental illnesses receive adequate treatment**.
 - **Less than two per cent of the government health budget in India**, which itself is the lowest among all G20 countries, is **devoted to mental health issues**.
 - There is a **severe shortage of mental health professionals**. **Most private health insurance** covers only a restricted number of mental health conditions.
- Measures to Address the Issue**
- The **deep stigma** surrounding mental health issues which prevents patients from seeking timely treatment and makes them feel shameful, isolated and weak should be done away.
 - Mental health has to be made an **integral part of the public health programme** to reduce stress, promote a healthy lifestyle, screen and identify high-risk groups and strengthen mental health interventions like counseling services.
 - **Special emphasis will need to be given to schools and highly vulnerable groups** to mental health issues such as victims of domestic or

sexual violence, unemployed youth, marginal farmers, armed forces personnel and personnel working under difficult conditions.

- A **strong infrastructure** has to be created for mental health care and treatment.
 - Substantial investments will be needed to address the gaps in the mental health infrastructure and human resources.
- Mental health services should be made **affordable for all**.
 - All government health assurance schemes, including Ayushman Bharat, should cover the widest possible range of mental health conditions.

Conclusion

- As rightly said by the first Director General of WHO Brock Chisholm, **“there is no health without mental health”**.
- As we strive to provide universal health coverage to our population, we should ensure that mental health is an integral part of our approach.

7) Diversification of Rare earth minerals sources

(GS1: Distribution of Key Natural Resources across the world)

Context

- Rare earth elements (REEs) are **central to the new post-pandemic economic landscape**: they underpin everything from advanced ballistics systems to industrial machinery and TV screens, contributing a total value of nearly \$200 billion to the Indian economy.
- They are also **crucial to emerging technologies** such as renewable energy and electric vehicles.

What are rare earth elements?

- The rare earth elements are a set of **seventeen metallic elements**. They are called 'rare earth' because **earlier it was difficult to extract them from their oxides forms technologically**.
- They are an **essential part of many high-tech devices**. The 17 Rare Earths are cerium (Ce), dysprosium (Dy), erbium (Er), europium (Eu), gadolinium (Gd), holmium (Ho), lanthanum (La), lutetium (Lu), neodymium (Nd), praseodymium (Pr), promethium (Pm), samarium (Sm), scandium (Sc), terbium (Tb), thulium (Tm), ytterbium (Yb), and yttrium (Y).

Why are they important?

- Rare earths are a **class of metals**. Their oxides need to be used in small but significant quantities to make **electric vehicles, mobile phones and sundry other consumer electronics, besides wind turbines and solar energy units**.
- **Renewable energy**, therefore, **depends on these metals**.
- Their demand is expected to soar, as the global energy mix shifts away from fossil fuels.

Who are the top producers?

- **China** has over time acquired global domination of rare earths.
- It has 44 million tonnes of proven reserves (2021), estimated at **one-third of known global reserves**.
- China annually produces 168,000 tonnes of rare earth oxides, which is **60 percent of the world's market share**.
- **The US** has a **15-16 per cent market share** and **Myanmar** (with the help of China) holds around 9.5 per cent.

Need for diversification

- **India** has the **world's fifth-largest reserves** of rare earth elements,

but it imports most of its rare earth needs in finished form from China.

- **Rare earths have a single-supplier**, and **China** will remain the go-to supplier for the foreseeable future.
 - **China along with Myanmar** controls nearly **70 percent** of the market.
- If China is hit by another pandemic, or there's a civil war, or a tsunami affecting Chinese coasts, or it has a toxic relationship with some nation, **rare earth supplies could be cut off.**

Existing Bottlenecks

- Merely having deposits of rare earths is no guarantee of being able to exploit them. Processed minerals usually take the form of a **rare earth oxide (REO)**, which then needs to be converted into a pure metal before it can be used to manufacture anything.
- India has granted **government corporations** such as **Indian Rare Earths Limited (IREL)** a **monopoly over the primary mineral that contains REEs: monazite beach sand**, found in many coastal states.
- IREL produces **rare earth oxides (low-cost, low-reward “upstream processes”)**, selling these to foreign firms that extract the **metals and manufacture end products (high-cost, high-reward “downstream processes”)** elsewhere.
- With little incentive to provide to global markets, **IREL accounts for only a minuscule fraction of the world's production: only 2265 tonnes of REOs in 2016-17**, providing almost no value to domestic manufacturers and consumers, who continued to

import finished REE derivatives from China.

Reforms and Solutions

- The key challenge for India today is to **scale up upstream and downstream processes in the rare earths value chain**. India **must open its rare earth sector up to competition and innovation**, and attract the large amounts of capital needed to set up facilities to compete with, and supply to, the world.
- The best move forward might be to create a **new Department for Rare Earths (DRE)** under the Ministry of Petroleum & Natural Gas. This DRE should oversee policy formulation and focus on attracting investment and promoting R&D.
- It should also create an **autonomous regulator**, the **Rare Earths Regulatory Authority of India (RRAI)**, to resolve disputes between companies in this space and check compliance.
- There are **three possible approaches** to maximising India's rare earth potential. First, the DRE could secure access to REEs of strategic importance by **offering viability gap funding** to companies to **set up facilities in the upstream sector**.
- Alternatively, it could **focus on downstream processes and applications**, such as manufacturing magnets and batteries; this would require a **focus on port infrastructure and ease of doing business measures** to allow Indian manufacturers to import REOs from whitelisted producers cheaply.
- Finally, it could **coordinate with other agencies to partner directly with groupings** such as the **Quad**, building up a **strategic**

reserve as a buffer against global supply crises.

