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INSTA SECURE SYNOPSIS **MAINS MISSION 2023**

GS-III

JUNE 2023



NOTE: Please remember that following ‘answers’ are NOT ‘model answers’. They are NOT synopsis too if we go by definition of the term. What we are providing is content that both meets demand of the question and at the same time gives you extra points in the form of background information.



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Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

Inflation affects several macroeconomic parameters and can have significant consequences on the overall economy. (250 words)

Difficulty level: Easy

Reference: [The Hindu](#), [Insights on India](#)

Why the question:

Indian households find themselves yet again struggling to cope with a sharp surge in the prices of essential kitchen staples — ranging from tomatoes, onions and potatoes to tur dal and rice.

Key Demand of the question:

To write about inflation, its impact and measures needed to keep it under control.

Structure of the answer:

Introduction:

Begin by defining inflation.

**Body:**

First, write about the impact of inflation on various macroeconomic parameters – purchasing power, growth, cost of living, availability of credit and exchange rates etc.

Next, write about the measures that are taken to keep inflation under tolerable limits – the monetary policy measures, fiscal policy measures and price control measures.

Conclusion:

Conclude by writing a way forward.

Introduction

Inflation refers to the rise in the prices of most goods and services of daily or common use, such as food, clothing, housing, recreation, transport, consumer staples, etc. Inflation measures the average price change in a basket of commodities and services over time. The opposite and rare fall in the price index of this basket of items is called 'deflation'. Inflation is indicative of the decrease in the purchasing power of a unit of a country's currency. This is measured in percentage.

Body**Impact of Inflation on various macroeconomic parameters**

- Inflation is a decrease in the purchasing power of currency due to a rise in prices across the economy.
 - For instance, the average price of a cup of coffee was a 50 paise. Today the price is closer to 25 Rupees.
- The value of currency unit decreases which impacts the cost of living in the country.
- When the rate of inflation is high, the cost of living also increases, which leads to a deceleration in economic growth.
- However, a healthy inflation rate (2-3%) is considered positive because it directly results in increasing wages and corporate profitability and maintains capital flowing in a growing economy.

Factors for the high rate of inflation in the Indian economy

- **Fuel prices:** The government has increased taxation of energy to raise resources.
 - Since energy is used for all production, prices of all goods and services tend to rise and push up the rate of inflation.
 - Further, **this is an indirect tax, it is regressive and impacts the poor disproportionately** It also makes the RBI's task of controlling inflation difficult.
- **Supply shortage:** The lockdowns **disrupted supplies** and that added to shortages and price rise.
 - **Prices of medicines and medical equipment rose dramatically.**
 - Prices of items of day-to-day consumption also rose.
 - Fruits and vegetable prices rose since these **items could not reach the urban markets.**



- **International factors:** Most major economies have recovered and demand for inputs has increased while supplies have remained disrupted (like chips for automobiles).
 - So, **commodity and input prices** have risen (like in the case of metals).
 - Businesses claim increase in input costs underlies price rise.
- **Data collection and methodology:** In April and May 2020, data on production and prices could not be collected due to the strict lockdown.
 - So, the current data on prices for April to July 2021 are not comparable with the same months of 2020.
 - As such, the official inflation figures for these months in 2021 do not reflect the true picture.
- **Weak Rupee:** The weakening of the rupee also added to inflation.

Measures to keep the inflation under control

- **Monetary policy Measures:** Maintaining **price stability** is the foremost objective of the monetary policy committee of RBI. However, during the pandemic, growth has taken centre stage and RBI has rightly cut interest rates.
- **Commodity prices: Govt needs to remove supply side bottlenecks.** For example, Govt can immediately offload 10-20% of its pulses stock with NAFED in the open market.
- **Fuel prices:** Bringing them under GST would reduce the prices by at least 30 rupees. GST council must agree to this with haste.
- **Policy measures:** Navigating out of this will need a fiscal stimulus to shore up consumer spending, an investment revival to increase the productive capacity of the economy, and a careful management of inflationary expectations.
- Concomitantly, the government will also need to **pursue redistribution of income** to reduce the widening disparity.
- This also calls for **fiscal prudence to cut wasteful spending, find new revenue through asset sales, mining and spectrum auctions, and build investor confidence.**

Conclusion

With the rise in inflation amidst a second wave, the balancing acumen of the MPC will now be sorely tested. Factors like rising commodity prices, supply chain disruptions are expected to raise overall domestic inflation. Economists have pointed at India's K-shaped recovery where a few have benefitted while others have fallen sharply behind. Big companies have benefitted and increased market share, revenues and profits sharply. They have also taken advantage of low interest rates to decrease the cost of their borrowings. Small and medium companies, struggling with falling revenues and cash flows, have not been able to take advantage of the rates. Hence inflation must also be controlled while growth is focussed upon.



Despite economic growth, job opportunities have not expanded at a satisfactory rate, resulting in a high unemployment rate and a lack of adequate livelihood options for the population. What strategies are needed to address the above-mentioned issue? (250 words)

Difficulty level: Moderate

Reference: [Indian Express](#), [Insights on India](#)

Why the question:

The article emphasizes that job creation is a significant challenge for the government. It underscores the importance of adopting effective policies, promoting skill development, and fostering entrepreneurship to address the issue and stimulate sustainable employment growth.

Key Demand of the question:

To write about causes behind unemployment and measures need to create jobs.

Structure of the answer:

Introduction:

Begin by citing statistic to give a current scenario of unemployment in the country.

Body:

First, write about the causes behind unemployment in India – historical, unequal growth, lack of job specialisation, automation related losses etc.

Next, suggest measures that are needed in order to ensure job creation and to reduce unemployment in the country.

Conclusion:

Conclude by writing a way forward.

Introduction

India's unemployment rate rose to 8.30% in December 2022, the highest in 16 months, from 8.00% in the November 2022, data from the Centre for Monitoring Indian Economy (CMIE) showed. The urban unemployment rate rose to 10.09% in December 2022 from 8.96% in the November 2022, while the rural unemployment rate slipped to 7.44% from 7.55%, the data showed.

In a jobless growth economy, unemployment remains stubbornly high even as the economy grows. This tends to happen when a relatively large number of people have lost their jobs, and the ensuing recovery is insufficient to absorb the unemployed, under-employed, and those first entering the workforce. Jobless growth of the Indian economy is a **"5C" problem: a Complicated Condition Created by Combinations of Causes.**

Body

Causes of unemployment in India

- **Jobless growth:** There is mounting concern that future growth could turn out to be jobless due to de-industrialization, de-globalization, the fourth industrial revolution and technological progress. As per the **NSSO Periodic Labour Force Survey 2017-18, India's labour force participation rate for the age-group 15-59 years is around 53%, that is, around half of the working age population is jobless.**
- **Asymmetric demography:** The growth in the working-age ratio is likely to be concentrated in some of India's poorest states and the demographic dividend will be fully realized **only if India is able to create gainful employment opportunities** for this working-age population.



- **Lack of skills:** Most of the new jobs that will be created in the future will be highly skilled and lack of skill in Indian workforce is a major challenge. India may not be able to take advantage of the opportunities, due to a **low human capital base and lack of skills**.
- **Low human development parameters:** India ranks 130 out of 189 countries in UNDP's Human Development Index, which is alarming. Therefore, **health and education parameters need to be improved substantially** to make the Indian workforce efficient and skilled.
- **Informal nature of economy in India** is another hurdle in reaping the benefits of demographic transition in India.

Public sector employment as a remedy: Critical analysis

- The latest data showed that there were **86 lakh vacant jobs** among all central government civilian posts as of March 2020.
- The government recently announced **Agnipath scheme** for youth as a contract employment of four years.
- But even this measure would be ameliorative in the real economy that continues to remain distressed, a consequence of **effects of the pandemic in the last few years**.
- The country cannot afford to squander more years in its race to reap the benefits of its demographic dividend, and the push to provide jobs for those seeking to enter the labour force, even if belated, will help ease matters for the medium term.
- **Real jobs in manufacturing, industries, MSME's** are the key to reaping demographic dividend. Skill development will also help in youth getting jobs in high paying services sector.

Measure needed and way forward

- **Building human capital:** Investing in people through **healthcare, quality education, jobs and skills** helps build human capital, which is key to supporting economic growth, ending extreme poverty, and creating a more inclusive society.
- **Skill development** to increase employability of young population. India's labour force needs to be empowered with the right skills for the modern economy. Government has established the **National Skill Development Corporation (NSDC)** with the overall target of skilling/ upskilling 500 million people in India by 2022..
- **Education:** Enhancing educational levels by properly investing in primary, secondary and higher education. India, which has almost 41% of population below the age of 20 years, can reap the demographic dividend only if with a better education system. Also, **academic-industry collaboration** is necessary to synchronise modern industry demands and learning levels in academics.
 - Establishment of **Higher Education Finance Agency (HEFA)** is a welcome step in this direction.
- **Health:** Improvement in healthcare infrastructure would ensure higher number of productive days for young labour force, thus increasing the productivity of the economy.
 - Success of schemes like **Ayushman Bharat** and National Health Protection scheme (**NHPS**) is necessary. Also nutrition level in women and children needs



special care with effective implementation of **Integrated Child Development (ICDS)** programme.

- **Job Creation:**The nation needs to **create ten million jobs per year** to absorb the addition of young people into the workforce. Promoting businesses' interests and entrepreneurship would help in job creation to provide employment to the large labourforce.
 - India's improved ranking in the **World Bank's Ease of Doing Business Index** is a good sign.
 - Schemes like **Start-up India** and **Make in India**, if implemented properly, would bring the desired result in the near future.
- **Urbanisation:**The large young and working population in the years to come will migrate to urban areas within their own and other States, leading to rapid and large-scale increase in urban population. How these migrating people can have access to basic amenities, health and social services in urban areas need to be the focus of urban policy planning.
 - Schemes such as **Smart City Mission** and **AMRUT** needs to be effectively and carefully implemented.

Conclusion

India is on the right side of demographic transition that provides golden opportunity for its rapid socio-economic development, if policymakers align the developmental policies with this demographic shift.

To reap the demographic dividend, proper investment in human capital is needed by focussing on education, skill development and healthcare facilities.

Value-addition

Steps taken by government in recent times

- **Dedicated Shram Suvidha Portal:** That would allot Labor Identification Number (LIN) to units and allow them to file online compliance for 16 out of 44 labor laws.
- **Random Inspection Scheme:** To eliminate human discretion in selection of units for inspection, and uploading of Inspection Reports within 72 hours of inspection mandatory.
- **Universal Account Number:** Enables 4.17 crore employees to have their Provident Fund account portable, hassle-free and universally accessible.
- **Apprentice Protsahan Yojana:** Government will support manufacturing units mainly and other establishments by reimbursing 50% of the stipend paid to apprentices during first two years of their training.
- **Revamped Rashtriya Swasthya Bima Yojana:** Introducing a Smart Card for the workers in the unorganized sector seeded with details of two more social security schemes.
- **The National Career Service** is being implemented as a mission mode project to provide various job-related services information on skills development courses, internships etc



What were the factors that drove GDP growth in India during the fiscal year 2022-23.? Examine the role of government policies in the increased GDP growth. (250 words)

Difficulty level: Tough

Reference: [Live Mint](#)

Why the question:

The article discusses the factors that contributed to GDP growth in India during the fiscal year 2022-23.

Key Demand of the question:

To write about the factors behind increased GDP growth and role of government policies in its increase.

Directive word:

Examine – When asked to ‘Examine’, we must investigate the topic (content words) in detail, inspect it, investigate it and establish the key facts and issues related to the topic in question. While doing so we should explain why these facts and issues are important and their implications.

Structure of the answer:

Introduction:

Begin by giving context.

Body:

First, write about the factors that led to increased GDP growth – investment and infrastructure, industry and manufacturing, services and consumption, and international trade.

Next, write about the role of government policies in driving the GDP growth – mention the major policies and its impact. Write about the successes and limitations.

Conclusion:

Conclude by writing a balanced opinion.

Introduction

In 2022-23 actual gross home product (GDP) growth — which is adjusted for inflation — was at 7.2%, in opposition to 9.1% in 2021-22. This is 20 foundation factors increased than the Reserve Bank of India’s forecast of seven%.

Body

Factors that drove GDP growth in fiscal year 2022-23

- **Trade, resorts, transport, communication** and providers associated to broadcasting, which comprised just below a fifth of the GVA, grew by 14%.
- **The building sector**, which comprised round a twelfth of the GVA, **grew by 10%**.
- Other than this, **finance, actual property {and professional} providers**, which comprised **round 22.5% of the GVA**, grew by a good 7.1%.
- The authorities a part of the GVA, represented by public administration, defence and **different providers, grew by 7.2%**.
- Other than this **agriculture, forestry and fishing**, the mainstay of Indian employment, comprising round 15.1% of the GVA, grew by a good 4%, up from 3.5% in 2021-22.

Role of government policies in increased GDP

- **The FDI policy has been amended to ease the way for overseas investors** to access many more sectors including defense and aviation, while also simplifying the clearance process by



eliminating the need for a second level of approval in cases where licences have already been procured.

- **Monetary policy revisions and inflation targeting** also has led to stable economy.
- Regulations that **require unnecessary and repetitive business licence renewals have been scrapped** and the validity period of business licences has been extended from three years to seven years.
- **Foreign investors are also now permitted to invest in construction projects** that were earlier reserved for domestic companies.
- Certain sectors reserved for **small and medium-sized enterprises (SMEs) have now been opened to larger entities**. Revised bankruptcy laws have been implemented to encourage a free flow of capital and more flexibility and options for investment.
- To get back on the growth path, the Government has announced a stimulus package worth **nearly Rs.21 trillion (US\$277 billion), equivalent to around 10 per cent of India's GDP, to aid the sections of the society worst hit by the pandemic** and open up new avenues of trade and investment in the post-Coronavirus economy.
- On the trade front, the cost and time for imports and exports is being reduced significantly. **A tribunal to implement the new insolvency and bankruptcy provisions** will be fast-tracked. **E-courts will be tasked with enforcing contracts** in an expedited manner by provided an electronic system to handle complaints, summons, and payments.

Conclusion

The Government of India will continue to focus on its progressive and development-based agenda. With a well-functioning democracy that has the youngest population in the world, high literacy rates and an expanding middle-class, India offers real and exciting opportunities for investors and corporations looking for a welcoming and effective partner.

[While National Asset Reconstruction Company Limited \(NARCL\) has the potential to assist banks in managing their NPA liabilities, its success will depend on various factors such as adequate capitalization, accurate asset valuation, efficient legal processes, and prudent lending practices by banks. Comment. \(250 words\)](#)

Difficulty level: Moderate

Reference: [Insights on India](#)

Why the question:

The question is part of the static syllabus of General studies paper – 3.

Key Demand of the question:

To write about the potential of NARCL to solve the NPA issues in India.

Directive word:

Comment– here we must express our knowledge and understanding of the issue and form an overall opinion thereupon.

Structure of the answer:

Introduction:

Begin by defining National Asset Reconstruction Company Limited (NARCL) and its purpose.

Body:

First, describe the structuring of the NARCL and also mention its mandate that makes it a bad bank.



Next, write about the potential of NARCL – high capital, backing of the government, reduce the burden on taxpayers, revival or reclamation of assets etc.

Next, write about its limitations – presence of private ARC's, issues with restructuring and write off, corruption etc.

suggest need of] right incentive structure and an innovative approach in handling assets for an effective performance of NARCL.

Conclusion:

Conclude by writing a way forward.

Introduction

The [Reserve Bank of India](#) on **October 4, 2021** gave licence to the **Rs 6,000 crore National Asset Reconstruction Company Ltd (NARCL)**, a move that will help kickstart operations of the bad bank. **K V Kamath Committee** also suggested setting up Bad bank to revive sectors such as Trade, Textile, NBFCs, Steel and construction, etc.

The National Assets Reconstruction Company Ltd (NARCL), the government-backed bad bank, has appointed former State Bank of India (SBI) official Natarajan Sundar as its managing director and chief executive.

Body

Potential of NARCL

- While there are 28 ARCs in the private sector, there was a **need for government-backed receipts for big ticket resolutions.**
- The government guarantee for the proposed security receipts is a positive stepping stone for **unlocking stressed assets' value.**
- The **upfront cash payment by the NARCL to banks** will immediately be accretive for the profitability and capital of the banks, however the ability of the NARCL to resolve these assets in a time-bound manner will be critical for future provision writeback by banks
- The whole idea is to ensure that these assets for which this whole set-up is being created, and the value that is locked in the **assets is realised and comes back to the banks**; they use it as **agrowth capital** and the banking system becomes more robust
- From the perspective of a **commercial bank saddled with high NPA levels, it will help.**
 - That's because such a bank will get rid of all its toxic assets, which were eating up its profits, in one quick move.
 - When the recovery money is paid back, it will further improve the bank's position.
 - Meanwhile, it can start lending again.
- From the **perspective of the government and the taxpayer, the situation is a little more muddled.**
 - After all, whether it is recapitalising PSBs laden with bad loans or giving guarantees for security receipts, the money is coming from the taxpayers' pocket.
 - While recapitalisation and such guarantees are often designated as "reforms", they are band aids at best.



- The **only sustainable solution is to improve the lending operation in PSBs.**
- Lastly, the plan of bailing out commercial banks will collapse if the bad bank is unable to sell such impaired assets in the market.

Shortcomings of NARCL

- NARCL is **owned largely by public sector banks** and have its management drawn mostly from them.
- Also, the PSBs will be both shareholders and customers—and it leads to the danger of the **bad bank being nothing more than a means to shift some bad debt from one book to another.**
- The price at which NARCL buys the stressed loans from the banks might prove to be challenging, even though the transaction involves the public sector as both buyer and seller.
- The government guarantee mentioned earlier may ensure an 18% minimum recovery, but it is not free. **Banks will have to pay a fee to the government for it.** Adjusted for this, it remains to be seen how much recovery banks can make using NARCL.
- Banks though will have the freedom to sell the security receipts. But to what extent a secondary market for such securities evolves is debatable.
- Another issue is that physical assets tend to deteriorate soon. This has been a recurring problem in the IBC process, where pressing the bankruptcy solution too late has meant that there is little value left that will attract bidders. **The NPAs** that the NARCL will handle are all old, legacy assets and probably there is **little residual value left in them.**
- It is not clear whether the bad bank has a finite end date—that is, it is a one-time solution—or whether it will continue to exist forever as another option for banks. **In the US** and other countries, the **bad banks typically had a sunset clause** and worked with a finite timeline in mind. In fact, the success of bad banks abroad too has depended on speedy disposal instead of trying to manage them until they got the best price.

Way forward & Conclusion

- Banks typically recover only 10-15 paise to a rupee against their fully provisioned bad loans, entailing substantial haircuts of 85-90 per cent.
- It is important that banks transfer bad loans to NARCL at realistic valuations that factor in such haircuts.
- There is a possibility of conflict of interest arising too. Banks will be part-owners of both NARCL (51 per cent stake) and the asset management company (49 per cent), and they will also be sellers to NARCL.
- It is important, therefore, that the processes are transparent and **independent market professionals** are employed to avoid conflicts.
- The success of the bad loan experiment will require a talented management team of IDRCL and the incentive structure for its employees.
- If best talent is taken up from the market and is offered liberal incentives for recovery of loans above 18 per cent, it could generate more than what the industry is estimating now.



- This is a positive move for the banking sector. The success of the bad bank however will depend on the implementation and management of the transferred NPAs.

Foreign Portfolio Investment (FPI) is a significant route for foreign investment. FPIs have made a strong comeback after the COVID-19-induced slump. However, the recent tightening of disclosure norms by the Securities and Exchange Board of India (SEBI) may pose challenges for foreign investors. Examine. (250 words)

Difficulty level: Tough

Reference: [Indian Express](#)

Why the question:

The article discusses the resurgence of foreign investors in the Indian stock market.

