

SCIENCE AND TECHNOLOGY

Context: Genetically Engineered Insects, Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology.

WHY IN NEWS?

- According to the 'Bio economy Report 2022' released by the Department of Biotechnology (DBT), India hopes to raise the Bio economy's GDP (Gross Domestic Product) contribution from 2.6% to 5% by 2030.
- India's funding for biotechnology is still at 0.0001% of GDP, a stagnant level. Even with a brief boost during COVID-19, funding levels haven't gone back to what they were before the pandemic.
- For individuals who are interested in producing genetically altered insects but are having problems, the DBT's "Guidelines for Genetically Engineered (GE) Insects," published in April 2023, offer procedural road maps.

What is Bio economy?

- The bioeconomy is defined as "the production, use and conservation of biological resources, including related knowledge, science, technology, and innovation to provide information, products, processes, and services to all economic sectors with the aim of moving towards a sustainable economy" by the Food and Agriculture Organization (FAO) of the United Nations.
- Following its adoption by the European Union (EU) and the Organisation for Economic Co-operation and Development (OECD) as a framework for promoting the use of biotechnology to develop new products and markets, the term "bioeconomy" gained popularity in the first decade of the twenty-first century. Since then, specific bioeconomy policies have been implemented by the OECD and the EU.

Which aspects of the Bioeconomy Report 2022 stand out the most?

- The bioeconomy in India is expected to grow rapidly, with projections indicating that it will reach USD 150 billion by 2025 and surpass USD 300 billion by 2030.
- The industry saw a startling 14.1% growth, from USD 70.2 billion in 2020 to USD 80 billion in 2021.
- The bioeconomy has a significant economic impact as evidenced by its daily generation of USD 219 million.
- Three biotech start-ups were founded every day in 2021, for a total of 1,128 in the industry.
- The industry is showcasing its dedication to innovation and progress by investing more than USD 1 billion in research and development.
- India demonstrated its resilience and ability during the global pandemic by administering 4 million doses of the Covid-19 vaccine and performing 3 million tests every day.
- The number of biotech startups has increased from 50 to over 5,300 in the last ten years, and by 2025, it is predicted to have doubled.
- By creating 74 bio-incubation centers spread across 21 states and U.T., the Biotechnology Industry Research Assistance Council (BIRAC) has been instrumental in creating a welcoming atmosphere for bio-entrepreneurs.
- Notably, India has the second-highest number of manufacturing facilities outside of the US that have been approved by the USEFDA (United States Food and Drug Administration), highlighting its prominence in the biotech sector globally.

Genetically Engineered (GE) Insects: What Are They?**About:**

- Genetically engineered (GE) insects are organisms whose genetic makeup has been modified to introduce particular desired traits or characteristics through genetic engineering techniques.
- This entails modifying the insect's DNA in a way that is not found in nature, frequently in an effort to provide particular advantages or solve particular problems.

Application:

- The creation and release of genetically engineered insects has applications in a number of fields, including
- Vector control for the health of people and animals
- Control of common agricultural insect pests
- Preservation and enhancement of environmental quality and human health by cutting back on chemical use
- Protein synthesis for medical applications
- Genetic enhancement of advantageous insects, such as parasitoids, pollinators (like honey bees), predators, or productive insects (like lac insects and silkworms).

Concerns Regarding Genetically Modified Insects (GE) Guidelines:

- The guidelines are vague about the uses of GE insects that India may approve. They stress applications in the fields of health, agriculture, and the environment, but their focus is not in line with the larger goal of advancing the bioeconomy.

- **Uncertainty for Researchers:** The guidelines do not address confined trials or deployment; instead, they are restricted to research. Uncertainty regarding official approval for deployment prompts worries about community exposure without personal preference.
- **Uncertainty of Ambit:** Funders and scientists are discouraged from investing in GE insects due to uncertainty surrounding the definition of "beneficial." Progress is hampered by similar ambiguities in other gene-editing guidelines.

What are the Challenges Related to Genetically Engineered (GE) Insects?