Way Forward

- According to a 2016 estimate, the **Indian REE industry** could potentially **net a capital employment of about Rs 121,000 crore, including Rs 50,000 crore worth of foreign exchange.**
- India has already missed one global wave of industrial manufacturing. Its rare earth reserves and the post-pandemic economic situation offer it an opportunity to ride the next wave towards high-tech manufacturing. It must be sure not to miss this chance.

8) India's groundwater governance is in better shape

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

Background

- India, with nearly **18% of the world's population**, occupies about **2.4%** of the total **geographical area** and **consumes 4%** of total water resources.
- A **World Bank report** says that India is the **largest groundwater user**. A rapidly growing economy and population are straining the country's groundwater resources.
- Groundwater is the backbone of India's agriculture and drinking water security in rural and urban areas, meeting nearly **80%** of the country's drinking water and two-thirds of its irrigation needs.
- The theme of **UN World Water Day 2022** was '**Groundwater, Making the Invisible Visible**' which is a reflection of the importance given to the resource across the globe.

Role of Central Government

- The Government of India is working to achieve the goal of **sustainable groundwater management** in

collaboration with States and Union Territories.

- In 2019, the **Jal Shakti Ministry** was created to give impetus to the management of water resources with special focus on demand and supply management.
- Realising the importance of community participation, the **Jal Shakti Abhiyan** was launched subsequently which provides for asset creation, rainwater harvesting ('**Catch the Rain**' campaign) and extensive awareness campaign.

A Scientific Approach

- Initiatives have also been taken for the effective management and regulation of groundwater, examples being the **Atal Bhujal Yojana (ABY)** and the **National Project on Aquifer Management (NAQUIM)**.
- With the goal of "**participatory groundwater management**", ABY focuses on **demand side interventions** for sustainable groundwater management in **identified water stressed areas of seven States** in the country viz. Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh.
- NAQUIM, which is nearing completion, envisages the **mapping of sub-surface water bearing geological formations (aquifers)** to help gather authentic data and enable informed decision-making.
- A **heli-borne** based survey (state-of-the-art technology), has been used along with traditional exploratory methods for rapid and accurate aquifer mapping.
- Around **24 lakh square kilometres** of the country has been mapped from the available mappable area of nearly **25 lakh sq. km**. The remaining area is likely to be mapped by March 2023.

- **Region-wise aquifer management plans** are being prepared and shared with States.
- A software, '**India-Groundwater Resource Estimation System (IN-GRES)**', has also been developed. Developed by the **Central Ground Water Board**. The platform helps in assessment of ground water resources.

Successful Implementation

- The groundwater assessment in 2022 indicates a **positive inclination in the management of groundwater**. There has been a **3% reduction** in the number of '**overexploited**' groundwater units and a **4% increase** in the number of '**safe**' category units as compared to 2017.
- The assessment also showed a **reduction in annual extraction**. Overall extraction saw a **declining trend**, of about **3.25%** since **2017**.

Need for Source Sustainability

- As one of the fastest growing economies, India will need adequate groundwater resources to manage anthropogenic pressures.
- It is important to **ensure source sustainability** to provide **safe drinking water to all rural households by 2024**, under the **Jal Jeevan Mission**.
- Communities will have to manage their groundwater resources better with the help of various government agencies and non-governmental organisations.
- In the context of **climate change**, as uncertainties will increase with connection with groundwater resources, efforts must be made to find solutions that are essential for sustainable development.

Conclusion

- The groundwater resource assessment report 2022 shows a brighter future for groundwater

situations in the country as the initiatives taken by various governments have begun yielding results.

- This is a new beginning and steps must be taken to **make India a water surplus nation**, thus fulfilling the objective of a key **United Nations Sustainable Development Goal ("SDG 6: Ensure access to water and sanitation for all")**.

9) There is hardly any autonomy at the panchayat level

(GS2: Functions and Responsibilities of the Union and the States, Issues and Challenges Pertaining to the Federal Structure, Devolution of Powers and Finances up to Local Levels and Challenges Therein)

Context

- More than three decades after the 73rd and 74th Amendment Acts, which gave constitutional status to local governments, State governments, through the **local bureaucracy**, continue to exercise considerable discretionary authority and influence over panchayats.
- In India, the **powers of local elected officials remain seriously circumscribed** by State governments and local bureaucrats in multiple ways, thereby **diluting the spirit of the constitutional amendments** seeking to empower locally elected officials.

Issues in Funding and Spending

- **Gram panchayats remain fiscally dependent on grants** (both discretionary and non-discretionary grants) from the State and the Centre for everyday activities.
- Broadly, panchayats have **three main sources of funds** — their **own sources of revenue** (local

taxes, revenue from common property resources, etc.), **grants in aid** from the Centre and State governments, and **discretionary or scheme-based funds**.