Key Demand of the question:

To write about FPI, its importance and increased trends in FPIs and bottlenecks for FPIs in India.

Directive word:

Examine – When asked to ‘Examine’, we must investigate the topic (content words) in detail, inspect it, investigate it and establish the key facts and issues related to the topic in question. While doing so we should explain why these facts and issues are important and their implications.

Structure of the answer:

Introduction:

Begin by defining FPI. Cite statistic related to the extent of FPI in India.

Body:

In the first part, write about importance of FPI as mode of investment and its importance to the Indian economy.

Next, give context regarding the increased inflows of FPI, potential bottlenecks for it and steps that are needed to resolve them.

Conclusion:

Conclude with a way forward to ensure that withdrawal of FPI does not affect the economy.

Introduction

Foreign portfolio investment (FPI) consists of securities and other financial assets held by investors in another country. It does not provide the investor with direct ownership of a company’s assets and is relatively liquid depending on the volatility of the market. Along with foreign direct investment (FDI), FPI is one of the common ways to invest in an overseas economy. FDI and FPI are both important sources of funding for most economies.

Body

Background

- India has remained one of the attractive destinations for foreign portfolio investors (FPIs) with total inflows at Rs 61,958 crore so far in the current fiscal.
- However, post **Adani-Hindenburg episode**, market regulator Sebi’s proposal to ask FPIs to disclose the ultimate beneficiaries of high-risk FPI funds is likely to impact the inflows

FPI regime as a route for foreign investment in India

- FPIs are the largest non-promoter shareholders in the Indian market and their investment decisions have a huge bearing on the stock prices and overall direction of the market.
- FPIs hold sizeable stakes in private banks, tech companies and big caps like Reliance Industries.



- India's strong macroeconomic fundamentals and rising risk appetite are the reasons for the rise in FPI investment in the country's market.
- FPI invested Rs 11,631 crore in April, Rs 43,838 crore in May and Rs 6,489 crore in the first two days of June into the domestic equity market, according to National Securities Depository Ltd (NSDL) data.
- In the first three months of FY23, FPIs had massively sold Indian stocks amid risk aversion due to the Ukraine-Russia war.
- Between April and June 2022, they pulled out Rs 1.07 lakh crore from the equity market. During FY2023, FPI outflows from the equity segment stood at Rs 37,632 crore.

Impact of SEBI tightening on FPI

- Recently, Sebi floated a consultation paper proposing tighter disclosure norms for high-risk FPIs.
- Assets of Rs 2.6 lakh crore, or 6 per cent of total FPI equity AUM, and less than 1 per cent of Indian equity market capitalisation may potentially be identified as high-risk FPIs that meet either of the 50 per cent group concentration or the Rs 25,000 crore fund size thresholds, Sebi says.
- The tightening could dampen sentiment in equity and forex markets.
- The proposed amendments would result in "disclosure down the the rabbit hole to find the final beneficial owner in certain high-risk investor categories
- It will help prevent violations of public float standards.

Conclusion

The heavy inflow of FPI can provide Indian economy a non-debt creating source of foreign investment. It also reduces the pressure of foreign exchange gap. The FPI has an added advantage of the flow of resources into the capital-scant countries like India. Significant reforms like wider taxation bracket, KYC norms, land arbitration, ease of doing business, ease of governance will definitely attract FPI in coming years.

Inclusive growth and issues arising from it.

[Despite high growth, why does poverty continue to remain a massive challenge in India? Suggest a more comprehensive approach that takes into account social indicators, income distribution, and environmental sustainability to create a more prosperous and equitable society. \(250 words\)](#)

Difficulty level: Moderate

Reference: [Indian Express](#)

Why the question:

The article emphasizes the importance of shifting the focus from GDP growth to poverty reduction and inclusive development.

Key Demand of the question:

To write about the challenges associated with poverty and to evaluate the performance of various measures taken to alleviate poverty and suggest further measures.



Structure of the answer:

Introduction:

Describe the giving statistic regarding the current status of poverty in India.

Body:

First, write about the various challenges associated with eradication of poverty in India.

Next, Evaluate the pros and cons of the various poverty alleviation measures in India – Swarnjayanti Gram Swarozgar Yojana (SGSY), National Social Assistance Programme, Land Reforms, MGNREGA and various PDS initiatives etc.

Suggest measures to overcome the above the limitations of the above.

Conclusion:

Conclude with a way forward.

Introduction

According to World Bank, Poverty is pronounced deprivation in well-being, and comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. Poverty also encompasses low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice, and insufficient capacity and opportunity to better one's life.

In India, **21.9% of the population lives below the national poverty line in 2011**. In 2018, almost 8% of the world's workers and their families lived on less than US\$1.90 per person per day (international poverty line).

Body

Achievements in poverty alleviation over the years

- **Decline in Extreme Poverty:** Extreme poverty in India was **3% points lower in 2019 compared with 2011**, as poverty headcount rate declined from 22.5% in 2011 to 10.2% in 2019, with a comparatively sharper decline in rural areas.
 - Slight moderation in consumption inequality since 2011, but by a **margin smaller than what is reported in the unreleased National Sample Survey -2017**.
 - The extent of poverty reduction during 2015-2019 is estimated to be notably lower than earlier projections based on growth in private final consumption expenditure reported in national account statistics.
 - The World Bank defines "extreme poverty" as living on less than **USD 1.90 per person per day**.
- **Rural vs Urban Poverty:** Poverty reduction was **higher in rural areas compared with urban India** as rural poverty declined from 26.3% in 2011 to 11.6% in 2019, while in urban areas the decline was from 14.2% to 6.3% in the corresponding period.
 - Rural and urban poverty dropped by **7 and 7.9% points during 2011-2019**.
 - Urban poverty in India rose by 2% in 2016, coinciding with the **demonetisation**, and rural poverty rose by 10% in 2019.
- **Small Farmers:** Smallholder farmers have **experienced higher income growth**. Real incomes for farmers with the smallest landholdings have grown by 10% in annualized terms between the two survey rounds (2013 and 2019) compared to a 2% growth for farmers with the largest landholding.



- The growth in incomes of smallest landholders in rural areas provides more evidence of moderation in income disparity in rural areas.
- **Smallest landholders comprise a larger share of the poor population.** This income includes wages, net receipt from crop production, net receipt from farming of animal farming and net receipt from non-farm business. Income from leasing out land has been exempted.

Various poverty alleviation programs in India since Independence:

- **Integrated Rural Development Programme (IRDP):** It was introduced in 1978-79 and universalized from 2nd October, 1980, aimed at providing assistance to the rural poor in the form of subsidy and bank credit for productive employment opportunities through successive plan periods.
- **Jawahar Rozgar Yojana/Jawahar Gram Samridhi Yojana:** The JRY was meant to generate meaningful employment opportunities for the unemployed and underemployed in rural areas through the creation of economic infrastructure and community and social assets.
- **Rural Housing – Indira Awaas Yojana:** The Indira Awaas Yojana (LAY) programme aims at providing free housing to Below Poverty Line (BPL) families in rural areas and main targets would be the households of SC/STs.
- **Food for Work Programme:** It aims at enhancing food security through wage employment. Food grains are supplied to states free of cost, however, the supply of food grains from the Food Corporation of India (FCI) godowns has been slow.
- **National Old Age Pension Scheme (NOAPS):** This pension is given by the central government. The job of implementation of this scheme in states and union territories is given to panchayats and municipalities. The states contribution may vary depending on the state. The amount of old age pension is ₹200 per month for applicants aged 60–79. For applicants aged above 80 years, the amount has been revised to ₹500 a month according to the 2011–2012 Budget. It is a successful venture.
- **Annapurna:** This scheme was started by the government in 1999–2000 to provide food to senior citizens who cannot take care of themselves and are not under the National Old Age Pension Scheme (NOAPS), and who have no one to take care of them in their village. This scheme would provide 10 kg of free food grains a month for the eligible senior citizens. They mostly target groups of ‘poorest of the poor’ and ‘indigent senior citizens’.
- **Sampoorna Gramin Rozgar Yojana (SGRY):** The main objective of the scheme continues to be the generation of wage employment, creation of durable economic infrastructure in rural areas and provision of food and nutrition security for the poor.
- **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) 2005:** The Act provides 100 days assured employment every year to every rural household. One-third of the proposed jobs would be reserved for women. The central government will also establish National Employment Guarantee Funds. Similarly, state governments will establish State Employment Guarantee Funds for implementation of the scheme. Under the programme, if an applicant is not provided employment within 15 days s/he will be entitled to a daily unemployment allowance.



- **National Rural Livelihood Mission: Ajeevika (2011):** It evolves out the need to diversify the needs of the rural poor and provide them jobs with regular income on monthly basis. Self Help groups are formed at the village level to help the needy.
- **National Urban Livelihood Mission:** The NULM focuses on organizing urban poor in Self Help Groups, creating opportunities for skill development leading to market-based employment and helping them to set up self-employment ventures by ensuring easy access to credit.
- **Pradhan Mantri Kaushal Vikas Yojana:** It will focus on fresh entrant to the labour market, especially labour market and class X and XII dropouts.
- **Pradhan Mantri Jan Dhan Yojana:** It aimed at direct benefit transfer of subsidy, pension, insurance etc. and attained the target of opening 1.5 crore bank accounts. The scheme particularly targets the unbanked poor.

Assessment

- However, none resulted in any radical change in the ownership of assets, process of production and improvement of basic amenities to the needy.
- Scholars, while assessing these programmes, state three major areas of concern which prevent their successful implementation. Due to unequal distribution of land and other assets, the benefits from direct poverty alleviation programmes have been appropriated by the non-poor.
- Compared to the magnitude of poverty, the amount of resources allocated for these programmes is not sufficient. Moreover, these programmes depend mainly on government and bank officials for their implementation.
- Since such officials are ill motivated, inadequately trained, corruption prone and vulnerable to pressure from a variety of local elites, the resources are inefficiently used and wasted. There is also non-participation of local level institutions in programme implementation.
- Government policies have also failed to address the vast majority of vulnerable people who are living on or just above the poverty line. It also reveals that high growth alone is not sufficient to reduce poverty.
- Without the active participation of the poor, successful implementation of any programme is not possible

Measures needed

- **Immediate support package will need to quickly reach both the existing and new poor.**
 - While existing safety net programs can be mobilized to get cash into the pockets of some of the existing poor relatively quickly, this is not the case for the new poor.
 - In fact, the new poor are likely to look different from the existing poor, particularly in their location (mostly urban) and employment (mostly informal services, construction, and manufacturing).
 - the identification of poor and vulnerable groups is need of the hour.



- India should consider fixing a universal basic income in the post-Covid period through a combination of **cash transfers, expansion of MGNREGA**, and introduction of an **urban employment guarantee scheme**
- **Employment generation for the masses:**
 - A large fiscal stimulus along with intermediate informal employment insurgency through MGNREGA and other employment generation programmes are urgent to rein the adverse impact of covid-19 on the welfare of the masses.
- **Multilateral global institutions must support the developing nations:**
 - Oxfam is calling on world leaders to agree on an Emergency Rescue Package of 2.5 trillion USD paid for through the immediate cancellation or postponement of 1 trillion in debt repayments, a 1 trillion increase in IMF Special Drawing Rights (international financial reserves), and an additional 500 billion in aid.
- **An effective response in support of poor and vulnerable households will require significant additional fiscal resources.**
 - Providing all the existing and new extreme poor with a cash transfer of \$1/day (about half the value of the international extreme poverty line) for a month would amount to \$20 billion —or \$665 million per day over 30 days.
 - Given that impacts are likely to be felt by many non-poor households as well and that many households are likely to need support for much longer than a month, the sum needed for effective protection could be far higher.
- **Decision-makers need timely and policy-relevant information on impacts and the effectiveness of policy responses.**
 - This can be done using existing, publicly available data to monitor the unfolding economic and social impacts of the crisis, including prices, service delivery, and economic activity, as well as social sentiment and behaviours.
 - In addition, governments can use mobile technology to safely gather information from a representative sample of households or individuals.
 - Phone surveys can collect information on health and employment status, food security, coping strategies, access to basic services and safety nets and other outcomes closely related to the risk of falling (further) into poverty.

Conclusion and way forward

- The **Global Multidimensional Poverty Index-2018** released by the UN noted that 271 million people moved out of poverty between 2005-06 and 2015-16 in India. The poverty rate in the country has nearly halved, falling from 55% to 28% over the ten-year period. Still a big part of the population in India is living Below the Poverty Line.
- Rapid economic growth and the use of technology for social sector programs have helped make a significant dent in extreme poverty in the country.
- Despite rapid growth and development, an unacceptably high proportion of our population continues to suffer from severe and multidimensional deprivation. Thus, a more comprehensive and inclusive approach is required to eradicate poverty in India.



By leveraging digital platforms and implementing gender-transformative strategies, India can create an inclusive and empowering financial ecosystem for women. Discuss. (250 words)

Difficulty level: Moderate

Reference: [Live Mint](#)

Why the question:

The article discusses India's journey towards financial inclusion and women's empowerment in the digital era through a gender-transformative approach.

Key Demand of the question:

To write about challenges faced by women in accessing formal financial services and suggest steps to promote the financial inclusion of women in India.

Directive word:

Discuss – This is an all-encompassing directive – you must debate on paper by going through the details of the issues concerned by examining each one of them. You must give reasons for both for and against arguments.

Structure of the answer:

Introduction:

Briefly explain what financial inclusion is and why it is important for women.

Body:

First, write about the challenges faced by women in accessing formal financial services – lack of access to banking services, limited mobility, privacy concerns, etc.

Next, write about the various measures that can be taken to promote financial inclusion of women – promoting digital payments, designing dedicated services for women, nurturing the ecosystem of business correspondents, etc.

Conclusion:

Conclude with a way forward.

Introduction

Digital platforms provide an opportunity to bridge the gender gap in financial access by offering convenient and accessible financial services to women, particularly those in remote areas.

Body

Digital platforms and gender transformative strategies

- **Inclusion in economic activity:** By adopting **digital payment infrastructure (DPI)**, such as mobile banking and digital wallets, India can provide greater accessibility and convenience to women, **enabling them to participate more actively in the formal financial system.**
 - This can help overcome traditional barriers like **distance, time constraints, and lack of documentation that often hinder women's access to financial services.**
- **Access to Information and Education:** Digital platforms have made it easier for women in India to access information and education, breaking down traditional barriers.
 - Online learning platforms offer courses and resources on various subjects, **including entrepreneurship, leadership, and gender studies.**
 - This allows women to enhance their skills, pursue higher education, and gain knowledge to challenge societal norms.



- **Entrepreneurship and Economic Empowerment:** Digital platforms have opened doors for women entrepreneurs in India.
 - **E-commerce platforms enable women to start online businesses, reaching customers across the country.**
 - Platforms like **Etsy, Amazon, and Shopify** provide opportunities for women to showcase their products and services, expanding their customer base and generating income.
 - Additionally, digital payment systems have made financial transactions more accessible, **enabling women to participate in the formal economy.**
- **Safety and Security:** Digital platforms have also played a role in enhancing women's safety and security.
 - Mobile applications like **Safetipin and Himmat provide safety features such as emergency helplines, real-time location tracking,** and reporting mechanisms. These apps help women feel safer when traveling alone and enable them to seek help in case of emergencies.
- **Online Communities and Networking:** Digital platforms facilitate the formation of online communities where women can connect, share experiences, and support each other. Online forums, social media groups, and professional networking platforms create spaces for women to network, collaborate, and seek mentorship. These communities foster a sense of belonging and enable knowledge sharing and collective action.

Measure needed to improve digital financial inclusion for women

- A gender-transformative approach should be integrated into the design and implementation of digital financial solutions.
- This involves addressing gender-specific challenges, such as addressing the digital gender **divide, promoting digital literacy, ensuring privacy and security,** and tailoring services to meet women's specific needs.
- Pradhan Mantri Jan Dhan Yojana (**PMJDY**) a pioneer in promoting financial inclusion. By **linking these initiatives with digital platforms** and ensuring gender-sensitive policies, India can further enhance the financial empowerment of women.
- **Building trust and confidence in digital platforms is crucial** to encourage women's participation and enable them to fully benefit from the opportunities presented by the digital era.
- Important thing is creating a safe and secure digital environment for women. This includes **ensuring privacy, protection against fraud, and addressing issues of harassment or discrimination** that may arise in digital financial transactions.

Conclusion



There is a need for a comprehensive approach that combines digital technologies, policy interventions, and gender-transformative strategies to create an inclusive and empowering financial ecosystem for women in India.

[In recent years, policymakers have increasingly prioritized the poverty-reducing aspects of inclusive growth rather than focusing solely on economic growth itself. Analyse. \(250 words\)](#)

Difficulty level: Tough

Reference: [Hindustan Times](#)

Why the question:

The article reports that Uttar Pradesh (UP), a state in India, has observed International Child Labour Day and declared 20 districts as child labour-free with the assistance of UNICEF.

Key Demand of the question:

To write about impact of inclusive growth and reduction in absolute poverty in the country.

Directive word:

Analyse – When asked to analyse, you must examine methodically the structure or nature of the topic by separating it into component parts and present them in a summary.

Structure of the answer:

Introduction:

Begin by giving context regarding decline in poverty.

Body:

First, write about the emphasis on inclusive growth by the policy makers in the past couple of decades and the steps and measures that were taken in this regard.

Next, write about the successes and limitations of the above-mentioned measures.

Next, write about the further measures that are needed to end poverty.

Conclusion:

Conclude by writing a way forward.

Introduction

The recent release of the NFHS data for 2019-21 allows for a detailed analysis of the progress in the reduction of absolute poverty and related determinants like nutrition. There is decline in poverty between periods of 2004-2013 and 2014-2021 and that India's economic growth has been the most inclusive between 2014 and 2019.

The two time periods under examination i.e. **2005 to 2011 (P-1) and 2011 to 2021 (P-2)** are separated by per capita income growth declining in the world (2.8 to 2.2 per cent) and in India (from 6.3 to 4.4 per cent).

Body

Background: Statistics

- **Poverty downturn:** NFHS estimates put emphasis that poverty fell sharply after 2011 based on these two periods i.e. P-1 to P-2
- **Depiction:** Multidimensional poverty declined at a compounded annual average rate of 4.8 per cent per year in P-1 and more than double that pace at 10.3 per cent a year during P-2.
 - The average equally weighted decline for nine indicators was 1.9 per cent per annum in P-1 and a rate of 6 per cent per annum, more than eight times higher in P-2.



- This unambiguous and strong conclusion however needs further investigation that what made growth so inclusive in P-2.
- **Bolstering reveals:** Also the **Demographic and Health Surveys (DHS) nutrition** index improved at a 2.5 per cent rate during 2005-11 and at a more than five times faster rate during 2020-11.
- **About DHS:** The DHS are nationally-representative household surveys that provide data for a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition.
 - A similar improvement is found in nutrition deprivation, which registered a CAGR decline of 11.6 per cent from 2015 onward.
- **Contrasting findings:** On other hand, the Global Hunger Index (GHI) released recently depicted a worsening of hunger in India between 2014 and 2021, and hence contradicts the large improvement documented in the NFHS data.
 - **It ranked India 107 out of 123 countries**, dropping from the rank of 101 in 2021 and put it in “serious” category and behind all south Asian countries except the war-torn Afghanistan.
- However, unlike the GHI, the NFHS provides comparative state-level data, including the main pointers that determine health and nutrition.