- **Ecological Impact:** The possible ecological effects of releasing genetically modified insects into the environment are a major source of concern. These insects run the risk of upsetting non-target species or tipping the equilibrium of already-existing populations, which would upset ecosystems.
- **Unintended Consequences:** Because genetic engineering is a complicated process, there may be unanticipated outcomes. Modifications to the targeted genes may have unanticipated consequences for the behaviour, longevity, and interactions of the insect with other organisms.
- **Ethical Issues:** The ethics of changing a living organism's genetic makeup raises ethical questions for some, especially when it comes to releasing the altered creature into the wild.
- **Regulatory Obstacles:** It can be difficult to create legal frameworks for genetically modified insects. Assuring safety and efficacy requires figuring out the right amount of testing, supervision, and monitoring.
- **Extended Stability:** It is imperative to guarantee the generational stability of the engineered traits. The intended purpose of genetic modifications must not be compromised by degradation or natural selection pressures; instead, they must continue to be effective.

Way Forward

- The ambitious goals set for the bioeconomy require comprehensive and well-defined policies, and addressing these issues is essential to the sector's growth and contribution to the national economy.
- To address the issues surrounding genetically modified insects and guarantee that the advantages outweigh the risks, a multidisciplinary approach involving scientists, legislators, ethicists, and the general public is necessary.
- To responsibly navigate these complexities, it is imperative to engage in ongoing research and foster open dialogue.

ECONOMY

Context: Concerns Regarding NBFC and Digital Lending Practices Raised by CAFRAL

Why in News?

- The Reserve Bank of India (RBI) established the Centre for Advanced Financial Research and Learning (CAFRAL) as a research organization to examine potential risks in the digital lending space and to draw attention to the increasing risk in bank financing for Non-Banking Finance Companies (NBFCs).
- Additionally, CAFRAL issued a warning regarding fraudulent or illegitimate lending apps that collect personal data and could be misused, putting users' safety at risk.

What Principal Issues Has CAFRAL Raised?

- **Interdependency Risks in the NBFC Sector:** According to CAFRAL, banks tend to lend more to larger NBFCs, which increases cross-lending within the NBFC industry.
- This establishes a web of mutual reliance and propagation pathways that can intensify shock waves and disperse them throughout the system.
- Examples of events that affected the asset quality and profitability of banks that had lent to NBFCs were the default of IL&FS in 2018 and the collapse of DHFL in June 2019. These events also caused a liquidity crisis and a loss of confidence in the NBFC sector.

Contractionary monetary policy's effects on NBFCs:

- Additionally, CAFRAL discovered that NBFC portfolio risk increases as a result of contractionary monetary policy.
- The policy rate tightening by the RBI results in increased borrowing costs and decreased profitability for NBFCs.
- They frequently move their lending to riskier markets, like unsecured loans, subprime borrowers, etc., in order to preserve their margins. Moreover, they expand their exposure to the capital markets by purchasing stocks and mutual funds.
- Their solvency and stability may be impacted by these strategies, which increase their exposure to credit, market, and liquidity risk.

Alerts Regarding Unlawful Lending Apps and Their Effect on Fintech:

- It also issues a warning against fraudulent or unlawful digital lending apps that pose as trustworthy while collecting personal information that might be misused.
- It is difficult for users to confirm whether these apps are legal. If the connections between traditional banking and online lending become stronger, there are worries about possible losses.

- While some of the data may actually be required, these apps frequently ask for a great deal of personal information, which puts the safety and privacy of users at danger.
- With about 1100 lending apps available for Indian Android users across 80 app stores, FinTech has increased product diversity.

NOTE: Digital lending is the practice of extending credit or loans to people or companies via the internet or other digital channels without requiring conventional paper records or face-to-face meetings.

Describe NBFCs.

About:

- Under the Companies Act of 1956, an NBFC is a company that conducts a range of financial operations, including lending, securities investments, leasing, and insurance.
- Institutions engaged primarily in the trading of goods, services, agriculture, industry, or immovable property are not included.

Criteria:

- A company's primary involvement in financial activities is indicated when more than 50% of its assets are financial assets and more than 50% of its income is derived from these financial assets.
- Businesses that satisfy both requirements are listed with the RBI as NBFCs.
- The RBI Act of 1934 grants the Reserve Bank the authority to register, establish guidelines, give orders, inspect, control, oversee, and monitor these NBFCs.

Note:

- Even if they engage in some financial activity, businesses that are primarily involved in industries, real estate, services, trade, agriculture, or other sectors would not be subject to RBI regulation. The '50-50 test' is used to determine this exclusion.