- Their **own sources** of revenue (both tax and non-tax) constitute a **tiny proportion** of overall panchayat funds. For instance, in Telangana, less than a quarter of a panchayat's revenue comes from its own sources of revenue.
- Further, **access to discretionary grants for panchayats remains contingent on political and bureaucratic connections**.
- An **inordinate delay** in transferring approved funds to panchayat accounts **stalls local development**.
- Moreover, in almost all States, there is a system of **double authorisation** for spending panchayat funds. Apart from sarpanchs, disbursement of payments requires **bureaucratic concurrence**.

Taxing Process of Seeking Approvals

- State governments also **bind local governments** through the **local bureaucracy**. Approval for **public works** projects often requires **technical approval** (from the engineering department) and **administrative approval** from local officials of the rural development department, such as the block development officer, a tedious process for sarpanchs that requires paying multiple visits to government offices.
- It is also not unusual to find higher-level politicians and bureaucrats **intervening in selecting beneficiaries** for government programmes and limiting the power of sarpanchs further.
- The ability of sarpanchs to exercise **administrative control over local**

employees is also **limited**. In many states, the recruitment of local functionaries reporting to the panchayat, such as village watchmen or sweepers, is conducted at the district or block level.

Shadow of Bureaucrats

- Unlike elected officials at other levels, **sarpanchs can be dismissed** while in office.
- **Gram Panchayat Acts** in many States have empowered district-level bureaucrats, mostly **district Collectors**, to act against sarpanchs for **official misconduct**.
- On what grounds can Collectors act against sarpanchs? Apart from abuse of power, embezzlement, or misconduct, the conditions include mere **refusal to "carry out the orders** of the District Collector or Commissioner or Government for the proper working of the concerned Gram Panchayat".
- Across the country, there are regular instances of bureaucrats deciding to dismiss sarpanchs from office.

Way Forward

- India has **limited decentralisation** because if local governments get genuine autonomy to allocate the monies, power will shift from the MLAs and State government-controlled bureaucracy to the sarpanch.
- The present situation is a reminder for State governments to re-examine the provisions of their respective Gram Panchayat laws and consider greater devolution of funds, functions, and functionaries to local governments.

10) Take a step to regulate deepfakes

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

Background

- The **lack of proper regulations** creates avenues for individuals, firms and even non-state actors to **misuse AI**.
- The **legal ambiguity**, coupled with a **lack of accountability and oversight**, is a potent mix for a disaster.
- **Policy vacuums** on deepfakes are a perfect archetype of this situation.

Deep Fakes

- Deepfakes leverage powerful techniques from **machine learning (ML)** and **artificial intelligence (AI)** to manipulate or **generate visual and audio** content with a high potential to **deceive**.

Issues with Deepfakes

- Since they are **compelling**, deepfake videos can be used to **spread misinformation and propaganda**. They seriously compromise the public's ability to distinguish between fact and fiction.
- There has been a history of using deepfakes to **depict someone in a compromising and embarrassing situation**.
- For instance, there is no dearth of **deepfake pornographic material** of celebrities. Such photos and videos do not only amount to an **invasion of privacy** of the people reportedly in those videos, but also to **harassment**. As technology advances, making such videos will become much easier.
- Deepfakes have also been used for **financial frauds**.

Creating Tensions

- There are three areas where deepfakes end up being a lethal tool

in the hands of India's **non-friendly neighbours** and **non-state actors** to create tensions in the country.

- Deepfakes can be used to **influence elections** and **manipulate election outcomes**.
- Deepfakes can also be used to **carry out espionage activities**. Doctored videos can be used to blackmail government and defence officials into divulging state secrets.
- In India, deepfakes could be used to **produce inflammatory material**, such as videos purporting to show the armed forces or the police committing 'crimes' in areas with conflict. These deepfakes could be used to **radicalise populations, recruit terrorists, or incite violence**.
- As the technology matures further, deepfakes could **enable individuals to deny the authenticity of genuine content**, particularly if it shows them engaging in inappropriate or criminal behaviour, by claiming that it is a deepfake.

Need for Legislation

- Currently, very few provisions under the **Indian Penal Code (IPC)** and the **Information Technology Act, 2000** can be potentially invoked to deal with the malicious use of deepfakes.
- **Section 500 of the IPC** provides punishment for **defamation**. **Sections 67 and 67A** of the **Information Technology Act** punish **sexually explicit material** in explicit form.
- The **Representation of the People Act, 1951**, includes provisions prohibiting the creation or distribution of false or misleading information about candidates or political parties during an election period. However, these rules **do not**

address the potential dangers posed by deepfake content.

Way Forward

- In India, the legal framework related to AI is insufficient to adequately address the various issues that have arisen due to AI algorithms.
- The Union government should introduce **separate legislation** regulating the nefarious use of deepfakes and the broader subject of AI.
- **Legislation should not hamper innovation in AI**, but it should recognise that deepfake technology may be used in the commission of criminal acts and should provide provisions to address the use of deepfakes in these cases.

11) The delay in the decennial Census

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

Context

- The decennial Census of 2021 has been pushed forward yet again and is unlikely to start till September 2023, at least.