Inclusive growth prioritised in recent times

- **Access to toilets :** The current government’s Swachh Bharat mission in P-2 constructed over 110 million toilets.
- **Access to electricity:** Close to one-third of Indians were deprived of electricity till as recently as 2014. However, after a dedicated push of **Saubhagya Yojana**, India managed to electrify every village, and eventually households.
 - **Electricity deprivation declined by a 28.2 per cent** rate post-2014, but from 2005-2011 (P-1), the rate of decline was close to zero.
- **Financial inclusion: Jan Dhan Yojana**, providing basic banking facilities to the underprivileged, made financial inclusion a reality in India, especially for women.
 - **It presently has in excess of 472 million accounts** with deposits in excess of ₹1.75 lakh crore.
- **Access to modern cooking fuel:** Through the **Ujjwala Yojana**, deprivation was nearly halved from 26 per cent to 14 per cent in just five years. The previous halving (2005/6 to 2015/16) took 10 years.
- **Affordable housing scheme: Under Awas Yojana**, less than 14 per cent are now deprived, compared to thrice that number in 2011/12.
- **Clean water:** More recently, after 2019, India has embarked on an ambitious project of ensuring universal access to piped water under the **Jal Jeevan Mission**.



- Rural piped water coverage was a little less than 17 per cent in 2019, but is now well above 54 per cent and expected to at least be near, if not meet, the 100 per cent target by 2024.

Measures needed

- To engineer an inclusive and sustainable growth for India, **the social infrastructure like education, health and social protection are being given utmost priority by the Government**
- The gaps in the expenditure on social infrastructure like health and education should be closed by strengthening the delivery mechanisms of the government initiatives. Protecting and investing in people's health, education, and skilling is vital for reducing income inequality, and sustained inclusive economic growth.
- India needs to increase its spending on health and education. As recommended by the **National Health Policy 2017 and the NEP 2020**, India needs to increase its spending on health and education to at least 2.5 % in 6 % of GDP respectively from its current levels. Enhancing policies to maintain and even increase health and longevity will therefore be necessary.
- The current situation calls for **more and better schools, especially in rural areas**. It also calls for better transportation links between rural areas and regional urban hubs.
- India has to **invest more in human capital formation at all levels**, from primary education to higher education, cutting-edge research and development as well as on **vocational training to increase the skill sets of its growing working-age population**.
- The flagship schemes such as **Skill India, Make in India, and Digital India** have to be implemented to **achieve convergence between skill training and employment generation**.
- Bridging the gender gaps in education, skill development, employment, earnings and reducing social inequalities prevalent in the society have been the underlying goals of the development strategy to enhance human capabilities.
- **Improved infrastructure, skill development, access to easy finance, reducing barriers to entrepreneurship and forums for mentorship of emerging entrepreneurs** in partnership with corporates are some of measures.
- **Decentralized models of development:** Social policies for each state must be differentiated to accommodate different rates of population growth. The populations in south and west India are growing at a much slower pace than in the central and eastern states.

Conclusion

The policy-makers and academics have given a higher priority to the poverty-reducing properties of inclusive growth rather than growth per se. Given the estimated poverty decline in India, time has come to change our economic policies; concentrate on what causes growth, not what causes poverty to decline.

Poverty is now not just about food but living standards like sanitation, housing, piped water, electricity, education, health, and jobs. And on each of these elements, the focus should shift to quality, not quantity.



Effects of liberalization on the economy, changes in industrial policy and their effects on industrial growth.

It is crucial for MSMEs to embrace digital transformation and leverage e-commerce to stay competitive in today's rapidly evolving business landscape. Support the above statement with relevant examples and facts. Also, discuss the importance of India's e-commerce sector. (250 words)

Difficulty level: Tough

Reference: [Live Mint](#)

Why the question:

The linked article discusses how India's e-commerce sector serves as a crucial driver of sustained high growth, particularly during a global economic slowdown and disruptions.

Key Demand of the question:

To write the various benefits from MSME's adopting e-commerce.

Directive word:

Discuss – This is an all-encompassing directive – you must debate on paper by going through the details of the issues concerned by examining each one of them. You must give reasons for both for and against arguments.

Structure of the answer:

Introduction:

Begin by stating statistic regarding the importance of MSME to the Indian economy.

Body:

First, mention the adverse impact of the pandemic and current difficulties faced by MSME's.

Next, write about the impact that e-commerce can have in MSME's – economic stability, growth and security, even the smallest MSMEs to showcase their products in any part of the world, removing barriers, providing a large customer base and consequently, ensuring increased revenues, transformation at minimal costs, investment and innovation etc.

Next, write about various obstacles for MSME's to adapt e-commerce and suggest steps to overcome them.

Next, paint a picture of importance of e-commerce to Indian economy.

Conclusion:

Conclude by summarising.

Introduction

The MSME sector in India continues to demonstrate remarkable resilience. The sector has sustained an annual growth rate of over 10% for the past few years. The sector has shown admirable innovativeness and adaptability to survive economic shocks, even of the gravest nature.

Body

Significance of MSME

- The significance of MSMEs is attributable to their calibre for employment generation, low capital and technology requirement.
- They are also important for promotion of industrial development in rural areas, use of traditional or inherited skill, use of local resources, mobilization of resources and exportability of products.



- According to the estimates of the Ministry of MSME, the sector generates around 100 million jobs through over 46 million units situated throughout the geographical expanse of the country.
- With 38% contribution to the nation's GDP and 40% and 45% share of the overall exports and manufacturing output, respectively – they play a role in social and economic restructuring of India.
- The sector is engaged in the manufacturing of over 6,000 products ranging from traditional to hi-tech items.
- MSMEs are likely to play a significant role in the government's \$5 trillion economy vision by 2025, provided technology adoption becomes the key focus for enterprises ahead.

Relevance of Adopting technology by MSMEs

- Adopting technology improves all aspects of their business including engagement with stakeholders, financial management, marketing, supply chain management, product innovation, skill development, employee engagement and other areas.
- The current business landscape across the globe is being led by digital technologies that are transforming the way systems and processes work.
- In fact, it wouldn't be incorrect to say that unless companies adopt digitization now, they will never be able to gain a competitive advantage.
- An initiative being led by the CII, Digital Saksham embarks on the beginning of a digital adoption movement.
- The goal is to strengthen over three lakh MSMEs through digital adoption, improved business skills and financial inclusion, thus strengthening their competitiveness through digital know-how and acceptance.
- Among existing digital tools, cloud computing has been the prominent go-to solution for small businesses during the pandemic to secure their data and enable a remote work environment.

Concerns / Challenges

- MSMEs face multiple challenges, ranging from limited budgets to a lack of know-how and expertise required in the adoption of digital technologies, security and trust issues.
- Lack of finance prevents MSMEs from investing in innovative projects, improving their productivity, and seizing opportunities for expanding to enter new markets.
- Unavailability of right technology talent, and fundamentally being averse to the adoption of the latest technologies have been and would remain among key challenges.

Way Forward

- Improved access to finance is needed to boost the widespread technological transformation of MSMEs across the country.
- MSMEs need to be better integrated into the digital economy to expand their market access, diversify their customer base and solidify their supply chain.



- They need to become digitally trained rather than outsourcing the digitization work.
- The integration of MSMEs into the digital economy can begin with digital and financial education leading to improved business practices and digital acceptance.
- There is a high demand for digital and cognitive skills, and MSMEs need to react quickly by becoming digitally enabled.
- Focussed effort to provide both funding as well as capability building through R&D for the MSMEs to flourish.
- Industry and the Indian economy along with MSMEs would reap the benefits of leveraging technology, that will have positive ripple effects on the nation's GDP and the creation of more jobs.

Major crops cropping patterns in various parts of the country, different types of irrigation and irrigation systems storage, transport and marketing of agricultural produce and issues and related constraints; e-technology in the aid of farmers
Is natural farming key to sustainable agriculture in India or just a 'pipe dream'? Discuss its potential and limitations when compared to conventional farming or chemical farming. (250 Words)

Difficulty level: Easy

Reference: [DTE](#), [InsightsonIndia](#)

Why the question:

According to a recent research study conducted by the Indian Council of Agricultural Research (ICAR), natural farming supplemented with farmyard manure (FYM) has been found to yield higher crop yields compared to conventional farming practices.

Key Demand of the question:

To write about the potential of natural farming and its limitations as compared to conventional or chemical farming.

Directive word:

Discuss – This is an all-encompassing directive – you must debate on paper by going through the details of the issues concerned by examining each one of them. You must give reasons for both for and against arguments.

Structure of the answer:

Introduction:

Define natural farming and its principles. Briefly, provide an overview of the concept of natural farming and its growing popularity as an alternative to conventional farming practices.

Body:

Write about the potential of natural farming: e.g., a) Environmental sustainability b) Biodiversity conservation c) Resilience to climate change etc.,

Next, write the limitations of natural farming: E.g., a) Lower productivity, b) Knowledge and skill requirements c) Market demand and scalability etc.,

Briefly compare natural farming with conventional farming practices and give your opinion on whether Natural farming is just a 'pipe dream' or not.

Conclusion:

You can write the conclusion as:



Natural farming can be seen as a viable and desirable alternative to conventional farming, but it requires further research, support, and a balanced approach to ensure a sustainable and food-secure future.

Introduction

Natural farming can be defined as a “**chemical- free farming and livestock based**”. Soundly grounded in agro-ecology, it is a **diversified farming system that integrates crops, trees and livestock, allowing the optimum use of functional biodiversity**. It holds the **promise of enhancing farmers’ income while delivering many other benefits**, such as restoration of soil fertility and environmental health, and mitigating and/or reducing greenhouse gas emissions.

Body

Some success stories of Natural farming

As per a new study, **Zero Budget Natural Farming (ZBNF) in Andhra Pradesh** has led to significantly **higher crop yield compared** to organic or conventional (synthetic fertilisers and pesticides) farming under the state’s **APCNF programme**.

According to a recent research study conducted by the Indian Council of Agricultural Research (ICAR), natural farming supplemented with farmyard manure (FYM) has been found to yield higher crop yields compared to conventional farming practices.

Potential of Natural Farming

- **Minimized Cost of Production:**
 - It is **considered as a cost- effective farming practice** with scope for raising employment and rural development.
- **Ensures Better Health:**
 - As Natural Farming does not use any synthetic chemicals, **health risks and hazards are eliminated**. The food has higher nutrition density and therefore offers better health benefits.
- **Employment Generation:**
 - It generates **employment on account of natural farming input enterprises**, value addition, marketing in local areas, etc. The surplus from natural farming is invested in the village itself.
 - As it has the potential to generate employment, thereby stemming the migration of rural youth.
- **Environment Conservation:**
 - It ensures **better soil biology, improved agrobiodiversity and a more judicious usage of water** with much smaller carbon and nitrogen footprints.
- **Livestock Sustainability:**
 - The integration **of livestock in the farming system plays an important role in Natural farming and helps in restoring the ecosystem**. Eco Friendly bio-inputs, such as Jivamrit and Beejamrit, are prepared from cow dung and urine, and other natural products.



- **Resilience:**
 - The changes in soil structure with the help of organic carbon, no/low tillage and plant diversity are supporting plant growth even under extreme situations like severe **droughts and withstanding severe flood** and wind damage during
 - NF impacts many farmers positively by imparting resilience to the crops against weather extremities.

Limitations of Natural Farming

- Lack of readily available natural inputs is a barrier to converting to chemical-free agriculture. For profitable farming this delay and shortage in natural inputs are detrimental.
- It is a well-built-up capital-intensive industry. It naturally discourages any efforts towards natural farming.
- Natural farming was perceived to be more labour intensive & regular monitoring by farmers was required.
- Sikkim, the first organic state in India has seen a decline in yield following conversion to organic farming. Many farmers have switched back to conventional farming after this decline.
- The farmers also expect higher prices for the natural farming produce, considering it is free from chemicals. Hence, the non-availability of designated markets for natural farming produce (as in the case of organic produce) has driven reluctance towards natural farming adoption

Comparison between Conservation Agriculture (CA) and ZBNF:

Conservation Agriculture (CA)	ZBNF
1. CA is a modern farming approach that uses low levels of external inputs and emphasizes technological solutions for yield improvement	1. ZBNF is an approach that emphasizes natural farming techniques and no external inputs
2. It emphasizes the use of cover crops and improved seeds	2. It places more emphasis on natural mulching and the use of indigenous seeds
3. It is considered to be more cost-effective and economically viable.	3. It has a lower ecological footprint and potentially higher carbon sequestration potential
Both approaches focus on soil health, water conservation , adoption of reduced tillage, application of crop residues and intercropping to minimise soil disturbance	

Conclusion



There is a substantial reduction in input cost of natural farming as compared to non-natural farming due to non-use of expensive agro-chemicals. This has resulted in a significant reduction in the cost of cultivation of all the crops for better profitability natural farming practitioners.

Issues related to direct and indirect farm subsidies and minimum support prices; Public Distribution System- objectives, functioning, limitations, revamping; issues of buffer stocks and food security; Technology missions; economics of animal-rearing.

Withdrawal of the Livestock and Livestock Product Bill was driven by the need to address the apprehensions of farmers, traders, and communities who felt that the proposed legislation would have negative impacts on their livelihoods and cultural practices. Suggest changes that are needed to the bill to ensure livestock sector's growth and development contribute to the overall well-being of rural communities and the country's agricultural economy. (250 words)

Difficulty level: Tough

Reference: [Indian Express](#), [Down to Earth](#)

Why the question:

The article discusses the withdrawal of the draft Livestock and Livestock Product Bill in India and provides an explanation for the decision.

Key Demand of the question:

To examine the issues with Livestock and Livestock Product Bill and changes require in it.

Structure of the answer:

Introduction:

Begin by mentioning the aims and objectives of Livestock and Livestock Product Bill.

Body:

First, enumerate the major features of Livestock and Livestock Product Bill.

In the next part, write about the major issues in the bill because of which it was withdrawn.

Next, suggest changes to make the bill more farmer centric and ensure its acceptance.

Conclusion:

Conclude by writing a way forward.

Introduction

The draft bill was issued on June 7, 2023 by the Union Ministry of Fisheries, Animal Husbandry and Dairying. The draft bill, on which the ministry requested public comments by June 17, framed measures for regulating import of livestock and livestock products as well as their promotion and development of exports.

However, the proposed bill faced sharp criticism from animal rights organisations and right-wing groups, especially on exporting live animals and on inclusion of canines and felines under the definition of 'livestock', meaning live canines and felines and their products can be imported and exported.

The withdrawal issued on June 20 stated that the proposed bill would need "wider consultation" after representations have been made expressing concerns.

Body

Background



- **The Live-stock Importation Act, 1898, being the pre-constitutional / pre-independence Central Act**, a need has been felt to align it with the contemporary requirements and prevailing circumstances related to sanitary and phytosanitary measures, and its extant Allocation of Business Rules, 1961.
- Basically, DAHD's (Department of Animal Husbandry and Dairying) role is primarily pertaining to support by having upgraded livestock health facilities, hygiene etc., including animal welfare aspects for overall development of the animal husbandry sector.

Features of draft Livestock Bill

- Firstly, the earlier law regulates only imports of livestock, **while the proposed draft Bill has provisions to regulate livestock exports also.**
- **Secondly, the draft bill has expanded the definition of livestock to include felines and canines also.**
- The Centre has defined the live-stocks and live-stock products as commodities in the proposed draft Bill.
- The proposed draft bill takes away some powers of state governments to regulate this area.

Criticisms faced by the bill

- Animal rights organizations have said that the draft Bill will open a **"Pandora's Box" of cruelties on animals.**
- This is because allowing the live export of animals from India is a **blanket free pass for the abuse of millions of animals farmed for food and other uses.**
- According to 2021 figures released by the United Nations, almost 2 billion of the 80 billion land animals raised for food around the world are exported alive to different countries.

Conclusion

The Bill is meant to replace the Live-stock Importation Act, 1898, and the Live-stock (Amendment) Act, 2001. It frames guidelines for the import and export of live animals, which has raised concerns among animal lovers. Seeing the criticism from all quarters and the bill touted as being against farmers, government has withdrawn the bill.

[Do you think urea should be brought under the Nutrient-Based Subsidy \(NBS\) regime? Examine its potential impact on the Indian agricultural sector. \(250 words\)](#)

Difficulty level: Tough

Reference: [Down to Earth](#)

Why the question:

The Commission for Agricultural Costs and Prices (CACP) has recommended that the Indian government bring urea under the Nutrient-Based Subsidy (NBS) regime to address the issue of overuse.

Key Demand of the question:



To write about the rationale behind to bring urea under the Nutrient-Based Subsidy (NBS), the benefits and challenges of including urea in the NBS regime,

Directive word:

Examine – When asked to ‘Examine’, we must investigate the topic (content words) in detail, inspect it, investigate it and establish the key facts and issues related to the topic in question. While doing so we should explain why these facts and issues are important and their implications.

Structure of the answer:

Introduction:

Briefly explain the concept of the Nutrient-Based Subsidy (NBS) regime.

Body:

In the first part, provide an overview of the CACP’s recommendation to bring urea under the NBS regime

Next, write about Current Scenario of Urea Usage – Highlight the prevalent use of urea in Indian agriculture, Discuss the drawbacks and consequences of excessive urea application and the need for regulating urea use to ensure sustainable agriculture

Next, write about Implications of the above for the Indian Agricultural Sector – Discuss the potential impact of urea regulation on crop productivity and soil health, Highlight the economic implications for farmers, fertilizer industry, and government subsidies, Assess the overall effect on food security and sustainability in India

Conclusion:

Conclude with a way forward.

Introduction

The **Nutrient Based Subsidy (NBS) regime** in India was introduced to promote the balanced use of NPK fertilizers in the optimal ratio of 4:2:1 (the current NPK ratio of fertilizer usage is approximately 6.7:2.4:1) and encourage farmers to use the right type and quantity of nutrient-based fertilizers for specific crops and soil types.

Body

Background

- The Commission for Agricultural Costs and Prices (CACP) has recommended the Centre to bring urea under the nutrient-based subsidy (NBS) regime to address the problem of imbalanced use of nutrients.
- The recommendations come four months after the government told Parliament that there was no proposal to shift urea to NBS, a scheme introduced in 2010, which links subsidy to the nutrient content of fertilisers.

No, Urea shouldn’t be brought under NBS Regime

- Urea is left-out in the NBS scheme and hence it remains under price control as NBS has been implemented only in other fertilizers.
- The MRP of urea is today officially fixed at Rs 5,628 per tonne.
- There is technically no price control in other fertilisers.
- The prices of the other fertilizers which were decontrolled have gone up that has led the farmers to use more urea than before.
- This has further worsened fertilizer imbalance.

Yes, Urea should be brought under NBS regime



- Fertiliser response and efficiency has continuously declined over decades mainly due to imbalanced use of nutrients, deficiency of micro and secondary nutrients and depletion of soil organic carbon, while fertiliser subsidy has been rising.
- The urea remains under price control and NBS has been implemented only in other fertilisers.
- Keeping urea out of NBS essentially means that the government has retained direct control over MRP of urea and its subsidy.
- The MRPs of other fertilisers have been under indirect control by virtue of NBS policy. Manufacturers of these fertilisers have the freedom to fix MRP within “reasonable limits”, and a fixed per-tonne subsidy linked to their nutrient content is given.
- The price of fertilisers (other than urea) — which were decontrolled have gone up from 2.5 to four times during these 10 years. However, since April 2010, the price of urea has been raised by hardly 11%.
- This has caused their MRPs to increase over the years, whereas urea’s price has remained unchanged.
- This has led to tilting of the usage of fertilisers in favour of urea because farmers have overused it, owing to its low pricing, thus resulting in deteriorating soil health.
- In order to address the imbalance in the fertilizer use, urea has to come under NBS.
- A feasible way to do it is by hiking urea prices and simultaneously reducing the NBS rates of phosphorus, potash and sulphur to make other fertilisers cheaper.
- Subsidised urea is getting diverted to bulk buyers/traders or even non-agricultural users such as plywood and animal feed makers.
- It is being smuggled to neighbouring countries like Bangladesh and Nepal.