Exclusivity from RBI Registration:

- In order to function as a non-banking financial institution, an NBFC is required by Section 45-IA of the RBI Act, 1934 to obtain a registration certificate from the RBI and maintain Net Owned Funds of ₹25 lakhs (₹Two crore since April 1999).
- Nonetheless, some NBFC categories that are subject to regulation by other bodies, like stock broking firms, merchant banking, and venture capital funds registered with SEBI, are not required to register with the RBI.

Disparities between banks and NBFCs:

- Unlike banks, which frequently accept these deposits that can be withdrawn on demand without prior notice, NBFCs are prohibited from taking public demand deposits.
- NBFCs are not a part of the payment and settlement system, in contrast to banks. They cannot write checks drawn on themselves, which is a common service provided by banks.
- Depositors of non-bank financial companies (NBFCs) are not eligible for the deposit insurance facility offered by organizations such as the Deposit Insurance and Credit Guarantee Corporation.
- This insurance protects depositors in the event of bank failures; however, it excludes NBFC depositors.
- Funding: A combination of bank loans and market borrowing is the main source of funding for NBFC operations.

The Way Ahead

- Monitoring the Inter-linkages and Spillovers: Using a variety of instruments, including network analysis, stress testing, early warning indicators, etc., the RBI and other regulators must intensify their monitoring of the inter-linkages and spillovers both within and between the NBFC sector and banks.
- In order to facilitate efficient information exchange and crisis management, they must also collaborate and coordinate with one another.
- Risk management and governance: To effectively identify, evaluate, and reduce possible risks in NBFCs, risk management procedures should be strengthened.
- To guarantee good decision-making and transparency, corporate governance and regulatory oversight should be strengthened.
- Regulatory Surveillance of Digital Lending: Increasing regulatory control over digital lending platforms to guarantee adherence to data privacy and consumer protection legislation.
- Putting in place precise rules to confirm the legitimacy and legality of lending apps.

PRELIM FACTS

1.Towards Eliminating Plastic Pollution by 2040 report released by the Organisation for Economic Co-operation and Development (OECD)

- **Context:**

- The Report was released at the Third Session of the Intergovernmental Negotiating Committee on plastic pollution (INC-3).
- It provided a roadmap for governments and policymakers to tackle the full lifecycle of plastic by curbing production and demand, increasing circularity, etc.
- **The key findings of the report**
- Business as usual is unsustainable. Under the Baseline scenario (reflecting climate policies in place as of 2021), would lead to a 50% increase in leakage of (macro)plastics to the environment by 2040.
- Early, stringent, and coordinated policy action globally could cut plastic waste generation in 2040 by a quarter below the baseline.
 - Such policy action would cost 0.5% of global GDP.
- **Recommendations to eliminate plastic pollution**
- Curb production and demand: restrain production and demand towards sustainable levels by targeted taxes and regulation on avoidable plastics.
- Design for circularity: make the plastic production process more circular by ecodesign criteria and product standards for reuse.
- Enhance recycling: close material loops by improving separate collection, sorting, and recycling of plastic waste and steps like extended producer responsibility.
- Close leakage pathways: decrease losses into the environment, including via effective waste collection and disposal.

2. The government issues FY24's first Sovereign Green Bond (SGrBs)

- Green bonds are debt instruments that support expenditures and projects with environmental benefits.
- The Union Budget 2022-23 made an announcement to issue Sovereign Green Bonds.
- Later, the Finance Ministry approved India's final Sovereign Green Bonds framework. The core components of the Framework are
 - **Use of Proceeds:** It outlines 9 eligible categories like clean transportation of projects to finance using SGrB proceeds.
 - **Process for project evaluation and selection:** established a two-tier governance process.
 - ✓ The initial selection of projects is the responsibility of the ministry or department in charge of implementing the project or program.
 - ✓ The Green Finance Working Committee oversees and validates decisions by the ministries or departments
 - **Management:** proceeds are deposited into the Consolidated Fund of India and managed by the Ministry of Finance's Public Debt Management Cell.
 - **Audit:** by the Comptroller and Auditor General (CAG).
- **Benefits**
 - They carry nil credit and default risks.
 - They do not bear project-related risks and support government financing.
- **Challenges**
 - Greenwashing (environmental claims without evidence) in the funded projects.
 - Lower liquidity and widening pricing differentials in the bond market as select large investors hold green bonds until maturity (due to their investment mandate).