How is the Census conducted?

- **India's first proper or synchronous Census**, one which begins on the same day or year across regions of the country, was carried out in **1881** by the colonial administration and has since **happened every 10 years**, except the one that was supposed to be carried out in 2021.
- The decennial census is carried out by lakhs of enumerators empanelled and trained by the government in **two phases**.
- The **first phase** is the **housing Census**, where data on housing conditions, household amenities

and assets possessed by households are collected and the **second phase** is where data on population, education, religion, economic activity, Scheduled Castes and Tribes, language, literacy, migration, and fertility are collected.

- The Census is still conducted under the **Census Act of 1948**, which predates the Constitution.
- Notably, the Act **does not bind the government** to conduct the Census on a particular date or to release its data in a notified period.

2021 Census

- The Centre's intent to conduct the 2021 Census was notified in the Gazette of India on March 28, 2019. In 2020, the census was **postponed indefinitely** due to the COVID-19 pandemic.
- According to UN statistics, multiple countries had delayed their census exercises due to the pandemic, but many of them, like the U.S., U.K., China, and Bangladesh, have completed the count by now.

Implications of the Delay

- The Census data is **crucial for various administrative functions, welfare schemes, and other surveys**.
- The **Finance Commission** allocates funds to States on the **basis of Census figures** and any delay could put them at a **disadvantage**.
- Besides, **outdated Census information** (available from the last Census in 2011) often becomes **unreliable** and affects those who do and do not receive the **benefits of welfare schemes**.
- For instance, as per the **National Food Security Act, 2013**, 75% of the rural population and 50% of the urban population — totalling 67% of the country's population — are entitled to receive subsidised food

grains from the government under the targeted public distribution system (PDS).

- According to the **2011 Census**, India's **population** was about **121 crore**, and PDS beneficiaries were approximately **80 crore**. However, economists have pointed out that population growth over the last decade means that if the **67%** ratio is applied to **2020's projected population of 137 crore**, **PDS coverage** should have increased to around **92 crore people**.
- The Constitution talks about the use of Census data for **delimitation of constituencies** and for **determining the quantum of reservation for Scheduled Castes and Scheduled Tribes**.
- Besides, the Census is crucial to determine the **population of migrants and migration patterns**.

Proposed Digital Census

- The upcoming Census will also be the **first Census both in digital mode** and through **paper schedules** (questionnaires/forms).
- In 2022, the Union government amended the Census Rules framed in the year 1990 to allow the details to be captured and stored in an electronic form and also make a provision **enabling self-enumeration by respondents**.

Conclusion

- The government should take a quick call on conducting the census as the delay is not good and has serious ramifications.

12) Superbugs and antimicrobial resistance

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

Context

- Antimicrobial resistance (AMR), often also called antibiotic resistance, is a global health challenge and a looming public health crisis.
- The **WHO** has declared it as **one of the top 10 health threats facing humanity**.

What is AMR?

- Antimicrobial Resistance occurs when **bacteria, viruses, fungi and parasites** change over time and **no longer respond to medicines** making infections harder to treat and increasing the risk of disease spread, severe illness and death.
- As a result of drug resistance, antibiotics and other antimicrobial medicines become **ineffective** and **infections become increasingly difficult or impossible to treat**.
- Microorganisms that have antimicrobial resistance are sometimes called "**superbugs**".

What accelerates the emergence and spread of antimicrobial resistance?

- AMR occurs **naturally** over time, usually through genetic changes.
- Antimicrobial resistant organisms are found in people, animals, food, plants and the environment (in water, soil and air). They can **spread from person to person or between people and animals**, including from food of animal origin.

Other causes

- The main drivers of antimicrobial resistance include:
 - the misuse and overuse of antimicrobials;
 - overuse of antibiotics in livestock and fish farming;
 - lack of access to clean water, sanitation and hygiene (WASH) for both humans and animals;

- poor infection and disease prevention and control in health-care facilities and farms;
- poor access to quality, affordable medicines, vaccines and diagnostics;
- lack of awareness and knowledge; and
- lack of enforcement of legislation.

Issues in Tackling AMR

- **AMR national action plans (NAPs)** have been implemented in several economies including India for human health. However, the **development and implementation of antimicrobial plans for animals and the environment** that equally impact AMR hasn't been adequate.
- Though vaccines are a powerful tool to prevent infections and curb the spread of AMR infections, **immunization programmes are not comprehensive and exhaustive yet** for many infectious diseases.

How can we effectively fight against AMR?

- **Disease prevention and wellness:**
 - **Spearheading sanitation drives, ensuring a clean water supply and supporting hospital-driven infection-control programmes** can help prevent infections which are equivalent to averting resistance.
- **Appropriate use of antimicrobials:**
 - Reducing AMR also requires **prescribing antimicrobials judiciously and only when they are absolutely needed.**

- **Coordination across the animal industry and environmental sectors** to prevent the unnecessary use of antibiotics in farms is necessary.
- **Robust surveillance systems:**
 - Development of robust surveillance systems will allow us to detect resistant pathogens of all kinds in the environment and hospitals that would eventually allow containment.
- **Research and Development:**
 - It is crucial to **invest heavily in research and development** through both government and private funding.