Potential impact on the Indian agricultural sector

- The NBS policy incentivizes the production and use of fertilizers that contain a balanced mix of nutrients, which can help promote soil health and increase crop yields.
- The subsidy is provided based on the nutrient content rather than the quantity of fertilizer produced.
- This can lead to a **reduction in fertilizer use** which can minimize the negative environmental impact of excess fertilization. Thus it has improved soil health too.
- The NBS policy helps reduce the cost of fertilizers for farmers, which means that they can purchase fertilizers at more affordable prices. The subsidies allocated for urea-based fertilizers have also been reduced.

Conclusion

In the long run, **NBS itself should be replaced by a flat per-acre cash subsidy** that could be used to purchase any fertiliser. This subsidy must **include value-added and customised products** containing not just other nutrients, but delivering even nitrogen more efficiently than urea.



Food processing and related industries in India- scope' and significance, location, upstream and downstream requirements, supply chain management.

By investing in necessary infrastructure, the food processing industry in India can meet the growing demand for processed food items, create employment opportunities, contribute to economic growth, and ensure the availability of safe and nutritious food options for the expanding urban and young population. Examine. (250 words)

Difficulty level: Easy

Reference: [Insights on India](#)

Why the question:

The question is part of the static syllabus of General studies paper – 3.

Key Demand of the question:

To write about the steps that are needed to harness India's food processing potential.

Directive word:

Examine – When asked to 'Examine', we must investigate the topic (content words) in detail, inspect it, investigate it and establish the key facts and issues related to the topic in question. While doing so we should explain why these facts and issues are important and their implications.

Structure of the answer:

Introduction:

Begin by giving a statistic about current status of food processing industry in India.

Body:

First, in detail, write about the scope for food processing in India – youth population, growing demand, its suitability, sustained agricultural production etc.

Next, write about the steps that must be taken by the food processing industry to step up to realise its potential.

Conclusion:

Conclude by writing a way forward.

Introduction

Food processing generally includes the basic preparation of foods, the alteration of a food product (usually raw) into another form (as in making preserves from fruit), and preservation and packaging techniques. Food processing typically takes harvested crops or animal products and uses these to produce long shelf-life food products.

Body

Scope of FPIs

- India is the world's second largest producer of fruits & vegetables after China but hardly 2% of the produce is processed.
- India is among the top 5 countries in the production of coffee, tobacco, spices, seeds etc. With such a huge raw material base, we can easily become the leading supplier of food items in the world.
- In spite of a large production base, the level of processing is low (less than 10%). Approximately 2% of fruits and vegetables, 8% marine, 35% milk, 6% poultry are processed. Lack of adequate processable varieties continues to pose a significant challenge to this sector.
- **Economic Survey 2020:** During the last 6 years ending 2017-18, Food Processing Industries sector has been growing at an average annual growth rate of around 5.06 per cent.



Significance of the food processing industries:

The **Food Processing Industry (FPI)** is of enormous significance as it provides vital linkages and synergies that it promotes between the two pillars of the economy, i.e. agriculture and industry.

- **Employment Opportunities:** Food processing industries can absorb a major share of workers from the agriculture sector, who face disguised unemployment. It can lead to better productivity and GDP growth.
- **Doubling of farmers' income:** With contract farming, farmers can get better technological inputs from industries as well. There is income security and proportionate value for produce. They are also protected against price shocks.
- **Crop-diversification:** Food processing will require different types of inputs thus creating an incentive for the farmer to grow and diversify crops.
- **Farmer Beneficiaries:** The SAMPADA scheme is estimated to benefit about **37 lakh** farmers and generate about **6 lakh direct/ indirect employment** (ES 2020 data).
- **Curbing Distress Migration:** Provides employment in rural areas, hence reduces migration from rural to urban. Resolves issues of urbanization.
- **Prevents Wastage:** Nearly one-third of the food that is produced each year goes uneaten, costing the global economy **over \$940 billion** as per report by **World Resources Institute (WRI)**
 - India is biggest producer of numerous fruits and vegetable. Most of these are perishable and have very low shelf life. This is the major reason for high percentage of wastage. Their shelf life can be increased through food processing.
- **Value Addition:** Products such as tomato sauce, roasted nuts, de-hydrated fruits are in high demand.
- **Reduce malnutrition:** Processed foods when fortified with vitamins and minerals can reduce the nutritional gap in the population.
- **Boosts Trade and Earns Foreign exchange:** It is an important source of foreign exchange. For e.g. Indian Basmati rice is in great demand in Middle Eastern countries.
- **Make in India:** Food processing is one of the six superstar sectors under the GoI's, Make in India initiative and has the potential to transform India as a leading food processing destination of the World.
- **Curbing Food Inflation:** Processing increases the shelf life of the food thus keeping supplies in tune with the demand thereby controlling food-inflation.
 - **For e.g.** Frozen peas/ corn are available throughout the year.
 - Similarly, canned onions under Operation Greens can achieve price stability.

Challenges facing food processing industry in India

- Demand of processed food is mainly restricted to urban areas of India.
- Major problems are listed below:



- Small and dispersed marketable surplus due to fragmented holdings
- Low farm productivity due to lack of mechanization,
- High seasonality of raw materials
- Perishability and lack of proper intermediation (supply chain) result in lack of availability of raw material.
- This in turn, impedes food processing and its exports.
- More than 30% of the produce from farm gate is lost due to inadequate cold chain infrastructure.
- The NITI Aayog cited a study that estimated annual post-harvest losses close to Rs 90,000 crore.
- Lack of all-weather roads and connectivity make supply erratic.
- The food processing industry has a high concentration of unorganised segments, representing almost 75% across all product categories. Thus, causes the inefficiencies in the existing production system.
- Further, most processing in India can be classified as primary processing, which has lower value-addition compared to secondary processing.
- Due to this, despite India being one of the largest producers of agricultural commodities in the world, agricultural exports as a share of GDP are fairly low in India relative to the rest of the world.

Solutions to address the challenges

- The Ministry of Food Processing Industries (MoFPI) is implementing **PMKSY (Pradhan Mantri Kisan SAMPADA Yojana)**. The objective of PMKSY is to supplement agriculture, modernize processing and decrease agri-waste.
 - Mega Food Parks.
 - Integrated Cold Chain, Value Addition and Preservation Infrastructure.
 - Creation/Expansion of Food Processing/Preservation Capacities.
 - Infrastructure for Agro Processing Clusters.
 - Scheme for Creation of Backward and Forward Linkages.
- **Foreign Direct Investment (FDI) policy:** FDI up to 100%, under the automatic route is allowed in food processing industries.
- **Agri Export Zones:** To give thrust to export of agro products, new concept of Agri Export Zones was brought in 2001. **APEDA** has been nominated as the Nodal Agency to coordinate the efforts
 - cluster approach of identifying the potential products;
 - the geographical region in which these products are grown;



- Adopting an end-to-end approach of **integrating the entire process** right from the stage of production till it reaches the market (farm to market).

Conclusion

Food processing has a promising future, provided adequate government support is there. Food is the biggest expense for an urban Indian household. About 35 % of the total consumption expenditure of households is generally spent on food. As mentioned, food processing has numerous advantages which are specific to Indian context. It has the capacity to lift millions out of undernutrition. Government has its work cut out to develop industry in a way which takes care of small scale industry along with attracting big ticket domestic and foreign investments.

Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

What are critical minerals and on what basis are they designated as such? Ensuring access to critical minerals is crucial for strategic purposes and the advancement of clean energy technologies. Examine. (250 words)

Difficulty level: Tough

Reference: [Indian Express](#)

Why the question:

In a strategic move, the Centre has identified 30 critical minerals, including lithium, cobalt, nickel, graphite, tin and copper, which are essential for the country's economic development and national security.

Key Demand of the question:

To write about the ways to ensure resilient supply chains of critical minerals.

Structure of the answer:

Introduction:

Start by giving context of critical minerals and their basis of designation.

Body:

Firstly, in detail, mention the various threats and impediments to supply of critical minerals and rare earths and how any disruption in their supply will affect India.

Next, write about the measures that are needed to ensure their seamless supply and for India to get self-reliant in supply chain.

Conclusion:

Conclude by writing a way forward.

Introduction

Critical minerals are a group of minerals that are essential for various industrial sectors and have strategic importance for a country's economy and security. These minerals are characterized by their scarcity, high economic value, and criticality in the production of advanced technologies and defence systems.

Union Minister of Coal, Mines & Parliamentary Affairs has unveiled the first-ever report on "Critical Minerals for India." The report, prepared by an expert team constituted by the Ministry of Mines, identifies 30 strategically important critical minerals for the country.

Body

Basis for designation



- Mineral commodities that have important uses and no viable substitutes, yet face potential disruption in supply, are defined as critical to the Nation's economic and national security.
- Critical minerals are the building blocks of essential modern-day technologies.

Various threats and impediments to supply of critical minerals

- India faces global and domestic challenges in assuring resilient critical minerals supply chains. On the international front, there currently exist four significant risks.
- China, the most dominant player in the critical mineral supply chains, still struggles with Covid-19-related lockdowns. As a result, the extraction, processing and exports of critical minerals are at risk of slowdown.
- Russia is one of the significant producers of nickel, palladium, titanium sponge metal, and the rare earth element scandium.
- Ukraine is one of the major producers of titanium. It also has reserves of lithium, cobalt, graphite, and rare earth elements, including tantalum, niobium, and beryllium. The war between the two countries has implications for these critical mineral supply chains.
- As the balance of power shifts across continents and countries, the critical mineral supply chains may get affected due to the strategic partnership between China and Russia. As a result, developed countries have jointly drawn up partnership strategies, including the Minerals Security Partnership (MSP) and G7's Sustainable Critical Minerals Alliance, while developing countries have missed out.

Risks posed by their shortage

- Manufacturing renewable energy technologies would require increasing quantities of minerals, including copper, manganese, zinc, and indium.
- Likewise, the transition to electric vehicles would require increasing amounts of minerals, including copper, lithium, cobalt, and rare earth elements.
- However, India does not have many of these mineral reserves, or its requirements may be higher than the availability, necessitating reliance on foreign partners to meet domestic needs.

Measures taken by the government to ensure their supply

- India has set up KABIL or the Khanij Bidesh India Limited, a joint venture of three public sector companies, to ensure a consistent supply of critical and strategic minerals to the Indian domestic market.
- It ensures the mineral security of the nation; it also helps in realizing the overall objective of import substitution.
- India and Australia have reached a significant milestone in working towards investment in critical minerals projects to develop supply chains between the two countries.



- In mid-2020, India, through a newly floated state-owned company, had signed an agreement with an Argentinian firm to jointly prospect lithium in the South American country that has the third largest reserves of the metal in the world.
- India has shown interest in joining the USA-led Minerals Security Partnership (MSP) but has not found a place in the grouping because the country does not bring much expertise to the table.
- It would be desirable to participate in such multi-country dialogues.

Way forward and conclusion

- India has a geological potential similar to mining-rich Western Australia, much still needs to be explored.
- Given the increasing importance of critical and strategic minerals, there is an imperative need to create a new list of such minerals in the MMDR Act.
- The list may include minerals such as molybdenum, rhenium, tungsten, cadmium, indium, gallium, graphite, vanadium, tellurium, selenium, nickel, cobalt, tin, the platinum group of elements, and fertiliser minerals such as glauconitic, potash, and phosphate (without uranium).
- These minerals must be prospected, explored, and mined on priority, as any delays may hinder India's emissions reduction and climate change mitigation timeline.
- The reconnaissance and exploration of minerals must be encouraged, with particular attention given to deep-seated minerals. This will call for a collective effort by the government, 'junior' miners, and major mining companies.
- An innovative regime must be devised to allocate critical mineral mining assets, which adequately incentivises private explorers, including 'junior' explorers.
- Given the long lead times of setting up new exploration, extraction, and processing activities, these issues must be addressed soon if India is to utilise its natural wealth for its manufacturing needs.
- India needs to determine where and how the processing of minerals and assembly of critical minerals-embedded equipment will occur. Currently, India relies on global supplies of various processed critical minerals, as there are limited domestic sources.
- India requires a critical minerals strategy comprising measures aimed at making the country AatmaNirbhar (self-reliant) in critical minerals needed for sustainable economic growth and green technologies for climate action, national defence, and affirmative action for protecting the interests of the affected communities and regions.
- In addition, India must actively engage in bilateral and plurilateral arrangements for building assured and resilient critical mineral supply chains.
- Furthermore, the assessment of critical minerals for India needs to be updated every three years to keep pace with changing domestic and global scenarios.



- A national critical minerals strategy for India, underpinned by the minerals identified in this study, can help focus on priority concerns in supply risks, domestic policy regimes, and sustainability.

[Recognizing the interdependence of road safety and environmental sustainability is essential for developing a safer and greener transportation system. Discuss. \(250 words\)](#)

Difficulty level: Tough

Reference: [Indian Express](#), [Insights on India](#)

Why the question:

The article emphasizes the importance of addressing the various issues surrounding highway development in India.

Key Demand of the question:

To write about the efforts to improve road infrastructure in the country, causes behind increasing road accidents and measures need to improve road safety.

Directive word:

Discuss – This is an all-encompassing directive – you must debate on paper by going through the details of the issues concerned by examining each one of them. You must give reasons for both for and against arguments.

Structure of the answer:

Introduction:

Start by giving statistic relate to road safety in the country.

Body:

Frist, write about the various measures that have been taken in the recent past to improve the road infrastructure in the country.

Next, write reasons behind increasing road accidents – poor quality, lack of air bags, information deficit, overburdened roads etc.

Next, write about ways to reduce the road accidents and casualties due to it.

Conclusion:

Conclude by writing a way forward.

Introduction

The impact of road safety goes a long way. In addition to ensuring an easier, comfortable, and more secure commute, **safer roads also have a positive impact on the environment. In 2021, India reported 4,03,116 crashes**, each of which adversely impacted the environment in various ways and in different degrees.

Body

Statistics on road safety

- In 2020 alone, speeding was responsible for 91,239 road crash fatalities, comprising 69.3% of all road crash deaths registered.
- Speeding has consistently been responsible for over 60% of all road crash fatalities in India in the last five years.
- Simulation exercises in Europe have demonstrated that cutting motorway speed limits even by 10 km/h can deliver 12% to 18% fuel savings for current technology passenger cars, along



with a significant reduction in pollutant emissions, particularly Nitrogen Oxides and particulate matter (PM) output, from diesel vehicles.

Road safety and environmental sustainability linkage

- Most vehicles contain **toxic metals such as lead, mercury, cadmium or hexavalent chromium**, which are detrimental to the environment.
- Fuel and fluid leaks are seen at crash sites. Severe road crashes lead to automobile wreckage, which becomes a **part of unusable end-of-life vehicles**.
- This gives rise to scrappage. India is estimated to have about **22.5 million end-of-life vehicles by 2025**.
- Despite being one of the largest car and light commercial vehicle markets in the world, India's National Automobile Scrappage Policy, launched in 2021, is still in its nascent stages.
- With the absence of widespread, systematic facilities dedicated to their proper recycling, vehicles after road crashes as well as old end-of-life automobiles are **left to rot by the wayside**.
- Some **end up at landfills or at informal recycling facilities** where rudimentary hand tools are utilised to unscientifically dismantle them.
- This leads to the **leakage of hazardous constituents such as oils**, coolants and glass wool.
- Vehicle landfills turn into automobile graveyards leading to wasteful and sub-optimal land usage and water and soil pollution for decades.

Causes of road accidents

- Many road accidents are the result of **faulty road-design especially a single-lane one** with a sharp curve.
 - **Eg: In Cyrus Mistry accident**, a parapet wall was protruding dangerously.
- **Infrastructural deficits**: Pathetic **conditions of roads** and vehicles, poor **visibility** and **poor road design and engineering** – including quality of material and construction.
- **Negligence and risks**: Over speeding, driving under the influence of alcohol or drugs, tiredness or riding without a helmet, driving without seatbelts.
- **Distraction while driving like talking over mobile phones** while driving has become a major cause of road accidents.
- **Overloading** to save cost of transportation.
- **Weak Vehicle Safety Standards in India**: In 2014, crash tests carried out by the Global New Car Assessment Programme (NCAP) revealed that some of India's top-selling car models have failed the UN's frontal impact crash test.
- **Lack of awareness** among people regarding importance of safety features like airbags, Anti-lock Braking system etc. Moreover, Vehicle manufacturers do not provide them as standard fitment but only in higher class of vehicles reducing their reach.

Measures needed

Telegram: <https://t.me/insightsIAStips>

Youtube: <https://www.youtube.com/channel/UCpoccbCX9GEIwaile4HLjwA>

Facebook: <https://www.facebook.com/insightsonindia>



- **Implementation of Legislation:** The Motor Vehicles (Amendment) Act of 2019 has provisions that aim to bring about change.
- **Behavioural Changes:** Increasing motorcycle helmet use, increasing seat-belt uses and increasing child restraint use. Awareness regarding influence of alcohol on driving.
- **Safe Roads:** Safety consideration during the planning, design, and operation of roads, can contribute to reducing road traffic deaths and injuries.
- **Vehicular Safety Standards:** Vehicle safety features such as electronic stability control, effective Car Crash Standards and advanced braking should be made mandatory.
- **Awareness and Publicity:** Mass media and social media should be used effectively for spreading awareness about road safety.
- **Training and capacity building:** Training courses and training workshops have been organized for building capacity in road safety audits and road safety engineering.
- **Motor Vehicle Accident Fund** is proposed to be created. It will provide compulsory insurance cover to all road users in India for certain types of accidents.

Way forward

- **Zones of excellence in Road Safety Model:** Union and state governments can earmark smaller areas in some cities as **Zones of Excellence in Road Safety (ZoE)**.
 - All roads in the ZoE should be **properly lane-marked, zebra-marked, and signposted**.
 - Most markings and signage should, in addition to the pictorial image, define the instructions in words for easy understanding, and as a source of regular education of the road users.
 - A **dedicated corridor for emergency vehicles** must be marked.
- **Corrective action on the “black spots”** should be completed on top priority in a **ZoE**.
- In the meantime, temporary measures can be put in place to slow down, and guide the traffic.
 - It is also important to gradually provide enabling conditions such as improved, handicap-friendly footpaths, a safe lane for cyclists and pedestrians, more zebra paths with an inbuilt safety mechanism.
 - Round-the-clock checks should be conducted to enforce adherence to traffic norms in the earmarked ZoE.
- All **available tech devices should be deployed**, and private IT agencies of repute roped in.
- **Regular road safety awareness and education programmes** should be conducted in residential areas, over the weekends, with the active assistance of the RWAs/local bodies/NGOs.
- A **three-tier administrative structure** can be put in place to run a ZoE in a smooth, war-zone like spirit.

Conclusion



Roads and the environment are inseparable spaces. They are not just our shared resources but also our joint responsibility. Therefore, safer roads and a sustainable environment can be ensured only through the joint efforts of road-owning agencies, enforcement officials and the public.

[Green Hydrogen holds significant promise in ensuring energy security and combating climate change. By scaling up green hydrogen production and utilization, India can transition to a more sustainable energy system. Evaluate. \(250 words\)](#)

Difficulty level: Moderate

Reference: downtoearth.org.in

Why the question:

The article discusses the private sector's active involvement in the production of green hydrogen, as highlighted by Hardeep Singh Puri, India's Minister of Petroleum and Natural Gas, during a G20 event.

Key Demand of the question:

To write about the green hydrogen, its advantages, potential of Hydrogen as an eco-friendly fuel and steps India has taken in this regard.

Directive word:

Evaluate – When you are asked to evaluate, you have to pass a sound judgement about the truth of the given statement in the question or the topic based on evidence. You must appraise the worth of the statement in question. There is scope for forming an opinion here.

Structure of the answer:

Introduction:

Begin by defining green hydrogen.

Body:

Distinguish between Brown, Blue and Green Hydrogen. Mention how the Hydrogen fuel can secure India's energy security as well as help cut down carbon footprint.