3. UN resolution condemning Israeli settlements

- India supports UN resolution condemning Israeli settlements in Palestine
- UN draft resolution, titled "Israeli Settlements in Occupied Palestinian Territory, including East Jerusalem, and Occupied Syrian Golan", was passed with a majority.
 - It was favored by 145 countries (including China, France, Japan, and Russia), and opposed by seven (including US, Canada).
- The resolution "Reaffirms that the Israeli settlements in the "Occupied Palestinian Territory", are illegal and an obstacle to peace and economic and social development
- Earlier, India had abstained from a resolution that called for an immediate, durable and sustained humanitarian truce leading to a cessation of hostilities.

4. Portuguese Coin

- **Context:**
- A farmer in North Goa's Nanoda Bamber village unearthed a pot containing coins from another era.
- The pot contains 832 copper coins, which were struck in Goa during the Portuguese occupation in the 16th or 17th centuries.
- **What was Characteristic of Portuguese Coinage in India?**

- Portuguese mints in Goa produced gold and silver coins, as well as copper, tin, and lead coins from other mints in Cochin, Diu, and Damo.
- The gold coins were known as 'Cruzado' or 'Manoel' and came in the same size, value, and weight. They were engraved with a cross on one side and the royal arms on the other.
- 'Meia-espera' and 'Espera' were the names of the silver coins.
- The copper coins were separated into numerous denominations such as 'Bazaruco', 'Leal', 'Tanga', 'Pardau', and 'Real'.
 - The copper coins featured a castle, a lion, a crown, a crucifix, and the king's name.
- Tin and lead coins known as 'Dinheiro' were mostly issued in Diu and Malacca.
 - They were crudely designed and frequently uneven in shape and size. On one side, they had the king's name or initials, and on the other, a crucifix or a flower.
- **What was India's Engagement with Portuguese in Goa?**
- **Portuguese as a Traveller:** Vasco da Gama was the first Portuguese explorer to reach India by sea in 1498 at Calicut on the Malabar Coast and was welcomed by a local ruler Zamorin.
- **Portuguese as a Coloniser:** In 1505, Francisco de Almeida became the first viceroy of Portuguese India and established a base in Cochin. He also fought against the Zamorin of Calicut and the Mamluks of Egypt, who were rivals in the spice trade.
 - Afonso de Albuquerque (in 1510) captured Goa from the Bijapur Sultanate and made Goa the capital of the Portuguese State of India.
- **Colonial Rule of Portuguese:** The Portuguese rule in Goa lasted for about 450 years, from 1510 to 1961. During this period, Goa became a prosperous and cosmopolitan city, known as the "Rome of the East".
- **Liberation of Goa:** The liberation of Goa from Portuguese rule was achieved by the Indian government in December 1961, after a 36-hour military operation known as Operation Vijay.
- **Statehood to Goa:** In 1987, Goa was granted statehood by the Indian government, and became the 25th state of India.

5. Ben Gurion Canal Project

- This project plans to join the Red Sea with the Mediterranean providing an alternative to the Suez Canal.
- It envisages cutting a canal through the Israeli-controlled Negev Desert from the tip of the Gulf of Aqaba to the Eastern Mediterranean coast.
 - It was first envisioned in the 1960s.
- If completed, it would transform global maritime dynamics by taking away Egypt's monopoly over the shortest route between Europe and Asia.
- Challenges: extremely complex and expensive; limitations due to terrain and topography

ANSWER WRITING

Q. What are the objectives and challenges of India's 'Digital India' program? Discuss its impact on the Indian economy.

Introduction

India's Digital India Programme aims to equip the country for a knowledge-based future. Making technology the key to facilitating change is the main goal. It's an umbrella programme that encompasses numerous departments.

The program's overall goals for Digital India are:

- To develop digital infrastructure and give every citizen access to it.
- To give citizens access to digital services and resources in order to facilitate their digital empowerment.
- To encourage digital literacy and develop a workforce with digital skills.
- To encourage the application of technology to governance and enhance openness and efficiency.
- To encourage entrepreneurship and innovation in the digital sphere.

Challenges of Digital India program:

- **Digital Divide:** Unequal distribution of digital infrastructure and services across the country.
- **Cyber security:** Protecting data and digital infrastructure from online attacks.
- **Digital Literacy:** A sizable section of the population has limited digital literacy.
- **Infrastructure:** Some regions of the nation lack the necessary infrastructure to meet the goals of the programme.
- **Privacy concerns:** safeguarding citizens' data and ensuring their privacy.