Conclusion

- The cost of AMR to the economy is significant and it is critical to develop policies and implement them through a holistic **"One Health"** approach.

13) Need a balanced approach

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

Context

- Converting surplus sugarcane and its products, including sugar and cane juice, into biofuel has unwarranted ecological ramifications, which are cause for concern.

Status of Sugar Industry

- From being a constant seeker of government assistance, the Indian sugar industry has transformed into a **vibrant, self-sustaining sector, achieving performance records** on all fronts.
- The **output of sugarcane touched a new peak** of 500 million tonnes in 2021-22 and that of **sugar** swelled to a new high of 39.4

million tonnes, of which **3.6 million tonnes was diverted to ethanol production. Sugar exports** also surged to a record 11 million tonnes.

- The **outstanding cane price arrears** payable to farmers have **shrunk to the lowest ever level** of less than 2 per cent.

Reasons for Flourishing Sugar Industry

- Converting surplus sugarcane and its products, including sugar and cane juice, into **biofuel** has favored both the sugar industry and cane growers.
- Rise in sugar exports was aided partly by
 - **favorable international prices** in the aftermath of the Russia-Ukraine conflict
 - **lower supplies from Brazil, the world's largest sugar exporter.**
- The additional revenue generated from exports and sugarcane-based biofuel has helped **improve the industry's financial health**, enabling it to **make timely payments** to cane growers and **invest in expanding ethanol-manufacturing capacity.**

Significance of Ethanol Production from Sugarcane Surplus

- The permission granted to sugar mills to make ethanol from their surplus produce is highly significant which would otherwise have resulted in depressed domestic prices.
- The resultant **increase in the availability of biofuel** has enabled oil-marketing companies to **raise the level of ethanol-blending of petrol to 10 per cent** and look forward to increasing it further to **20 per cent by 2025.**
- **Note:** Last year, the Union Cabinet approved amendments to the **National Policy on Biofuels,**

2018, to advance the ethanol blending target of 20% blending of ethanol in petrol to 2025-26 from 2030.

Adverse effects of sugarcane cultivation on groundwater resources

- Much of the expansion in cane acreage has occurred in states like **Uttar Pradesh, Maharashtra, and Karnataka, where subsurface water is already being depleted at an alarming pace.**
- In any case, a **land- and water-stressed country like India can ill-afford the luxury of producing first-generation (1G) ethanol from feedstock** like sugarcane, including sugar, sugar syrup, cane juice, B-heavy molasses and C-heavy molasses, or cereals like rice, wheat, barley and corn, which are also now being used for biofuel production. Hence this policy would need to be revisited.

Way Forward

- A fine **balance would need to be maintained between food and water security and fuel and energy security.**
- The best option for India would be to utilize the huge amount of residual biomass that its farm sector generates to **produce biofuel through second-generation (2G) ethanol-production technology,** rather than using water-guzzlers like sugarcane or cereals.

Related Information Biofuels

- Biofuels are **liquid or gaseous fuels produced from biomass** that are generally **high in sugar** (such as sugarcane, sugarbeet, sweet sorghum), **starch** (such as corn and cassava) or **oils** (such as soybeans, rapeseed, coconut, sunflowers, and palms). The two most commonly

used biofuels are **ethanol and biodiesel**.

Categories of Biofuels

- **First generation Biofuels** are mainly produced from **food crop feedstock**, such as oil, sugar and starch crops, thus **competing for agricultural areas** used for food production.
- **Second generation Biofuels** differ in feedstock which, in this case, comes from **non-food plants** such as agricultural crops, residues and wood (so-called **lignocellulosic biomass**).
- **Third generation Biofuels** are produced from **micro-organisms** like algae. Its production is supposed to be **low cost and high-yielding** – giving up to nearly 30 times the energy per unit area as can be realized from current, conventional ‘first-generation’ biofuel feedstocks.
- **Fourth generation Biofuels** use **genetically modified (GM) algae** to enhance biofuel production. Key to the process is the **capture and sequestration of CO₂**, a process that renders fourth-generation biofuels a **carbon negative source of fuel**.

14) Deep Invasion

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

Context

- Invasive ornamental shrub, **Lantana Camara** is altering traits to spread across Indian forests.

Lantana Camara

- *Lantana camara* is a species of **flowering plant native to the American tropics**.
- It was introduced in **India** as a **decorative shrub** during the **British colonial period** but turned out to be an **invasive plant**.

- It is a very **adaptable species**, and can inhabit a wide variety of ecosystems.

Invasive Alien species

- Any **non-native species** that significantly **modifies** or **disrupts** the ecosystems it colonizes is referred to as **invasive** in nature.
- Common characteristics include
 - **Rapid reproduction and growth;**
 - **High dispersal ability;**
 - **Phenotypic plasticity** (ability to adapt physiologically to new conditions), and
 - **Ability to survive** in a wide range of environmental conditions.