Next, write about the advantages offered by green hydrogen.

Next, write about the Green Hydrogen Mission and its potential to harness green hydrogen for its developmental and clean energy ambitions. Mention that India has a number of obstacles to overcome in terms of technology, storage, transportation, new materials research, safety standards etc.

Conclusion:

Conclude by writing a way forward to maximise the benefits of the hydrogen fuel technology.

Introduction

Green hydrogen — also referred to as 'clean hydrogen' — is produced by using electricity from renewable energy sources, such as solar or wind power, to split water into two hydrogen atoms and one oxygen atom through a process called electrolysis. The Union Government recently notified the **green hydrogen and green ammonia policy aimed at boosting the domestic production of green hydrogen to 5 million tonnes by 2030** and making India an export hub for the clean fuel.

Green hydrogen is an emerging option that will help reduce India's vulnerability to such price shocks. The Cabinet has cleared India's **Rs 20,000 cr National Green Hydrogen Mission** to make the country a global green hydrogen hub..

Body

Advantages of Green hydrogen



- It is a clean-burning molecule, which can decarbonize a range of sectors including iron and steel, chemicals, and transportation.
- Renewable energy that cannot be stored or used by the grid can be channelled to produce hydrogen.
- India, being a **tropical country**, has a significant edge in **green hydrogen production** due to its favourable geographical conditions and abundant natural resources.
- Producing hydrogen from renewables in India is likely to be cheaper than producing it from natural gas.

Significance of Green Hydrogen in tackling energy challenges

- Green hydrogen energy is vital for India to meet its Nationally Determined Contribution (INDC) Targets and ensure regional and national energy security, access and availability.
- Green Hydrogen can act as an energy storage option, which would be essential to meet intermittencies (of renewable energy) in the future.
- In terms of mobility, for long distance mobilisations for either urban freight movement within cities and states or for passengers, Green Hydrogen can be used in railways, large ships, buses or trucks, etc.
- India is the **world's fourth largest energy consuming country** (behind China, the United States and the European Union), according to the IEA's forecast, and will overtake the European Union to become the world's third energy consumer by the year 2030.
- Realising the impending threats to economies, the Summit will see several innovative proposals from all over the world in order to reduce dependence on use of fossil fuels.
- The scale of interest for 'plucking the low hanging fruit' can be gauged by the fact that even oil-producing nations such as Saudi Arabia where the day temperature soars to over 50° C in summer, is prioritising plans to manufacture this source of energy by utilising 'idle-land-banks' for solar and wind energy generation.
- It is working to establish a mega \$5 billion 'Green hydrogen' manufacturing unit covering a land-size as large as that of Belgium, in the northern-western part of the country.
- India is also gradually unveiling its plans. The Indian Railways have announced the country's first experiment of a hydrogen-fuel cell technology-based train by retrofitting an existing diesel engine; this will run under Northern Railway on the 89 km stretch between Sonapat and Jind.
- The project will not only ensure diesel savings to the tune of several lakhs annually but will also prevent the emission of 0.72 kilo tons of particulate matter and 11.12 kilo tons of carbon per annum.

Challenges

- The 'production cost' of 'Green hydrogen' has been considered to be a prime obstacle.
- According to studies by the International Renewable Energy Agency (IREA), the production cost of this 'green source of energy' is expected to be around \$1.5 per kilogram (for nations



having perpetual sunshine and vast unused land), by the year 2030; by adopting various conservative measures.

- The global population is growing at a rate of 1.1%, adding about 83 million human heads every year on the planet.
- As a result, the International Energy Agency (IEA) forecasts the additional power demand to be to the tune of 25%-30% by the year 2040.
- Thus, power generation by 'net-zero' emission will be the best solution to achieve the target of expert guidelines on global warming to remain under 1.5° C.
- This will also be a leap forward in minimising our dependence on conventional fossil fuel; in 2018, 8.7 million people died prematurely as result of air pollution from fossil fuels.
- India has made good progress in decarbonization growing the share of renewable energy, energy efficiency & fuel transition.
- There is growing interest and hype for using hydrogen in multiple applications such as Hydrogen-based Agro vehicles, Hydrogen-powered passenger trains, Hydrogen in aviation etc.

Way forward

- As India is scaling up to the target of having 450 GW of renewable energy by 2030, aligning hydrogen production needs with broader electricity demand in the economy would be critical.
- The industrial sectors like steel, refining, fertilizer & methanol sectors are attractive for Green Hydrogen adoption as Hydrogen is already being generated & consumed either as a chemical feedstock or a process input.
- The public funding will have to lead the way in the development of green hydrogen, but the private sector has significant gains too to be made by securing its energy future.
- India requires a manufacturing strategy that can leverage the existing strengths and mitigate threats by integrating with the global value chain.
- The green hydrogen has been anointed the flag-bearer of India's low-carbon transition as Hydrogen may be lighter than air, but it will take some heavy lifting to get the ecosystem in place.
- Enforcing time-bound mid- and long-term policies would inspire the private sector to invest more in green hydrogen.
- India should aim to produce 4-6 million tonnes of green hydrogen per annum by the end of the decade and export at least 2 million tonnes per annum.



What are the various bottlenecks to an energy secure India? How can the government ensure successful energy transition towards renewable sources? Examine the role of state governments as key drivers in achieving India's renewable energy goals. (250 words)

Difficulty level: Tough

Reference: [The Hindu](#)

Why the question:

The article titled discusses the significance of state-level actions in India's energy transition.

Key Demand of the question:

To write about the various bottlenecks to energy secure India, steps needed for energy transition and role of state governments in it.

Structure of the answer:

Introduction:

Define the giving context by citing a statistic about the current status of energy transition in India.

Body:

In the first part, write about the various bottlenecks for an energy secure India – coal shortages, volatility of crude oil, increasing demand, climate commitments and lack of diversification of resources.

Next, write about the various measures that are needed to transition towards renewable sources without adversely affecting energy security.

Next, examine the role state governments can play in the above. Write about their strengths and limitations.

Conclusion:

Conclude by writing a way forward.

Introduction

Climate sustainability is **integral to India's economic policy while energy security also is equally important in this transitional phase.** The energy transition will also have far-reaching implications for energy security, and the ripple effects of unfolding events in Ukraine are a sobering reminder of its relevance.

Clean energy appears to be the future for the power needs of humanity across the globe as reliance of fossil fuels continues to diminish. However, the road to clean energy is not straight forward and here is where the government must rely on calculated measure to balance energy security and net-zero commitments.

Body

Obstacles to an energy secure India

- The **country's demand for energy** is set to **double by 2040**, and its **electricity** demand may
- Indian oil consumption is expected to grow faster than that of any other major economy (including China). This makes further improving energy security a key priority for India's economy.
- India's **oil demand** is expected to reach **6 million barrels per day (bpd) by 2024** from 4.4 million bpd in 2017, but its domestic production is expected to rise only marginally, making the country more reliant on crude imports and more **vulnerable to supply disruption in the Middle East.**



- India's **oil refining capacity is expected to rise to 5.7 million bpd by 2024**, making it a very attractive market for refinery investment.

Ensuring energy security while honouring its net zero commitments

- **Focus on Energy Efficiency:** Will need **energy efficient buildings, lighting, appliances and industrial practices** to meet the net-zero goal.
- **Increased usage of Biofuels:** Can help reduce emissions from light commercial vehicles, tractors in agriculture.
 - In aviation, the only practical solution for reducing emissions is greater use of biofuels, until hydrogen technology gains scale.
- **Transition towards Electric vehicles:** This will further help curb the carbon emissions and move towards cleaner fuel. Vehicular emissions are one of the biggest sources of GHG.
- **Carbon Sequestration: India will have to rely on natural and man-made carbon sinks to soak up those emissions.** Trees can capture 0.9 billion tons; the country will need carbon capture technologies to sequester the rest.
- **Carbon Pricing:**
 - India, which already taxes coal and petroleum fuels, should consider putting a tax on emissions to drive change.
- **Deploying lower-carbon Energy:** There are four main types of low-carbon energy: **wind, solar, hydro or nuclear power**. The first three are renewable, which means these are good for the environment – as natural resources are used (such as wind or sun) to produce electricity.
 - Deploying lower carbon energy would help address both domestic and international climate challenges while simultaneously improving the economic well-being of India's citizens.
- **Mainstreaming Renewable energy:** India's energy mix is dominated by coal powered electric generation stations as of now.
 - The need of the hour is increasing the share of renewable energy in this energy mix.

Role of state governments as key drivers in achieving India's renewable energy goals

- India's achievements on its 2022 target for 175 GW renewable energy offer some insights into the complexities.
- While it achieved a significant portion of the target, only Gujarat, Karnataka, and Rajasthan met their individual targets.
- Moreover, about 80% of the current renewable energy capacity is confined to Six states in the west and south of India.
- States as spheres of implementation are critical to the realisation of national targets.
- While the Centre may set goals, and use carrots and sticks to help achieve them, the realisation of these goals often depends on how they are aligned with State priorities and capabilities.



- The legacy issues in the electricity sector, such as high losses, unreliable supply and service quality, if left addressed, could be exacerbated by the transition.
- These are embedded in the State political economy and must be addressed at the State level.
- States as laboratories of policy innovations have been instrumental to India's energy transition.
- For example, early initiatives by Gujarat and Rajasthan on solar, and Maharashtra and Tamil Nadu on wind energy technologies, have contributed significantly to renewable energy uptake at the national level.
- Similarly, PM KUSUM is an adoption of successful State experiments on the solarisation of agriculture at a national scale.
- States could also be roadblocks to national goals, particularly when the goals are perceived to be misaligned with State priorities.

Conclusion and way forward

- Given the massive shifts underway in India's energy system, we would benefit from taking stock of our actions and focusing on near-term transitions.
- This will allow us to meet and even over-comply with our 2030 target while also ensuring concomitant developmental benefits, such as developing a vibrant renewable industry.
- We can start putting in place the policies and institutions necessary to move us in the right direction for the longer-term and also better understand, through modelling and other studies, the implications of net-zero scenarios before making a net-zero pledge.
- It would also be in India's interest to link any future pledge to the achievement of near-term action by industrialised countries.
- That would be fair and consistent with the principles of the UNFCCC and also enhance the feasibility of our own actions through, for example, increasing availability and reducing costs of new mitigation technologies.

There appears to be no turning back on the path of decarbonized economic growth for India. The recent Union budget has made this sufficiently clear. The scale of the challenge is also balanced by an opportunity. It's the execution that will now determine the pace at which we proceed along that path.

Value addition

India on path to achieve carbon neutrality

- **Exceeding the NDC commitment:** *India is on track (as reports/documents show) to meet and exceed the NDC commitment to achieve 40% electric power installed capacity from non-fossil fuel-based sources by 2030.*
- **Reduction in emission intensity of GDP:** *Against the voluntary declaration for reducing the emission intensity of GDP by 20%-25% by 2020, India has reduced it by 24% between 2005-2016.*



- *More importantly, we achieved these targets with around 2% out of the **\$100 billion committed to developing nations in Copenhagen (2009)**, realised by 2015.*
- **Renewable energy expansion:** *India is implementing one of the most extensive renewable energy expansion programmes to achieve 175 GW of renewable energy capacity by 2022 and 450 GW by 2030.*
- *Investment in green measures: As part of the fiscal stimulus after the pandemic, the Government announced several green measures, including:*
 - **a \$26.5-billion investment in biogas and cleaner fuels,**
 - **\$3.5 billion in incentives** for producing efficient solar photovoltaic (PV)
 - **and advanced chemistry cell battery, and \$780 million towards an afforestation programme.**
- *India's contribution to global emissions is well below its equitable share of the **worldwide carbon budget by any equity criterion.***

Science and Technology- developments and their applications and effects in everyday life; Achievements of Indians in science & technology; indigenization of technology and developing new technology.

[What is semiconductor fabrication? With a well-planned strategy, India can make significant strides toward achieving self-reliance in semiconductor manufacturing, bolstering its scientific capabilities, and enhancing its strategic position in the global technology landscape. Analyse. \(250 words\)](#)

Difficulty level: Moderate

Reference: [The Hindu](#) , [Insights on India](#)

Why the question:

The article discusses the importance of India developing its own semiconductor fabrication (fab) industry.

Key Demand of the question:

To write about applications of semi-conductors and how the government can create a thriving domestic semiconductor industry.

Directive word:

Discuss – *This is an all-encompassing directive – you must debate on paper by going through the details of the issues concerned by examining each one of them. You must give reasons for both for and against arguments.*

Structure of the answer:

Introduction:

Begin by giving a statistic highlighting strategic significance of semiconductors in India.

Body:

In the first part, discuss the various applications of semiconductors – computers, phones, server farms, missiles and in their guidance systems, warplanes, submarines, aircraft carriers, satellites etc. Next, write about the steps need to create a robust domestic industry for semiconductors – tackling R&D problems, funding, solving intellectual property issues. Mention various measures already initiated by the government in this regard.

Conclusion:

Conclude with a way forward.

Introduction



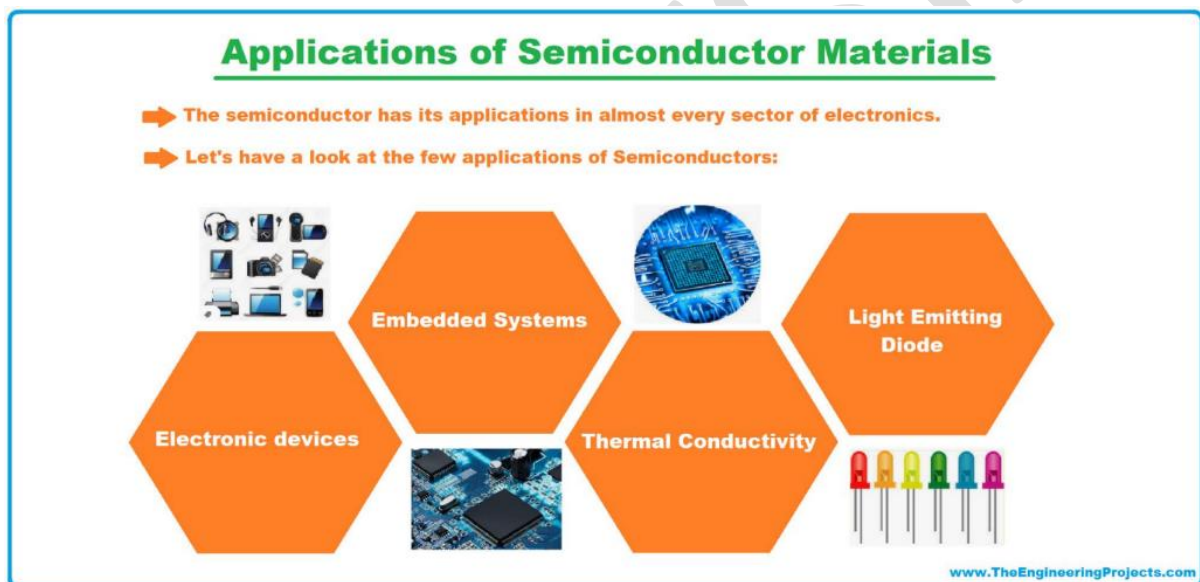
Semiconductor device fabrication is the process used to manufacture semiconductor devices, typically integrated circuits (ICs) such as computer processors, microcontrollers, and memory chips (such as NAND flash and DRAM) that are present in everyday electrical and electronic devices. It is a multiple-step photolithographic and physio-chemical process (with steps such as thermal oxidation, thin-film deposition, ion-implantation, etching) during which electronic circuits are gradually created on a wafer, typically made of pure single-crystal semiconducting mate.

India's ambition of [manufacturing semiconductor chips](#) appears to be taking longer to materialize.

Body

Background

- **Three entities**(Vedanta-Foxconn, international consortium ISMC and Singapore-based IGSS Ventures) that had applied to build the chips are **facing hurdles in setting up their manufacturing plants in India.**
- The Centre, which expects its semiconductor market to be **worth \$63 billion by 2026**, had received three proposals to set up a fab (fabrication/production) in the country.



Challenges

- For one, the **level of fiscal support** currently envisioned is **minuscule** when one considers the scale of investments typically required to set up manufacturing capacities in the various sub sectors of the semiconductor industry.
- A semiconductor fabrication facility, or fab, can **cost multiples of a billion dollars** to set up even on a relatively small scale and lagging by a generation or two behind the latest in technology.
- Even granting that **India's Production Linked Incentive scheme** intends to give only 50% of the cost of setting up at least two greenfield semiconductor fabs by way of fiscal support, not much of the current scheme outlay of approximately \$10 billion is likely to be left to



support other elements including display fabs, packaging and testing facilities, and chip design centres.

- Chip fabs are also very thirsty units **requiring millions of litres of clean water and extremely stable power supply.**
- India has a decent chip design talent but it never built up chip fab capacity. The ISRO and the DRDO have their respective fab foundries but they are primarily for their own requirements and also not as sophisticated as the latest in the world.
- It may be best if the new mission **focuses fiscal support**, for now, on other parts of the chip-making chain including design, where surely India already has considerable talent and experience.

Way Forward

- Given the long gestation periods and rapid technology changes, **India must out-strategize on design and functionality** as the end product will be out only after three-four years from the moment work begins, by which point the prevailing chip shortage would have been resolved, while technology would have advanced further.
- Apart from incentivising more FDI in electronics to deepen our supply chains through incentive schemes, we need to focus on encouraging Indian manufacturers and start-ups to enter and master complex R&D and manufacturing verticals.
- We can then ensure that valuable **Intellectual Property** is created and owned by Indian companies.
- The semiconductor industry is changing fast as new-age technologies require **innovation at the design, material, and process levels.**
- Indian engineers have contributed immensely to this area in multinational companies. We must encourage them to set up their design start-ups with handsome government grants and tax incentives.
- Premier research institutions such as the Indian Institute of Science should also be asked to work aggressively on R&D in chip designing and manufacturing.
- Further, the government must focus on emerging technologies like LiDAR and Phased Array in which incumbents do not have a disproportionate advantage and the entry barrier is low.
- By working aggressively in new cutting-edge technologies, India can ensure that it becomes Aatmanirbhar.
- India needs to push for a **Quad Supply Chain Resilience Fund** to immunise the supply chain from geopolitical and geographic risks
- India and Taiwan have started negotiations for a **free-trade agreement and setting up a semiconductor manufacturing hub in an Indian city**, signalling their resolve to further expand the two-way economic engagement.

Conclusion

The program will usher in a new era in electronics manufacturing by providing a globally competitive incentive package to companies in semiconductors and display manufacturing as well as design. The



program will promote **higher domestic value addition in electronics manufacturing** and will contribute significantly to achieving a **USD 1 Trillion digital economy and a USD 5 Trillion GDP by 2025**. This shall pave the way for India's technological leadership in these areas of strategic importance and economic self-reliance.

Value addition

Government initiatives in this regard

The Union Cabinet's decision to set **aside ₹76,000 crore for supporting the development of a 'semiconductors and display manufacturing ecosystem'** is a belated but welcome acknowledgment of the strategic significance of integrated circuits, or chips, to a modern economy.