Effects of the Digital India Initiative on the Economy of India

- **Enhanced Digital Penetration:** The initiative has made digital services more accessible, which has helped the digital economy expand.
- **Employment Creation:** The initiative has brought about employment prospects in the digital sector, particularly in fields like app development, digital marketing, and e-commerce.
- **Ease of Doing Business:** The initiative has resulted in the streamlining of a number of government procedures, which has made conducting business in India simpler.

- **Enhanced Transparency and Efficiency:** The application of technology to governance has improved service delivery, decreased corruption, and heightened transparency and efficiency.
- **Innovation and Entrepreneurship:** New startups and enterprises have emerged as a result of the program's promotion of innovation and entrepreneurship in the digital sphere.

Conclusion

The Digital India initiative has made a substantial contribution to realizing the goal of an India that is empowered by technology. Despite certain difficulties, the programme has had a good impact on society and the economy, and it is anticipated to play a significant part in India's economic development going forward.

MCQs

- Recently, which city set a Guinness Record by lighting over 22 lakh 'diyas', emerging as the largest event of lighting lamps together at one location?
 - Prayagraj
 - Ayodhya**
 - Agra
 - Lucknow
- Which of the following statements about Acharya Jivatram Bhagwandas(JB) Kripalani is not correct?
 - J.B. Kripalani was the president of the Indian National Congress(INC) in 1947.
 - He was one of the founders of the Kisan Mazdoor Praja Party (KMPP) after the independence leaving INC.
 - He moved the first-ever No confidence motion in Lok Sabha in 1963.
 - He was awarded the Bharat Ratna, India's highest civilian honour, posthumously in 1982.**
- Consider the following statements about Surety Bonds
 - A surety bond is a legally binding contract that is a unique type of insurance.
 - It is a three-party agreement that guarantees compliance, payment, or performance of an act.
 Choose the correct statements:
 - 1 only
 - 2 only
 - Both 1 and 2**
 - Neither 1 nor 2
- Regarding the Crop Residue Management (CRM) Scheme, consider the following statements:
 - It is a Centrally Sponsored Scheme launched under the Ministry of Agriculture & Farmers Welfare. Under this scheme, farmers receive financial assistance for the purchase of crop residue management machinery.
 - Cooperative Societies, Farmer Producer Organizations (FPOs), and Panchayats receive financial assistance at a rate of 100% for establishing Custom Hiring Centers (CHCs).
 How many of the statements given above are correct?
 - Only one**
 - Only two
 - All three
 - None
- Consider the following statements with respect to 'India-Ethiopia Joint Trade Committee':
 - India invited Ethiopia to collaborate on integrating the Unified Payment Interface (UPI) with Ethiopia's payment platform infrastructure in Ethswitch.
 - Ethiopia is one of the largest sources of long-term concessional credit to India for sectors such as rural electrification, sugar industry and railways.
- Which of the statements given above is/are correct?
 - 1 only**
 - 2 only
 - Both 1 and 2
 - Neither 1 nor 2
- 'Maitree Super Thermal Power Project' is situated in which country?
 - Bangladesh**
 - India
 - Sri Lanka
 - Nepal
- Which country is associated with the 'B61-13' Nuclear bomb?
 - Russia
 - Israel
 - USA**
 - China
- Consider the following statements.
 - Whenever a farm animal digests food, methane is released into the atmosphere.
 - The cultivation of paddy, which floods the fields, prevents oxygen from penetrating the soil and creates suitable conditions for methane-emitting bacteria.
 Which of the above statements is/are correct?
 - 1 only
 - 2 only
 - Both 1 and 2**
 - Neither 1 nor 2
- Consider the following statements.
 - The Monetary Policy Committee (MPC) has six members including the RBI Governor, where each member is nominated by the RBI.
 - The Monetary Policy Committee meets every two months to evaluate the current status and outlook for inflation and economic growth.
 - When the Monetary Policy Committee wants to contain inflation, it follows "dear money" policy.
 Which of the above statements is/are correct?
 - 1, 2
 - 1, 3
 - 2, 3**
 - 2 only
- Rotterdam Convention, often seen in news, is related to
 - Prohibition of the usage of biological weapons by the member countries
 - Promote shared responsibility among State Parties in the international trade of certain hazardous chemicals**
 - Prevention of the proliferation of ballistic missiles
 - None of the above