Recent Findings

- The "**India State of Forest Report 2021**", states that more than 9,793 sq km—an area larger than **Sikkim**—is under **lantana**. The spread of lantana is **only marginally less than the combined spread of 28 other invasive species**.
- At places, it has also **taken over the biodiversity, choking out the native flora**. For instance, in 1997, some 96 per cent of the Western Ghat reserve was under native flora, while 4 per cent was under lantana. By 2018, the area under native flora had shrunk to 53 per cent, while lantana occupied 47 per cent of the reserve.
- The invasive weed has started to **infiltrate the dense forests** in the country. Almost **44 per cent of India's forests** might have already been invaded by lantana.

Changing Character of Lantana

- Lantana **primarily invades open, well-lit environments** and **avoids less sunlit areas**.
- It is also known to **exhibit adaptive modulations** for

proliferating heterogeneous environments like grasslands, farms and rural and urban settings.

- Lantana has **high phenotypic plasticity**, which is the ability to alter physical traits when exposed to different environmental conditions.
- Lantana species that **grow** in the **shade**, for instance, **reproduce through vegetative propagation** (*a process in which plants reproduce from stems, roots, leaves and other parts*). This allows them to spread across the **forest floor** or climb closer to the **crown** of the trees. In **well-lit areas**, the same plant uses **seeds** to **propagate**.

Major Threats

- Lantana **restricts the diversity of native species** and poses a **threat to the forest ecosystem**.
- The plant also **reduces soil fertility** by uptaking water and nutrients faster than the native species.
- It **transforms the soil structure and micro environment** to their advantage by producing chemicals which cause threats to biodiversity.
- The dense invasion of lantana in the **understory** (*a layer of vegetation beneath the main canopy of a forest*) of seasonally dry forests is **escalating extreme fire events**.

Cut Root-stalk Method

- Currently, the country uses the "cut root-stalk" method to **get rid of lantana bushes**. In this method, the aim is to **chop down the main stem 2-3 cm below the ground**. The plant is placed **upside down** and this creates a hormonal imbalance, so no new roots are produced and the lantana dries up.
- However, this method has **not been very successful** as the **remains of the root system of the**

plant persist in the soil, and as soon as the plant gets **favorable conditions**, it **regenerates**.

- Further, it is an **expensive, labour-intensive** and **time-consuming** method.

Biological-control of *Lantana camara*

- Researchers are experimenting **biological-control of *Lantana camara* through crop competition using native species**. This method has identified several native species that have the potential for restoration of lantana-invaded forests as they grow as associates, and restrict the growth of lantana.
- These includes *Combretum decandrum*, *Olex scandens*, *Cryptolepis buchananii*, *Petalidium barlerioides*, *Helicteres isora* and *Capparis zeylanica*, etc.
- These native plants outcompete lantana, and they **create the environment for other native species to thrive**, something that lantana does not allow.
- This helps recover the native plant and gradually animal biodiversity of the area and restores the whole ecosystem.

Way Forward

- A **comprehensive survey** should be conducted by the Forest Department to identify the area and density of the spread of invasive species in wildlife sanctuaries, National Parks and Protected Areas. **Adequate time and budget** should be allocated to handle this herculean task.
- Further, biological-control of *Lantana* using native species can be promoted across the country.

15) Lead Toxicity

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

Context

- **Lead toxicity** in India continues to remain a public health concern.

Lead Toxicity

- Lead is a **highly toxic metal** and a **very strong poison**.
- **Lead poisoning** is a serious and sometimes fatal condition which occurs when lead builds up in the body.
- It is **characterized especially by** fatigue, abdominal pain, nausea, loss of appetite, anemia, a dark line along the gums, and muscle paralysis.

Indian Context

- **Half the children in India report high blood lead levels**, reveals a 2020 report by UNICEF. The report says 275 million children in India record blood lead levels **beyond the tolerable limit of 5 micrograms per decilitre ($\mu\text{g}/\text{dL}$)**.
- **Adults** are also affected by lead toxicity. In 2022, according to an analysis by Niti Aayog and the Council of Scientific & Industrial Research (CSIR) the **average blood lead levels among the population exceeded the 5 $\mu\text{g}/\text{dL}$ margin in more than 20 states**.
- Lead toxicity in India contributes to **4.6 million Disability-Adjusted Life Years** (number of years lost due to disease burden) and **165,000 deaths annually**.

Global Scenario

- Lead toxicity is not just a concern in India. UNICEF report notes **around one in three children worldwide record blood lead levels of over 5 $\mu\text{g}/\text{dL}$** .
- Countries with this burden include Iran, Afghanistan, Yemen, Peru,

Vietnam, the Philippines and parts of Central Africa.

Sources of Lead Exposure

Occupational Sources:

- Battery work
- Mining
- Glass manufacturing
- Automobile repair
- Ceramic work
- Painting
- Smelting
- Soldering

Non-Occupational Sources:

- Traditional medicine
- Vehicular exhaust
- Contaminated cosmetics and sindoor
- Household storage batteries
- Household paints
- Contaminated spices
- Food grown in lead contaminated areas
- Plumbing
- Retained bullets
- Food stored or cooked in lead-coated vessels
- Painted toys.