- **India Semiconductor Mission:**
 - In order to drive the long-term strategies for developing a sustainable semiconductors and display ecosystem, **a specialised and independent India Semiconductor Mission (ISM) will be set up.**
 - ISM will be led by **global experts in the semiconductor and display industry.** It will act as the nodal agency for efficient and smooth implementation of the schemes on Semiconductors and Display ecosystem.
- **Production Linked Incentives:**
 - Incentive support to the tune of Rs.55,392 crore (7.5 billion USD) has been approved under **PLI for Largest Scale Electronics Manufacturing, PLI for IT Hardware, SPECS Scheme and Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme.**
 - In addition, PLI incentives to the quantum of Rs.98,000 crore (USD 13 billion) is approved for allied sectors comprising **ACC battery, auto components, telecom & networking products, solar PV modules and white goods.**
- **Semiconductor Fabs and Display Fabs:**
 - It would provide **fiscal support of up to 50% of the project cost** for setting up semiconductor and display fabrication units.
 - The Union government will work with the States to **set up high-tech clusters with the required infrastructures** such as land and semiconductor-grade water.
- **Semi-conductor Laboratory (SCL):**
 - MeitY will take **requisite steps for modernization and commercialization of Semi-conductor Laboratory (SCL).**
 - MeitY will explore the possibility **for the Joint Venture of SCL with a commercial fab partner** to modernise the brownfield fab facility.
- **Compound Semiconductors:**
 - It will support **fiscal support of 30% of capital expenditure to approved units.**
 - **At Least 15 such units** of Compound Semiconductors and Semiconductor Packaging **are expected to be established** with Government support under this scheme.



- **Semiconductor Design Companies:**
 - **The Design Linked Incentive (DLI) Scheme shall extend product design linked incentive of up to 50% of eligible expenditure and product deployment linked incentive of 6% – 4% on net sales for five years.**
 - **Support will be provided to 100 domestic companies of semiconductor design for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design.**

[Discuss the concerns surrounding the approval of Neuralink for humans. Examine the potential risks from the Neuralink project. \(250 words\)](#)

Difficulty level: Moderate

Reference: [Indian Express](#)

Why the question:

On May 25, the USFDA approved an implantable Brain-Computer Interface (BCI) for clinical trials in humans.

Key Demand of the question:

To write about the potential risks from the Neuralink project.

Directive word:

Discuss – This is an all-encompassing directive – you must debate on paper by going through the details of the issues concerned by examining each one of them. You must give reasons for both for and against arguments.

Structure of the answer:

Introduction:

Briefly introduce Neuralink, a company founded by Elon Musk aiming to develop brain-machine interface technology.

Body:

First, explain the neuralink technology in brief.

Next, write about the potential risks associated with it – potential risks to human health, ethical considerations are discussed, including privacy concerns and the potential for misuse or manipulation of neural signals. socioeconomic divide etc.

Next, write about the need for a robust regulatory framework and oversight.

Conclusion:

Conclude by writing a way forward.

Introduction

On May 25, the USFDA approved an implantable Brain-Computer Interface (BCI) for clinical trials in humans. **The company building the device is Neuralink, a neurotech startup co-founded in 2016, by tech mogul Elon Musk and a group of young neuroscientist-engineers..**

Body

About Neuralink

- A relatively low-key start-up compared to other companies headed by Musk, Neuralink's **mission is two-fold: treating brain disorders and eventually, fusing human consciousness with AI.**
- The company hopes to build a surgically implantable chip containing several electrodes that essentially allows the brain to convey intent of movement to a device connected via



Bluetooth (e.g. a smartphone, to begin with) and then the device decodes the neural data and converts intent to action.

- **For example**, moving a cursor to a certain point and clicking or pressing a button with a robotic arm

Concerns associated with neuralink

- **Data opacity:** There is complete data opacity when it comes to backing the claims with evidence.
 - Instead, the company has relied on **episodic launch videos and show-and-tell events live-streamed on YouTube**, which predictably went viral very quickly.
 - Despite how cool the videos make it out to be, there remain several major safety and **viability concerns with Neuralink**, even if one does not engage with the obviously murky ethics of creating **trans-humans whose consciousness is fused with AI**.
- **Untested:** One major problem with Neuralink is scant published data that support its claims.
 - **There is just one article published in 2019, preceding the launch, with Musk and Neuralink sharing the authorship, that too, not in a prominent journal**, which describes the chip, the process of implantation of the chip by a surgical robot and shows one exemplar picture of a rodent with the implant.
- **Feasibility not supported:** However, before a device is approved for use in humans, its **feasibility and safety parameters need in-depth pre-clinical assessment in more complex mammals such as pigs, sheep and monkeys**. In one of the show-and-tell livestreams, Musk demonstrated a sole monkey, playing a video game with just eye movements.
- **Safety of implant:** In the case of an invasive surgical implant, questions immediately arise about **how safe the materials used in the fabrication of the implants are** — how truly inert they are — and despite the coatings on the surface, how stable is the material.
 - Before this is anywhere near implantation in humans, it has to be ascertained that **there is no leaching of any harmful chemical in the brain over time and the impact of small everyday actions**, like bumping into something, has to be studied.
 - The second concern is the thin wires, **which will arguably build more resistance and be susceptible to heat generation**.

Potential risks from Neuralink project

- **No quantitative data:** In the case of Neuralink, except for showing individual animals, and images from a brain (without even disclosing if that brain in question is a rodent, a pig or a monkey) there is no **released imaging or quantitative data from their so-called histology unit**.
- **Mortality:** There is no data published **about the per cent mortality in experimental animals or the success rate of the surgery**. There is pretty much no quantitative data available to the public about the safety of the procedure, or the efficacy of the implant — except what the Neuralink team chooses to display in a purely qualitative fashion.



- **Animal rights violation:** To make matters worse, a lawsuit by an animal ethics group has revealed several violations of animal welfare by Neuralink **with monkeys being used for invasive implant surgeries, and high mortality among animals** from surgery-related infections or other complications.
 - The company is also being investigated for the same by federal agencies.
 - Collectively, these events point to a general culture of secrecy about data regarding the safety of the device and its efficacy against non-invasive BCIs, which are also in development.
 - In addition, there is a conscious effort to mitigate the critical eye by dialling up the coolness factor for the general public.
- It is, however, known that Neuralink filed for this approval in 2022 and the FDA rejected the application, citing safety issues with the lithium batteries in the implanted chip and other concerns.
- It is unclear on what basis the FDA revised their decision. In an ideal world, companies would be ethical and the FDA would also be exacting and relentless in their scrutiny before approving a device. However, in reality, neither really applies when it comes to companies with deep pockets that routinely lobby legislators and regulatory authorities to review their products favourably for approvals.

Conclusion

It is, however, known that Neuralink filed for this approval in 2022 and the FDA rejected the The scientific and medical communities need to keep their eyes peeled, despite cautious optimism, because medical history in the US is full of instances when companies prioritise profit over patient safety, and regulatory oversight fails to curb such practices. Before the ethics of creating cyborgs can be debated at length, we need to ensure whether the Neuralink device is safe and offers any actual benefit over non-invasive counterparts.

Topic: Disaster and disaster management.

6. Government preparedness is essential in mitigating the impact of devastating cyclones. Preparedness can significantly reduce the loss of lives and properties, minimize disruptions, and facilitate the recovery process after cyclones. Analyse. (250 words)

Difficulty level: Moderate

Reference: [The Hindu](#), [Insights on India](#)

Why the question:

Strong winds and heavy rains pound Gujarat's coastal belt as cyclone Biparjoy made a landfall near Jakhau Port in Gujarat's Kutch district after churning across the Arabian Sea for over 10 days,

Key Demand of the question:

To write about the role of government preparedness in cyclone mitigation.

Directive word:



Evaluate – When you are asked to evaluate, you have to pass a sound judgement about the truth of the given statement in the question or the topic based on evidence. You must appraise the worth of the statement in question. There is scope for forming an opinion here.

Structure of the answer:

Introduction:

Begin by providing context and the increasing frequency of cyclones in India.

Body:

In first part, bring out the economic costs and human costs as a result of devastation caused by the severe cyclones.

Next, write about the role of government preparedness – installing a disaster warning system in the coastal districts, and construction of evacuation shelters in cyclone-prone districts etc.

Next, mention long term measures – Embankments that are resilient to storm surges, improved prevention of flooding from swollen rivers and coastal mangrove habitats regeneration etc.

Conclusion:

Conclude with a way forward as the how the above will help mitigate the impact of devastating cyclones.

Introduction

A cyclone is a large-scale air mass that rotates around a strong center of low atmospheric pressure. [Cyclones](#) are characterized by inward spiraling winds that rotate about a zone of low pressure. Tropical cyclones are intense low-pressure areas confined to the area lying between 30° N and 30° S latitudes, in the atmosphere around which high velocity winds blow. Horizontally, it extends up to 500-1,000 km and vertically from surface to 12-14 km.

Strong winds and heavy rains pounded Gujarat's coastal belt as **cyclone Biparjoy** made a landfall near Jakhau Port in Gujarat's Kutch district after churning across the Arabian Sea for over 10 days.

Body

IPCC research shows that the frequency and severity of cyclones will increase due to the warming of oceans and melting glaciers. Of India's 7,500 kilometre coastline, almost 5,700 kilometres are highly vulnerable to the impacts of tropical cyclones and related hydro-meteorological hazards and consequently to recurrent loss of life and properties. Approximately 40 percent of the total population in the maritime states, lives within 100 kms of coastlines.

Impacts of cyclones

- **Economic costs:** India lost around 2% of GDP and 15% of total revenue over 1999-2020. According to the **Global Climate Risk Index report 2021**, India ranks the seventh worst-hit country globally in 2019 due to the frequent occurrence of extreme weather-related events. Moreover, the report showed that India lost around 2,267 human lives, while damages stood at \$68,812 million in Purchasing Power Parity (PPP) terms in 2019. In the same year, India ranked first concerning human deaths and economic losses due to extreme weather-related events.



- **Coastal Flooding:** It is likely to reshape the coastlines and potentially inundate or even submerge many low-lying areas. Cities like Mumbai, Chennai, and Hyderabad are endangered by cyclone storms.
- **Destruction of Coastal Biodiversity:** Frequent storms can cause destructive erosion, wetland flooding, aquifer and agricultural soil contamination with salt, and lost habitat for biodiversity.
- **Dangerous Storm Surges:** Higher sea levels are coinciding with more dangerous hurricanes and typhoons leading to loss of life and property.
- **Regional Climate:** Tropical cyclones can quickly change the environment of the affected areas. They can bring warmer air into hot places. This makes the atmosphere feel very sticky and muggy and rises the temperature dramatically. This can cause heat strokes and other heat related illness to children and the elderly after the storm which is not good.
- **Fishing and livelihood:** Loss of habitat and Loss of juveniles and brood fishes. Loss of livelihoods of farmers and fishermen: Statistics show that the global average annual losses from cyclones and storm surges are estimated at US\$ 80 billion. Small fishermen with no state-of-the-art technology are usually advised to stay off the seas before and during the cyclones.
- **Lateral and Inland Migration:** Flooding in low-lying coastal areas is forcing people to migrate to the higher ground causing displacement and dispossession and in turn a refugee crisis
- **Effect on Communications Infrastructure:** The prospect of higher coastal water levels threatens basic services such as internet access.
- **Threat to Inland Life:** Rising seas can contaminate soil and groundwater with salt threatening life farther away from coasts.
- **Tourism and Military Preparedness:** Tourism to coastal areas and military preparedness will also be negatively affected by an increase in cyclone storms
- The interesting thing is that the **frequency of tropical cyclones has decreased** ever so slightly over the last 70 years.

Role of government preparedness

- **National Disaster Management Authority (NDMA)** has responsibility of formulating **National Guidelines for Management of Cyclones** and **India Meteorological Department (IMD)** is the nodal agency for providing cyclone warning services to communities and important officials in affected areas.
- The **National Cyclone Risk Mitigation Project (NCRMP)**, to be implemented with financial assistance from the World Bank, is envisaged to have four major components:
 - Component A: Improvement of early warning dissemination system by strengthening the Last Mile Connectivity (LMC) of cyclone warnings and advisories.
 - Component B: Cyclone risk mitigation investments.



- Component C: Technical assistance for hazard risk management and capacity-building.
- Component D: Project management and institutional support.
- These components are highly interdependent and have to be implemented in a coherent manner.
- Its **aim** is to undertake suitable structural and non-structural measures **to mitigate the effects of cyclones** in the coastal states and UTs of India.
- The **NDMA** had come up with its **National Guidelines of Management of Cyclones in 2008**. The basic premise of these guidelines is that the mitigation has to be multi-sectoral.

Challenges posing the Cyclone Management in India

- India has a **coastline of about 7,516 km**, 5,400 km along the mainland, 132 km in Lakshadweep and 1,900 km in the Andaman and Nicobar Islands.
- On an average, **five to six tropical cyclones form every year**, of which two or three could be severe.
- More cyclones occur in the Bay of Bengal than the Arabian Sea and the ratio is approximately 4:1. This is **now changing due to impact of climate change**.
- There is an over-emphasis on a total evacuee figure, particularly in states such as Odisha.
- There exists an inadequate focus on response aspects other than evacuation, such as measures to minimise crop damage, assistance for quick harvest, adequate relief and timely distribution of post-cyclone assistance such as for damaged houses, etc.

Measures needed to tackle such incidences:

Short term measures:

- provide cyclone forecasting, tracking and warning systems
- Construction of cyclone shelters, cyclone resistant buildings, road links, bridges, canals, drains etc.
- Establishing Early Warning Dissemination System (EWDS), and Capacity building for coastal communities.
- Mock drills, and training of local population and police by NDRF and SDRF
- Plantations of strong rooted trees, canopies, mangroves and proper vegetation cover which act as first line of defence.
- Proper drainage system throughout the city to discharge the water as soon as possible to avoid flood like conditions
- Use of NAVIC and RESOURCESAT-2 for disseminating coastal information and helping in disaster management.
- Implementation of National Cyclone Risk Mitigation Project

Long term measures:



- The **National Cyclone Risk Mitigation Project (NCRMP)**, to be implemented with financial assistance from the World Bank, is envisaged to have four major components:
 - Component A: Improvement of early warning dissemination system by strengthening the Last Mile Connectivity (LMC) of cyclone warnings and advisories.
 - Component B: Cyclone risk mitigation investments.
 - Component C: Technical assistance for hazard risk management and capacity-building.
 - Component D: Project management and institutional support.
- These components are highly interdependent and have to be implemented in a coherent manner.
- The **NDMA** had come up with its **National Guidelines of Management of Cyclones in 2008**. The basic premise of these guidelines is that the mitigation has to be multi-sectoral.
- **Developing Integrated Coastal Zone Management (ICZM) frameworks** for addressing the sustainability and optimal utilisation of coastal resources as also cyclone impact minimisation plans.
- Ensuring **cyclone resistant design standards** are incorporated in the rural/ urban housing schemes in coastal areas
- **Implementing coastal flood zoning, flood plain development and flood inundation management and regulatory plans.**
- **Coastal bio-shields** spread, preservation and restoration/ regeneration plans.
- There is a **need for private sector participation** in designing and implementing policies, plans, and standards.
- Need of **Disaster Management program** to be inclusive including women, civil society, and academia.

Conclusion

India should prepare to mitigate and deflect the destruction caused by Cyclones. We need to employ technology, strict following of command structure and most importantly the participation and cooperation of local communities in the affected area.

Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.

[Analyse India's participation in the Artemis Accords and its implications for space exploration and utilization. Discuss the benefits, and concerns associated with this international agreement. \(250 words\)](#)

Difficulty level: Easy

Reference: [The Hindu](#)

Why the question:



The article discusses India's participation in the Artemis Accords, an international agreement led by NASA that aims to establish a framework for cooperation among nations in exploring and utilizing resources on the Moon.

Key Demand of the question:

To write about Artemis Accords, benefits and concerns associated with it.

Structure of the answer:

Introduction:

Briefly explain the Artemis Accords and their significance in the context of space exploration.

Body:

First, write about the Benefits of India's participation – Scientific advancements, Technological collaborations, Economic opportunities.

Next, write about the Challenges and concerns associated with the above – Sovereignty and national interests, Equity and inclusivity and Environmental sustainability etc.

Conclusion:

Conclude with a way forward.

Introduction

NASA, in coordination with the U.S. Department of State, established the Artemis Accords in 2020 together with seven other founding member nations. Artemis Accords ensures that space exploration is conducted in a **safe, sustainable and transparent manner and in full compliance with international law**. It is a **non-binding set of principles designed to guide civil space exploration and use in the 21st century**. As more countries establish a presence in outer space, via research stations, satellites, or even rocket launchers, these **accords provide a set of principles** to create a safe and transparent environment that inspires exploration, science, and commercial activities.

Recently, India became the 27th country to sign the Artemis Accords.

Body

India's participation in the Artemis Accords and its implications for space exploration and utilization

- India has firmly backed a US-led alliance on space issues by joining the Accords, an alliance that presently and most certainly in the future would exclude Russia and China, two of the most significant spacefaring states.
- By signing the agreement, India can work with other countries, notably the United States, on upcoming Moon missions.
- This partnership makes it possible to share information and skills, advancing scientific inquiry, technological innovation, and the expansion of humanity's presence in space.
- To create a viable and long-lasting presence on the Moon, cooperation with other nations is crucial to the deal.
- The journey to Mars, which would be the first time astronauts have visited the red planet, depends on its presence.

Benefits of signing Artemis Accords

- A lot of what India plans to do in space — human missions, moon landings, planetary explorations, setting up a space station — has already been done by countries like the US, Russia or China.



- The fact that India has not yet sent manned missions to space, or even landed a satellite on the moon, is not because of lack of capacity or expertise. It has a lot to do with the technology denial regime of the early years.
- Joining the US-led alliance is an attempt by India to leapfrog and start collaborating on the next generation of technologies, even as it pursues its own efforts to implement its space plans.

Concerns associated

- Russia has been India's most trusted partner in the space sector, just like it has been in defence.
- Even recently, it was Russia that offered its facilities to train Indian astronauts for the Gaganyaan mission.
- Joining an alliance that is seen to be aimed at promoting US interests in space is not likely to be seen very favourably by Russia.
- Joining the alliance and seeking collaboration with other nations could potentially lead to overreliance on external technologies.
- As India aligns with the US-led alliance, there is a concern about the potential loss of autonomy and decision-making power in shaping its own space program.

Way forward and Conclusion

- India should proactively engage in diplomatic efforts to ensure smooth collaboration with other nations, including Russia.
- India should actively engage with other member nations of the alliance and seek opportunities for collaboration in space exploration.
- Balancing collaboration with maintaining independence and pursuing national objectives becomes crucial to ensure that India's space exploration plans are not dictated solely by the priorities of the alliance.
- Ensuring equitable participation, resource sharing, and decision-making processes will be crucial to address these concerns and ensure a fair and inclusive alliance.
- It is essential for India to strike a balance between its space exploration ambitions and addressing other critical needs such as poverty alleviation, healthcare, education, and infrastructure development.
- India should also continue pursuing its independent space goals, apart from such collaborations.
- By doing so, India can position itself as a key player in the global space arena and propel its space program to new heights.



[The decision to remove the ban on GM crops in India demonstrates the government's commitment to promoting innovation, empowering farmers, and moving towards self-reliance. Critically analyse. \(250 words\)](#)

Difficulty level: Tough

Reference: [Insights on India](#)

Why the question:

The question is part of the static syllabus of General studies paper – 3.

Key Demand of the question:

To write about the impact of clearance granted for the cultivation of GM-Mustard.

Directive word:

Critically analyze – When asked to analyse, you must examine methodically the structure or nature of the topic by separating it into component parts and present them in a summary. When 'critically' is suffixed or prefixed to a directive, one needs to look at the good and bad of the topic and give a balanced judgment on the topic.

Structure of the answer:

Introduction:

Begin by giving context.

Body:

First, in brief, write about the need for GM crops in the country to meet the challenges of food security and make farming commercially viable and tackle challenges posed by climate change.

Next, write about the positive aspect of the lifting the ban on G-Mustard and its impact on the farmers as well as scientific community in the country.

Next, write about the concerns associated with the above.

Conclusion:

Conclude by writing a way forward.

Introduction

Genetic engineering aims to transcend the genus barrier by introducing an alien gene in the seeds to get the desired effects. The alien gene could be from a plant, an animal or even a soil bacterium. In most cases, the aim is to introduce a new trait to the plant which does not occur naturally in the species.