Impact of Lead Toxicity

- Lead exposure can have **serious consequences** for the health of children. At high levels of exposure lead **attacks the brain and central nervous system, causing coma, convulsions and even death**.
- Lead can **affect children's brain development**, resulting in **reduced intelligence quotient (IQ), behavioral changes, reduced attention span, etc.**
- Lead exposure also causes **anemia, hypertension, renal impairment, and toxicity to the reproductive organs**.

Prevailing Challenges

- **India lacks systems to screen populations** for possible lead exposure. Screening is usually

- done on a voluntary basis or at health camps by non-profits.
- In several circumstances, **determining the source of lead poisoning is challenging** since patients may not disclose their history of lead exposure, resulting in a **late diagnosis**.
- Due to lack of stringent laws and poor policy implementation, **almost half of the used lead-acid batteries in India are recovered without using scientific techniques** in an unregulated and uncontrolled way.
- To address this issue, in 2022, the Union Ministry of Environment, Forest and Climate Change notified the **Battery Waste Management Rules, 2022**. The new rules aim at **reducing the share of battery recycling in the informal sector** and stress on **Extended Producer Responsibility**.
 - Extended producer responsibility is a practice and a policy approach in which producers take responsibility for management of the disposal of products they produce once those products are designated as no longer useful by consumers.*
- One source that can be seen as both occupational as well as a common hazard is **lead-based household paint**.
- Another common source is **food**. As of now, **spices** are the only identified sources of lead poisoning. There is a need to study the potential presence of lead in other foods.

Way Forward

- The country must **enhance capacity for testing**, currently done for blood lead levels.

- Next, there are **gaps in treatment protocols**. CSIR underlines the **need to train healthcare workers to monitor, detect and treat this condition**.
- The final tool is **public awareness**. Lead poisoning needs to be a part of the narrative of India's health status. We need to devise strategies on a state level, through regional bureaucracy, local press and vernacular language to have tangible impact.

16) India in the GVC diversification strategy

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

Context

- The restructuring of global value chains (GVCs) and their resilience remained the dominant global concerns of 2022 apart from war and pandemic. This article compares Vietnam and India who strive to be an attractive destination for relocating MNCs from China.

Restructuring Strategy

- "**China Plus n strategy**" is now the predominant strategy of large multinational corporations (MNCs) for GVC diversification. It is a global business strategy in which companies **avoid investing only in China and diversify their businesses** to alternative destinations.
- Large MNCs are relocating their supply chains to countries where the **risk of disruption from political chaos is low**.

Vietnam - a lead beneficiary of relocating MNCs

- Among South and Southeast Asian economies, Vietnam has been in the **lead in taking advantage of the**

opportunities arising from the regional shift in GVCs.

- Between 2010 and 2018, Vietnam registered **significant gains in its share of global merchandise exports**.
- From a low of 0.5 per cent in 2010, Vietnam's share increased more than threefold to 1.6 per cent in 2020, making it the **20th largest goods exporter in the world**.

India-Vietnam: Comparison

- As India strives to be an attractive destination for relocating MNCs, a comparison with Vietnam may be useful.

1. Open Trade Regime:

- Foremost among the factors that facilitate MNC relocation is an **open trade regime**. In the case of Vietnam, the **number of free trade agreements (FTAs)** that it has signed in the last decade, as well as the **nature of partner economies and the depth and coverage of its FTAs**, have been major contributory elements towards a conducive and liberal trade environment.
- Notably, Vietnam's FTAs include mega regionals like the **Regional Comprehensive Economic Partnership**, the **Comprehensive and Progressive Trans-Pacific Partnership** and the **Indo-Pacific Economic Framework trade pillar** as well as **bi-laterals with advanced economies** like the UK and EU and, as a **member economy of the ASEAN**, it is **party to the regional bloc's FTAs**.
- Interestingly, while India has an almost equal number of FTAs, these are **not deep trade agreements** and, **other than Japan and Korea**, India has **not been party to any FTA with developed economies**. India also is **not a member of any mega-regional trade agreement**.

- Significantly, India continues to be **reluctant to include labour and environment-related issues in FTAs**, both aspects, among others, are the reasons for the prolonged negotiations, most recently with the EU and UK.

2. Tariff Structure:

- Vietnam's tariff structure is another indicator of its relatively more open trade regime. Its **tariff for non-agricultural goods is much lower than that imposed by India**.
- In addition to this, a **significantly higher number of tariff lines are included in the duty-free category**.

3. Good Logistics:

- Finally, good logistics help **efficient movement of goods within and across borders, reduce trade costs and facilitate GVC operations**.
- In the **World Bank's Logistics Performance Index (LPI)** over the last decade, Vietnam has registered a significant increase in its score and rank. In 2018, it **ranked at 39** among 160 countries, a major improvement relative to its consistent ranking at 53 during 2007 to 2012.
- In contrast, **India was ranked at 44** in 2018, which was an improvement over its 2010 rank and score but of a **much smaller magnitude**.
- Additionally, Vietnam shows an **increase in the score for all components of LPI** from 2010 to 2018, while **India shows an increase in only two sub-components: Customs clearance and arranging competitively priced shipments**.

Way Forward

- While Vietnam seems poised to consolidate its position as the most attractive destination for MNCs

diversifying away from China, India needs to undertake substantial catch-up reforms in all areas to be considered a significant contender in this process.

17) A case for reassigning GST to States

(GS2: Functions and Responsibilities of the Union and the States, Issues and Challenges Pertaining to the Federal Structure, Devolution of Powers and Finances up to Local Levels and Challenges Therein)

Context

- The **Union government** is endowed with **more tax powers than the States**, while the **States** are assigned **more expenditure responsibilities** than the Union government.
- This gives rise to a **vertical fiscal imbalance (VFI)** between the Union and State governments.
- The main responsibility of the **Finance Commission** is to correct this, but this task remains unaccomplished.

Measuring Imbalances

- The simplest of the many empirical measures of VFI is '**VFI equals one minus the ratio of the State's own revenue to own expenditure**' (VFI= 1- Own revenue/Own Expenditure).
- If this VFI ratio is **zero**, the States have **enough own revenue to meet their own expenditure** and there is **no need for financial transfers**.
- Looking at the data for all the States over the periods of the last three Finance Commissions (2005-06 to 2020-21), the **VFI ratio shows an increasing trend**.
- For the latest period of 2015-16 to 2020-21, the **ratio was 0.530**, which means that **only 47% of the**

State's own expenditure was **financed by their own revenue** in that period.

Reasons for Vertical Fiscal Imbalance

- The following changes have considerably altered the States' revenue structure.
- The **Fiscal Responsibility and Budget Management Act** was implemented in 2003 to **constrain the fiscal deficits** of the States. States directly borrow from the market subject to **limits imposed by the Union government**.
- The Union Planning Commission was dissolved in 2014, leading to the **withdrawal of Plan grants**.
- The **Goods and Services Tax (GST)** was introduced in 2017.
- Currently, states have **little revenue autonomy** and are **more dependent** on the **Union government**.

Reassigning of Tax Powers

- A solution can be proposed to correct the VFI by **reassigning the tax powers** between the Union and the States.
- The **Union government** has exclusive power to **levy excise duty on petroleum products**, and the **States** have exclusive power to **levy excise duty and sales tax on liquor**. All other commodities fall under the GST.
- The **CGST and the excise duty on petroleum products** can be **assigned to the States** so that the entire GST is assigned to the States.
- The assignment of excise duty on petroleum products to the States will **hasten the process of integrating taxes on petroleum products into GST** and **remove the cascading effects** of the current excise duty on petroleum products.
- The positive aspect of this reassignment of tax will be the

increase in own tax revenue of the States. This will also **improve accountability of the States** to their people on fiscal matters.

Removing Veto

- Under the current GST system, individual states have **little power to unilaterally change this tax**. Though conceptually, the Union government could not do so either, the **GST Council** gives the **Union government a veto** to thrust its preferences on the States.
 - The Union government has a **one-third vote share** while **all other states have the remaining two-thirds share combined**. Since decisions taken by the Council have to be passed by a **three-fourths majority**, no recommendation can be passed without the Centre's consent.
- The **veto power** of the Union government **should be removed**. Then, the GST Council will truly become a body by the States to settle tax issues among themselves,

with the Union government facilitating the arrival of consensus among the States on tax issues. This may once again require some **constitutional amendments**.

Way Forward

- In addition to VFI, the **unequal tax base** with **unequal expenditure requirements** between the States creates **horizontal fiscal imbalance** among the States.
- Therefore, the Union government should **effect equalisation transfers** to address this issue of horizontal fiscal inequality.
 - *Equalization payments are transfer payments made by a government to offset financial differences between different parts of the country.*

Model Questions

- 1) Discuss how promotion of millets is crucial to attain Sustainable Development Goals (SDGs).
- 2) Examine the role of co-operatives in ensuring inclusive rural development.
- 3) Discuss the reasons for poor participation of women in STEMM (science, technology, engineering, mathematics, and medicine). Suggest measures to address the issue.
- 4) "Are genetically engineered trees - a boon or bane?" Discuss.
- 5) Income inequalities in India had increased even during pandemic. Suggest some income redistribution measures to reduce it effectively.
- 6) Do you think that mental health should be made an integral part of Universal health coverage? Give reasons.
- 7) What are rare earth elements? It is high time to diversify the sources of rare earth elements. Comment.
- 8) Groundwater extraction needs to be regulated for the sustainability of the source for future generations. Critically analyse.
- 9) Democratic decentralisation is hindered by bureaucratic centralisation. Comment.
- 10) Artificial intelligence poses a great threat to Indian security. Comment
- 11) Postponement of Census is affecting the administrative functions and the lives of marginal people. Substantiate the above statement.
- 12) Highlighting the causes for Antimicrobial Resistance (AMR), enumerate the measures to be taken to effectively fight against AMR.
- 13) A fine balance between food and water security and fuel and energy security is essential. Discuss in the context of ecological ramifications while converting sugarcane surplus into biofuel.
- 14) What are invasive species? List characteristic features that help them in colonizing new habitats.
- 15) Why is Lead toxicity a source of public health concern in India? Discuss.
- 16) What lessons can India learn from Vietnam in order to become an attractive destination in the Global Value Chains?
- 17) What do you understand by the term "Vertical Fiscal Imbalance (VFI)? Suggest measures to address VFI in India.