The recent clearance by the government for the release of GM Mustard Hybrid DMH 11 — based on the recommendations of GEAC under the Ministry of Environment, Forests and Climate Change — is a bold decision in the best interest of our farmers and the nation.

Body

Need for the GM Crops other than pest resistance:

- **Food Security:** Given the increased growth of global population and increased urbanisation, GM crops offer one of the promising solutions to meet the world's food security needs.
- **Improved Stress Tolerance:** Genes that give greater tolerance of stress, such as drought, low temperatures or salt in the soil, can also be inserted into crops. This can extend their range and open up new areas for food production.
- **Faster Growth:** Crops can be altered to make them grow faster, so that they can be cultivated and harvested in areas with shorter growing seasons. This again can extend the range of a food crop into new areas or perhaps allow two harvests in areas where only one is currently practical.



- **More Nutritious Crops:** Plants and animals can be engineered to produce larger amounts of essential vitamins and minerals, such as iron, helping to solve nutrition problems in some parts of the world. They can also be altered to change the amounts of protein, carbohydrates, and saturated and unsaturated fats that they contain. This could lead to the production of foods designed specifically for a healthy diet for all consumers.
- **Production of Medicines and Vaccines by Crops:** It may be possible to have plants and animals produce useful medicines and even vaccines, so that prevention and treatment of human diseases in some places can be achieved cheaply and efficiently through the diet.
- **Resistance to Herbicides:** Crops can be modified to be resistant to specific herbicides, making it much easier to control troublesome weeds. Farmers can simply apply the weed killer to a crop field, killing the unwanted plants and leaving the food crop unaffected. For example, GM oilseed rapeseed – the source of canola oil – is resistant to one chemical that’s widely used to control weeds.
- **Better Tasting Foods:** Foods can be engineered to taste better, which could encourage people to eat healthier foods that are currently not popular because of their taste, such as broccoli and spinach. It may be possible to insert genes that produce more or different flavours as well.
- **Economic benefits:** GM crops can increase yield and thus income. Genetically modified foods have a longer shelf life. This improves how long they last and stay fresh during transportation and storage.

Positive aspect of the lifting the ban on G-Mustard and its impact on the farmers as well as scientific community in the country

- It helps to meet our current challenges — over-exploitation of natural resources (soil, water, biodiversity), declining factor productivity, urgency to achieve sustainable development goals, especially ending poverty and hunger, and addressing timely the adverse effects of climate change
- A major concern of our farmers is that yields of mustard are low and have stagnated for a long time at around 1,260 kg/ha, much lower than the global average of 2,000 kg/ha.
- Mustard is a very important oilseed crop, grown in 6.0 -7.0 million hectares, mostly in Rajasthan, Haryana, Punjab and Madhya Pradesh. Thus, the government’s decision to allow the production of GM Mustard hybrids will go a long way in increasing our yields, while reducing the use of pesticides.
- Allowing the production of GM Soybean and GM Maize going forward will also be a positive step, increasing both the productivity and profitability of these crops and doubling farmers’ income — a goal envisioned by the Prime Minister.

Concerns/Challenges associated with GM Crops:

- **Human Health Risks:**
 - Potential impact on human health including allergens and transfer of antibiotic resistance markers.



- The impact of growing GM crops poses risks to human health as their resistance to antibiotics can turn medicines ineffective and may result in the formation of new toxins and allergens.
- Toxins produced by GM crops can not only affect non-target organisms but also pose the danger of unintentionally introducing allergens and other anti-nutrition factors in foods.
- **Bio safety concerns:**
 - They can **reduce species diversity**.
 - For example, Insect-resistant plants might harm insects that are not their intended target and thus result in destruction of that particular species.
 - Cross-pollination in GM crops paves the way for herbicide-resistant super weeds that can further threaten the sustenance of other crops and pests because of its uncontrolled growth
 - GM technology could also allow the transfer of genes from one crop to another, creating “**super weeds**”, which will be immune to common control methods.
 - Viral genes added to crops to confer resistance might be transferred to other viral pathogens, which can lead to new and more virulent virus strains.
- **Implications on Farmers and Consumers:**
 - Critics claim that **patent laws give developers** of the GM crops a **dangerous degree of control over the food supply**. The concern is over domination of world food production by a few companies
 - **National Institute of Agricultural Economics and Policy Research’s** anticipation that Bt brinjal’s high yield and increased shelf life will benefit consumers and farmers owing to cut in retail price of brinjals ignores the scenario that companies might charge premium prices for Bt brinjal seeds, in which case farmers may not benefit at all.
- **Economic Concerns:**
 - Introduction of a GM crop to market is a **lengthy and costly process**. It has not resulted in high yields as promised.
 - For instance, the highest yields in mustard are from the five countries which do not grow GM mustard — U.K., France, Poland, Germany and Czech Republic — and not from the GM-growing U.S. or Canada.
- **Inefficient Regulatory system:**
 - Seeing the lapses in the regulatory system and irregularities in the assessment of Bt brinjal (in terms of labelling and unapproved and illegal sowing of GM crops) Parliamentary Standing Committee on Agriculture and the Committee on Science & Technology, Environment and Forests recommended:
 - A thorough probe by a team of eminent independent scientists and environmentalists for commercialization of GM crops.



- Endorsed labelling GM foods to protect a consumer's right to know.
- **Ethical Concerns:**
 - Violation of natural organisms' intrinsic values by mixing among species.
 - There have also been objections to consuming animal genes in plants

Way Forward:

- The government must take decisions on GM technologies on the basis of scientific evidence.
- Need to start cultivating an environment of openness and transparency to allay genuine fears
- The government should adopt a participatory approach to bring together all stakeholders to develop regulatory protocols that restore trust in the process.
- There is a significant uncertainty over their safety, so precautionary principle is that country shall wait till a broader scientific consensus is achieved.
- Need for better policy, pricing and to rationalize the input costs
- GEAC needs to be a transparent body. it should put it in the public domain that on what grounds it has approved GM mustard
- There has to be strong liability laws if there are any environmental hazards or if something goes wrong in future
- Agriculture is a state subject; therefore, it is important for the Centre to take into consideration the views of State Governments as well.
- The Food and Agriculture Organization (FAO) has rightly pointed out in 2004, "Science cannot declare any technology completely risk free. Genetically engineered crops can reduce some environmental risks associated with conventional agriculture, but will also introduce new challenges that must be addressed".

Conclusion:

Clearly, there can be no credible argument against scientific experiments in agriculture that advance the goal of developing plant varieties that can withstand drought, resist pests and raise yields to feed the growing world population. But this should be done through a transparent regulatory process that is free of ethical conflicts. All this underscores the need for a cautious approach — one that fosters scientific inquiry, allows for scrutiny and is underpinned by regulation. Enacting a comprehensive law that covers all aspects of GM crops should be a priority.

[Discuss the objectives of the Chandrayaan-3 mission and its potential contributions to India's space exploration endeavours. \(150 words\)](#)

Difficulty level: Moderate

Reference: [The Hindu](#) , en.wikipedia.org

Why the question:

The Chairman of the Indian Space Research Organisation (ISRO) has announced that Chandrayaan-3, India's third lunar mission, is scheduled to be launched in mid-July.

**Key Demand of the question:**

To write about the objectives of Chandrayaan-3 and its potential contributions

Structure of the answer:**Introduction:**

Begin by giving context.

Body:

First, write about the major objectives of Chandrayaan-3 – conduct scientific studies of the Moon's surface and sub-surface using a lander and rover. The mission will also aim to study the lunar atmosphere and determine the presence of water and other minerals on the Moon etc.

Next, write about its contributions to India's Space Exploration

Conclusion:

Conclude by writing about the importance of space missions to moon.

Introduction

Chandrayaan-3 is the **successor to the Chandrayaan-2 mission** and it will likely attempt another **soft-landing** on the lunar surface. It will be a mission repeat of Chandrayaan-2 but **will only include a lander and rover** similar to that of Chandrayaan-2. It will **not have an orbiter**. As per ISRO, the total cost of Chandrayaan-3 mission will be over Rs 600 crores. In comparison, the total cost of the Chandrayaan-2 mission was Rs 960 crores.

The Chairman of the Indian Space Research Organisation (ISRO) has announced that Chandrayaan-3, India's third lunar mission, is scheduled to be launched in mid-July of 2023.

Body**Objectives of Chandrayaan – 3 mission**

- The mission is aimed at better understanding the Moon's composition.
- Isro has laid out three main objectives for the mission, which include
- demonstrating a safe and soft landing on the lunar surface
- demonstrating the rover's roving capabilities on the moon
- performing in-situ scientific observations.

Chandrayaan – 3: potential contributions to India's space exploration endeavours

- Chandrayaan 3 is an ISRO (Indian Space Research Organization) mission with the primary objective of putting a lander and rover in the highlands near the south pole of the Moon in 2023.
- According to ISRO, the Chandrayaan-3 mission will cost more than Rs 600 crores in total.
- Chandrayaan-3 will be a mission repeat of Chandrayaan-2 but will only include a lander and rover similar to that of Chandrayaan-2. It will not have an orbiter, but its propulsion module will behave like a communications relay satellite.
- India aims to examine the Moon's surface, especially areas that have not been receiving sunlight in some billion years.
- Scientists and astronomers are suspecting the presence of ice and abundant mineral stocks in these darker parts of the lunar surface.



- In addition, this exploration will not limit to the surface but aim to study the sub-surface and exosphere.
- The rover of this spacecraft will communicate to earth via an orbiter taken from Chandrayaan 2.
- It will study the surface by taking images at a distance of 100km from the lunar orbit.

Conclusion

Chandrayaan 3, if successful, will make India the fourth country to soft-land a spacecraft on the Moon after the United States, USSR and China.

How radically has encryption technology altered our digital lives? (150 Words)

Difficulty level: Moderate

Why the question:

The question is part of the static syllabus of General Studies paper – 1.

Key Demand of the question:

To write about the properties, applications and potential applications of Graphene as well as the approach needed to maximise its benefits.

Structure of the answer:

Introduction

Introduce the topic of encryption technology and its significance in the digital age.

Body

Define encryption and its purpose in securing digital communication and data.

How it impacts our life:

Impact on privacy and data security, Influence on communication and freedom of speech, Transformation of digital infrastructure and services, Implications for cybersecurity and digital threats etc

Suggest some measures to tackle the issues.

Conclusion

Conclude by writing a way forward

Introduction

Encryption is the method by which information is converted into secret code that hides the information's true meaning. The science of encrypting and decrypting information is called *cryptology*.

End-to-end encryption (E2EE) is a communication process that **encrypts data being shared between two devices**. It prevents third parties like cloud service providers, internet service providers (ISPs) and cybercriminals from accessing data while it is being transferred.

Body

Advantages of Encryption technology

- The primary purpose of encryption is to protect the confidentiality of digital data stored on computer systems or transmitted over the internet or any other computer network.
- **Confidentiality** encodes the message's content.



- **Authentication** verifies the origin of a message.
- **Integrity** proves the contents of a message have not been changed since it was sent.
- **Nonrepudiation** prevents senders from denying they sent the encrypted message.
- In addition to security, the adoption of encryption is often driven by the need to meet compliance regulations.
- A number of organizations and standards bodies either recommend or require sensitive data to be encrypted in order to prevent unauthorized third parties or threat actors from accessing the data.
- For example, the Payment Card Industry Data Security Standard (PCI DSS) requires merchants to encrypt customers' payment card data when it is both stored at rest and transmitted across public networks.

How Encryption impacts our digital life ?

- Security of nation-Encrypted messages can be used by terrorists and other non-state elements that can threaten sovereignty and integrity of nation
- Vulnerable communities: social media trolling, hate messages, child pornography gets difficult to restrict
- Data authenticity and fake messages on social media
- Difficulty in differentiating whether act was by state actor or non-state actor
- Government and law enforcement agencies express concern that encryption can protect people sharing illicit content because service providers are unable to provide law enforcement with access to the content.
- Although messages in transit are encrypted and impossible to read, information about the message – date of sending message and recipient, for instance – is still visible, which may provide useful information to an interloper.

Way forward

- While cryptographers and cybersecurity experts argue that attempts by law enforcement to weaken encryption with backdoors are ill-advised and could compromise the reliability of the internet, the move by tech companies to use end-to-end encryption to secure more user data seems to be getting stronger.
- Global regulations are constantly changing and adapting to trends, international best practices, and regulatory rulings.
- However, as these changes continue, it's likely that global requirements will align with one another more tightly to provide both country, citizen and organisation with a more solid regulatory footing.



Explain the unique properties and applications of graphene. Suggest a strategic approach and increased investment to harness the potential of graphene and ensure India's participation in this cutting-edge technology. (250 words)

Difficulty level: Moderate

Reference: [The Hindu](#), [Insights on India](#)

Why the question:

The article titled "Is India missing the graphene bus?" discusses India's potential missed opportunities in the field of graphene, a revolutionary material with numerous applications.

Key Demand of the question:

To write about the properties, applications and potential applications of Graphene as well as approach needed to maximise its benefits.

Directive word:

Explain – Clarify the topic by giving a detailed account as to how and why it occurred, or what is the context. You must be defining key terms wherever appropriate and substantiate with relevant associated facts.

Structure of the answer:

Introduction:

Start by defining Graphene and its various applications.

Body:

First, with examples, write about the unique properties of graphene, such as its exceptional strength, conductivity, and flexibility.

Next, write about potential applications of graphene in various fields, including electronics, energy storage, healthcare, and water purification.

Next, write about the potential strategy to harness its benefits.

Conclusion:

Conclude by writing a way forward.

Introduction

Graphene is a **one-atom-thick layer of carbon atoms arranged in a hexagonal lattice**. It is the thinnest, strongest, and most conductive material in the world, while also being flexible, transparent, and impermeable to gases. It was **discovered in 2004**, but it has been difficult to produce **high-grade large-scale graphene**.

Body

Unique properties of graphene

- Graphene is the world's thinnest, strongest, and most conductive material of both electricity and heat.
- It conducts electricity better than copper.
- It is 200 times stronger than steel but six times lighter.
- It is almost perfectly transparent as it absorbs only 2% of light.
- It is impermeable to gases, even those as light as hydrogen and helium.
- It has the potential to revolutionise electricity, conductivity, energy generation, batteries, sensors and more.
- Also, when added to other materials, graphene even in small quantities produces composite materials with dramatically transformed qualities.



Applications of graphene

- Graphene is the **most heat conductive** found to date. As graphene is also strong and light, it means that it is a great material for making heat-spreading solutions, such as heat sinks or heat dissipation films.
- This could be useful in both microelectronics (for example to make LED lighting more efficient and longer lasting) and also in larger applications – for example thermal foils for mobile devices. Huawei's latest smartphones, for example, have adopted graphene-based thermal films.
- graphene is the **world's thinnest material**, it also extremely high surface-area to volume ratio. This makes graphene a very promising material for use in **batteries and supercapacitors**.
- Graphene may enable **batteries and supercapacitors** (and even fuel-cells) that can store more energy – and charge faster, too.
- Graphene has a lot of promise for additional applications: **anti-corrosion coatings and paints, efficient and precise sensors, faster and efficient electronics, flexible displays, efficient solar panels, faster DNA sequencing, drug delivery, and more**.
- Graphene oxide and reduced graphene oxide uses fluorescence resonance energy transfer (FRET) characteristics to work effectively as a **biosensor**
- All elements that form part of GO or rGO functional groups can be effectively stored in their sheets and extracted later for use and are also being explored for their **applications in hydrogen storage**.
- Graphene has been predicted as a good candidate for the **manufacturing of electrostatic audio microphones and speakers** due to their lightweight, which provides moderately good frequency response.
- Graphene can also **detect cancer cells** in the early stages of the disease. Moreover, it **can stop them from growing any further** in many types of cancer by intervening the correct formation of the tumor or causing autophagy which leads to the death of cancer cells.
- Functionalized graphene can be used to **carry chemotherapy drugs to tumors** for cancer patients.
- Graphene based carriers targeted cancer cells better and **reduced and decreased toxicity of the effected healthy cells**.
- **Drug delivery** is not limited to cancer treatment, anti-inflammatory drugs have also been carried by graphene & chitosan combinations and yielded promising results.
- Scientists have discovered that graphene can also be used as a superconductive material.
- Graphene can also be used as a coating material because it prevents the transfer of water and oxygen. Graphene membranes can be used in food or pharmaceutical packaging by keeping food and medicines fresh for longer time.



- Micro-sized sensors can be produced thanks to graphene's unique structure. It can detect whether a molecule is dangerous or not for the environment. These sensors can be used in food industry, especially in crop protection.
- Graphene is important for defence and aerospace as well. Its exceptional strength makes it promising material for armour and ballistic protection.
- Graphene has the potential to absorb and dissipate electromagnetic waves, making it valuable for developing stealth coatings and materials that reduce radar signatures and electromagnetic interference.
- Graphene is highly sensitive to environmental changes, which makes it an excellent candidate for sensing chemical and biological agents, explosives, radiation, and other hazardous substances.
- Besides, graphene-based materials can also protect us against chemical and biological attacks.
- Better energy storage and electronics properties make graphene attractive in defence and aerospace as well as in civil and commercial applications.
- Graphene is a magnificent bactericidal material as it avoids the generation of microorganisms, such as bacteria, viruses, and fungi, by damaging their cell membranes between its outer layers.

potential strategy to harness its benefits

- **Graphene**, a form of carbon, is thought to be **the material of the future**.
- However, India's progress in graphene has been slower compared to leading countries like China and Brazil.
- The Centre needs to become the nodal point to spur large-scale innovation activity around graphene.
- India needs to come up with a national graphene mission. A nodal Ministry needs to be entrusted with this responsibility.
- India needs to be among the leaders in graphene because we may experience the 'winner takes the most' situation here.
- The need of the hour is to give a major fillip for scientific research in Graphene with innovation centers in various parts of India.
- By investing in research and development, infrastructure, and collaborations with academia and industry, India can work towards developing cost-effective and scalable methods for graphene production.



Conservation, environmental pollution and degradation, environmental impact assessment

Current strategies to address human-wildlife conflict often fall short due to various reasons. Through innovative measures, concerted efforts and collaboration can we create a future where humans and wildlife coexist harmoniously. Examine. (250 words)

Difficulty level: Easy

Reference: [Indian Express](#), [Insights on India](#)

Why the question:

The article highlights that addressing human-elephant conflict requires innovative approaches and the involvement of local communities

Key Demand of the question:

To explain the major causes for rising cases of man-animal conflict, limitations of present strategies and possible solutions for it.

Structure of the answer:

Introduction:

Start with what you understand by Man-Animal conflicts.

Body:

First, write about the main causes of man wildlife conflict – habitat loss and fragmentation, competition for resources, crop damage and livestock predation, human infrastructure and development, conservation successes, lack of awareness and education, and inadequate policy and mitigation measures.

Next, Write about the various government policies and programmes in this direction and their limitations. Write about innovative steps and concerted efforts required in this direction.

Conclusion:

Conclude with solutions to address the issue.

Introduction

According to data from the **Union environment ministry**, more than 1,608 humans were killed in human-wildlife conflict cases involving tigers, leopards, bears and elephants between 2013 and 2017. At least 91 people have lost their lives since 2019 due to elephant attacks in Karnataka. The conflict has resulted in at least 38 unnatural elephant deaths in the same period. A deadly conflict is underway between India's growing masses and its wildlife, confined to ever-shrinking forests and grasslands, with data showing that about one person has been killed every day for the past three years by roaming tigers or rampaging elephants.

Body

Reasons for rise in Man-Animal Conflicts

- **Unbridled Development:** The existing space for Tigers, Elephants and other big wild animals are shrinking due to encroachment of wildlife habitats. Unsustainable land use is the biggest problem in this regard.
 - Animals are increasingly finding their usual corridors and pathways blocked by roads, rail tracks and industries.
 - The Ken-Betwa **river interlinking project** will submerge 100 sq. km of Panna Tiger Reserve.
- **Urbanization:** Urbanization and growth agendas alter landscape dynamics, which has a cascading effect on the ecological dynamics of wildlife.



- Eg: In the area of Gwal Pahari on the Gurugram-Faridabad Road, for example, the district town and country planning department has issued change of land use permissions
- **Recent relaxations in norms** to allow for a widening of highway and railway networks near these protected areas are the new threats
- Primary reason for the increasing human-animal conflicts is the presence of a large number of animals and birds outside the notified protected areas.
 - Wildlife experts estimate that 29 per cent of the tigers in India are outside the protected areas
- **Poor Enforcement of laws:** No buffer zone is maintained between critical wildlife habitats and human settlements.
- **Climate Change and Biodiversity:** With the food chain undergoing rapid changes and pool of species declining, the forage is decreasing for wild animals. Hence, they come in search of livestock in fringe areas of human settlements.
- **Less Protected Area: Only 5%** of India's geographical area is in the protected area category. This space is not enough to have a full-fledged habitat for wild animals.
 - A territorial animal like a male tiger needs an area of 60-100 sq km. But the area allocated to an entire tiger reserve, like the Bor Tiger Reserve in Maharashtra, is around 140 sq km.
 - The territorial animals do not have enough space within reserves and their prey does not have enough fodder to thrive on.

Government Initiatives to reduce Man-Animal conflict

- A network of **Protected Areas** namely viz., national park, Sanctuaries, Conservation Reserves and Community Reserving covering important wildlife habitat have been created all over the country under the provisions of the Wild Life (Protection) Act, 1972 to conserve wild animals and their habitat.
- **Wildlife corridors:** Wildlife corridors have been developed in many parts of the country.
 - For example: In 2017, to protect elephant habitats, **the Odisha government had identified 14 corridors.**
 - **Tiger corridor around Tadoba-Andhari** Tiger Reserves are built.
- **"Plan Bee":** Indian **Railways** launched 'Plan Bee' to prevent **elephants** getting hurt on **rail tracks**, thereby reducing the **elephant** death toll.
 - Nearly 50 buzzing amplifiers have been deployed as part of "Plan Bee" at a dozen "elephant corridors" in the vast forests of Assam, home to nearly 6,000 elephants, 20% of the country's total.
- **State governments:**
 - Assistance to state government for construction of boundary walls and solar fences around the sensitive areas to prevent the wild animal attacks



- Supplementing the state government resources for payment of ex gratia to the people for injuries and loss of life in case of wild animal attacks.
- Encouraging state government for creation of a network of protected areas and wildlife corridors for conservation of wildlife.
- Provisions under the **Wild Life (Protection) Act, 1972** empower concerned authorities take necessary steps to handle problematic wild animals.
- **Standard Operating Procedures** for the management of major problematic animals like tiger, elephant, leopard, rhino etc. are being used by the respective state governments
- **Controlling population:** In January 2018, the Environment Ministry has approved “immune-contraception” method to address man-animal conflicts.
 - The immuno-contraception is non-hormonal form of contraception. It causes production of antibodies which in turn prevents conception in animals.
 - Ministry sanctioned over **Rs 10 crore for ‘immunology contraception’ of wild boars, Rhesus monkeys and elephants.**

Way Forward

- **Community Participation:** Local volunteers should be trained to handle with human-wildlife conflicts and organize locals for immediate initial steps till the wildlife rescue team arrives
- **Rescue Teams:** Wild Life Rescue Teams equipped with adequate personnel, equipment and communication systems should be present in potential areas of human-animal conflict.
- **Awareness campaign:**
 - Hunting of prey animals, such as deer and pig, needs to stop as they form the base for growth of tiger and other carnivore populations.
- Identifying regular movements corridors of large wildlife, and adequate publicity/awareness to avoid disturbances
- Compilation of data on conflicts, reasons for such conflicts, best practices of response. Identify hotspots of conflict and keep extra vigil in such areas.
- Insurance programs for damage due to wildlife.
 - **Crop insurances** should be provided in the event of destruction by wild animals.
 - **Livestock insurance** and its scope must be explored.
- Help locals in constructing barriers, and develop scaring away methods.

Conclusion

Human life is vital and so is a thriving wildlife that sustains the ecosystem. Harmony between humans and wildlife can ensure protection of both. Conservation and Development must go hand in hand to combat man animal conflict, which in turn will lead to sustainable development.



It is important to recognize the value of wildlife sanctuaries and national parks in preserving biodiversity, supporting ecosystem services, and maintaining the ecological balance. Protecting these areas from habitat loss and fragmentation is crucial for the long-term conservation of wildlife and the overall health of our planet. Examine. (250 words)

Difficulty level: Easy

Reference: [Insights on India](#)

Why the question:

The question is part of the static syllabus of General studies paper – 3.

Key Demand of the question:

To write about the threats faced by the wildlife sanctuaries and national parks in India.

Directive word:

Examine – When asked to ‘Examine’, we must investigate the topic (content words) in detail, inspect it, investigate it and establish the key facts and issues related to the topic in question. While doing so we should explain why these facts and issues are important and their implications.

Structure of the answer:

Introduction:

Begin by mentioning that The Union Government has established a country-wide protected area network for protection of these species and their habitats of threatened flora and fauna under Wild Life (Protection) Act, 1972.

Body:

First, write about the threats to wildlife sanctuaries and national parks from habitat loss.

Substantiate with examples. For e.g. Clearance of parts of Valley of flowers for Chardham highway project.

Next, about the other factors affecting wildlife sanctuaries and national parks – Road/Railway lines inside protected areas, Uncontrolled passage of heavy vehicles during night-time, Man-animal conflicts, Threat from invasive species

Next, Discuss the potential solutions to issues such as – involving local communities in decision making, building infrastructure, anti-poaching camps etc.

Conclusion:

Conclude with a way forward.

Introduction

India has around **5% of its geographical area as protected area with 566 existing wildlife sanctuaries and 104 existing national parks** in India. Despite being party to CITES and enacting Wildlife protection Act in India, there are many conservation challenges faced by sanctuaries and national parks.

Body

Threats faced by wildlife sanctuaries and national parks

- **Habitat loss:** Due to flood and siltation, size of water bodies inside the park are shrinking. Siltation also affects the grazing areas of herbivorous animals.
- **Invasive species** such as **water hyacinth and Mimosa are great threats to Kaziranga**. Water hyacinth clog water bodies and depletes oxygen in the water.
 - It threatens underwater life and shrinks the size of water bodies.



- Exotic leguminous species **Mimosa was introduced in Tea gardens of Assam**. The species have a **poisonous amino acid (Mimosin)**. So, they are harmful for **herbivorous**
- **Man-animal conflicts:** No park exists in isolation, and that fact is becoming increasingly clear as the areas surrounding parks are developed for living space, agriculture, mining, forestry, and more.
 - The iconic species protected inside the parks don't recognize boundaries and must often move in and out of the parks to feed, mate, or migrate.
 - **Avani Tigress** was killed due to public backlash.
- **Roads through sanctuaries:** Experts found as many as 85 roadkills in the past six months within the sanctuary limits.
 - There is uncontrolled passage of heavy vehicles during night-time threatening biodiversity.
- **Poor conservation infrastructure:** The rangers and frontline staff deployed in many parks and sanctuaries lacks modern weapons, advanced communication systems and efficient means of transportation. There is also lack of proper camps and watch towers.
- **Human interference:** **Illegal livestock grazing, illegal fishing, unplanned tourism infrastructure**, highway traffic, **tourism pressure**, crop raiding, etc.
 - **Mining, petroleum prospecting**, clear-cut lumbering, and other developments are generally prohibited inside parks—but they still pose serious threats to water quality, clean air, and other vital aspects of the park environment.

Need of the hour

- **WWF-India Eco-development project** aims to develop a model programme that can be used all over the country to help resolve this conflict.
- **Involve local communities in decision making** like Critical tiger habitats Gram Sabha is given importance similar to the forest rights act.
- Implementing the **Gadgil committee and K Kasturirangan committee and not** to water down the original recommendations.
- **Patrolling and wildlife monitoring** had to be taken up on a priority basis and scientific studies to ascertain the status of key species have been undertaken with the help of research organizations.
- **Participation of local communities:** The participation of local youth has been actively sought for the **management of Manas and its buffer regions**.
 - These youth were employed as conservation volunteers on a monthly stipend and ration.
 - They assisted the forest department in surveillance and patrolling activities.



- With the help of national and international nongovernmental organizations (NGOs), some of the youth were also **trained to act as nature guides for small ecotourism enterprises.**

Conclusion

The wildlife sanctuaries and national parks are established to provide protection to the endangered species. It is relatively hard to always relocate the animals from their natural territory, therefore, conserving them in their normal setting is advantageous. On of wildlife has major impact on entire human race and therefore must be taken up on war footing.

Measures and interest need to be channelled towards regrowing trees and increasing the land cover for forests. Reforestation and afforestation need to be promoted throughout the world. Proper forest management bodies need to be enforced to monitor wildlife actions and update on the latest. Care and habitation need to be provided to extinct species and efforts need to be taken to save them from becoming extinct.

[Carbon credits can play a role in incentivizing emission reductions and fighting climate change, their effectiveness and impact depend on the implementation and integration within a comprehensive climate policy framework. Evaluate. \(250 words\)](#)

Difficulty level: Moderate

Reference: [Live Mint](#)

Why the question:

The article discusses how India can benefit from the trading of carbon credits. It highlights the potential for India to capitalize on its large renewable energy capacity and reduce its carbon emissions, thereby earning carbon credits in international markets.

Key Demand of the question:

To write about carbon market and India's potential in using to fight climate change.

Directive word:

Evaluate – *When you are asked to evaluate, you have to pass a sound judgement about the truth of the given statement in the question or the topic based on evidence. You must appraise the worth of the statement in question. There is scope for forming an opinion here.*

Structure of the answer:

Introduction:

Begin by defining carbon market.

Body:

In the first part, in detail, write about the structure and functioning of carbon market and its brief history.

Next, write about the potential of carbon markets in reducing carbon emissions and fighting climate change. Write the ways in which it would help. Substantiate with facts and examples.

Next, write about the challenges and limitations associated with carbon markets in India. Mention ways to overcome them.

Conclusion:

Conclude by writing a way forward.

Introduction

Carbon markets allow for **buying and selling of carbon emissions** with the objective of **reducing global emissions**. Carbon markets existed under the **Kyoto Protocol, which is being replaced by the**



Paris Agreement in 2020. Carbon Markets can potentially deliver emissions reductions over and above what countries are doing on their own.

Body

About carbon market

- Carbon Markets and Carbon Credits are components of emissions trading, a **market-based approach to to reduce the concentration of Greenhouse gases** (GHG) in the atmosphere. It works by **providing economic incentives** for reducing the emissions of the designated pollutants. A carbon market allows investors and corporations to trade both carbon credits and carbon offsets simultaneously.
- Carbon credits (or allowances) work like **permission slips for emissions**.
 - When a company **buys a carbon credit, they gain permission to generate more CO2 emissions**.
 - One tradable carbon credit **equals one tonne of carbon dioxide or the equivalent amount of a different greenhouse gas reduced, sequestered or avoided**.
- Credits are measured against 'benchmarks' or allowed GHG emissions. If emissions are below the allowed limit, the emitter earns carbon credits (reducing 1 tonne of CO2 earns 1 carbon credit).
 - If emissions are above the allowed limit, the emitter must buy carbon credits from those who have excess credits.
 - Thus, crossing the emissions limit imposes a cost (amount spent on purchase of carbon credits) on the emitter. The idea is that this cost will force the emitters to be more efficient and reduce emission.

Potential to have carbon market framework In India

- **First**, it will help in **mitigating the adverse impacts of climate change** by reducing the GHG emissions.
- **Second**, there are multiple **co-benefits of offset projects** such as: ecosystem management, forest preservation, sustainable agriculture, renewable energy generation in third-world countries, etc.
- **Third**, the voluntary carbon market for offsets is smaller than the compliance market, but **expected to grow much bigger** in the coming years. It's open to individuals, companies, and other organizations that want to reduce or eliminate their carbon footprint, but are not necessarily required to by law.
- **Fourth**, consumers are increasingly aware of the importance of carbon emissions. Consequently, they're increasingly critical of companies that don't take climate change seriously. By contributing to carbon offset projects, companies signal to consumers and investors that they're paying more than just lip service to combat climate change.



- **Fifth**, it opens an **additional revenue stream** for environmentally beneficial businesses. For instance, Tesla, the electric car maker, sold carbon credits to legacy car manufacturers to the tune of \$518 million in just the first quarter of 2021.

Challenges with carbon market

- There are concerns regarding the **effectiveness of carbon markets in curbing emissions**.
 - Some companies simply buy credits **without making any effort to reduce emissions themselves**. It is cheaper for them to buy carbon credit than to invest in emission reducing technologies
- The issue of old carbon credits (certified carbon emissions, or CERs), issued under — the Clean Development Mechanism of the Kyoto Protocol — are still valid.
 - Counting them as valid would slow down climate action because those who are under commitments to reducing emissions would just buy the CERs and call it a done deal.
 - However, declaring them invalid would disappoint all those entities that were given the credits.
- **Phenomenon of ‘double counting’ exists**. If an emission reduction takes place in one country and another entity in another country buys the carbon credits, only one of the two countries should be logically allowed to use the activity against its own commitments — not both.
- Issues related to a fee levied on each carbon trading transaction for a fund to help poor countries adapt to the vagaries of the climate change.
- Buying carbon credits can **deviate the rich nations from the path of reducing emissions**. They can simply continue to emit and buy cheap carbon credits from developing countries.
- It is difficult to **establish the amount of carbon reduced by offset projects (like afforestation or wind energy project)**. The complexity is in establishing baseline emissions (Emissions baseline represents what would happen if your project did not occur i.e., the emissions in the absence of the project).
 - This makes it difficult to verify emission reductions and assigning carbon credits.
- **India’s own PAT (Perform, Achieve, Trade) Scheme has failed to achieve meaningful emissions reduction**. According to an analysis by the Center for Science and Environment, the emission reduction under the scheme has been only 1.57% and 1.44% over the two cycles.

Conclusion

The establishment of a domestic carbon market is a progressive step. However, the actual benefit will depend upon the effectiveness of the market. For this, the Government must ensure that proper regulations are established. Moreover, there must be periodic assessment of its functioning and corrective steps its necessary. Climate Change is real and imminent, Government must take all possible steps to mitigate the challenges.



Climate engineering remains a topic of debate and ongoing research. While it offers potential as a tool to address global warming, its risks and uncertainties should be carefully assessed, and it should not be considered a substitute for comprehensive emissions reduction and sustainable practices. Critically examine. (250 words)

Difficulty level: Easy

Reference: [wikipedia.org](https://www.wikipedia.org)

Why the question:

The question is part of the static syllabus of General studies paper – 3.

Key Demand of the question:

To analyse if climate engineering could be a viable option to overcome the climate crisis.

Directive word:

Critically examine – When asked to ‘Examine’, we have to look into the topic (content words) in detail, inspect it, investigate it and establish the key facts and issues related to the topic in question. While doing so we should explain why these facts and issues are important and their implications. When ‘critically’ is suffixed or prefixed to a directive, one needs to look at the good and bad of the topic and give a fair judgment.

Structure of the answer:

Introduction:

Begin the answer by defining climate engineering.

Body:

You can use a bubble diagram to show the various modes of geo-engineering such as Shoot Mirrors into Space (Solar Sunscreen), Copy a Volcano, Build Fake Trees etc.

In the first part of the body, write about how the above strategies work and will be beneficial for the planet above and over existing mitigation strategies to tide over the climate crisis. Clearly outline as to why it may be needed.

In the next part, mention about the major drawbacks, impediments and concerns regarding the implementation of the above strategies

Conclusion:

Conclude by giving a balanced opinion.

Introduction

Geoengineering interventions are large-scale attempts to purposefully alter the climate system in order to offset the effects of global warming. Geoengineering is the intentional, large-scale technological manipulation of the Earth’s systems. **It is also known as Climate Engineering** because it is often discussed as a technological solution for combating climate change.

Most geoengineering proposals can be divided into two types: **solar radiation management (SRM) and carbon dioxide removal (CDR)**. **Geoengineering** offers the hope of temporarily reversing some aspects of global warming and allowing the natural climate to be substantially preserved whilst greenhouse gas emissions are brought under control and removed from the atmosphere by natural or artificial processes.

Body:

Positives of geoengineering:

- As expected, the climate would begin to cool once geoengineering commences. This initial cooling phase, **would provide relief, particularly for species that were unable to keep up with past warming.**



- Also, birds and fish which may have moved in response to elevated temperatures in the past will possibly turn back.
- If solar geoengineering were ramped up slowly to half the rate of warming over the coming decades, then **it seems likely it would reduce many climate risks**. Solar geoengineering deployment can be ended without the impacts of a termination shock if it is gradually ramped down over decades.
- The climate models reveal that the large-scale action would indeed calm things down a bit and **potentially reduce the number of North Atlantic cyclones**.

Negatives of geoengineering:

- A recent study shows that rapid application, followed by abrupt termination of this temporary tech-fix can in fact **accelerate climate change**.
- The increase in temperature from the abrupt termination is so quick that **most species, terrestrial or marine, may not be able to keep up with it and eventually perish**.
- The increase in temperature is two to four times more rapid than climate change without geoengineering. **This increase would be dangerous for biodiversity and ecosystems**.
- Reptiles, mammals, fish and birds that have been moving at 1.7 km/year on average will now have to move faster than 10 km/year to remain in their preferred climatic zones. **This raises serious concerns, especially for less-mobile animals like amphibians and corals**.
- Not just species but **entire ecosystems could collapse by suddenly hitting the stop button on geoengineering**.
 - For example, temperate grassland and savannahs, which are maintained by specific combinations of temperature and rainfall, may experience increasing rates of temperatures, but an opposing trend in rainfall, after 2070.
- **Ineffectiveness**
 - The effectiveness of the techniques proposed may fall short of predictions.
 - In ocean iron fertilization, for example, the amount of carbon dioxide removed from the atmosphere may be much lower than predicted, as carbon taken up by plankton may be released back into the atmosphere from dead plankton, rather than being carried to the bottom of the sea and sequestered.
- Model results from a 2016 study, suggest that blooming algae could even accelerate Arctic warming.
- **Moral hazard or risk compensation**
 - The existence of such techniques may reduce the political and social impetus to reduce carbon emissions
- **Albedo modification strategies could rapidly cool the planet's surface but pose environmental and other risks** that are not well understood and therefore should not be deployed at climate-altering scales.



- In the case of environmental risks, the offsetting of greenhouse gases by increasing the reflection of sunlight is not going to be perfect. Some people, potentially a small minority, will get less rainfall. There is **concern about what particles might do to the ozone layer**.
- The drop off of tropical storms in one area would actually lead to a spike in drought in parts of Africa, according to the data.

Way forward:

- The potential of natural systems as an effective solution for sequestering carbon dioxide has led to several efforts to scale nature-based solutions to mitigate climate change.
- These proliferating efforts, however, must take cognisance of the fact that these solutions are effective only when applied while protecting the already existing forest.
- Additionally, we must not run blindly after planting trees; instead, we must back reason with science.
- Trees should be planted where they belong, that too with native species, and in consultation with local communities.

Conclusion:

In any case in the meantime, two aspects are certain: **under no scenario could climate engineering serve as a substitute to reduced greenhouse gas emissions, and it would be better to implement such technologies with more nuanced research.**

Value addition

Some geoengineering techniques and its drawbacks:

Carbon capture and storage technologies:

- *This carbon dioxide removal approach focuses on removing greenhouse gases from the atmosphere and locking them away.*
- *The process starts with the capture of generated CO₂ which undergoes a compression process to form a dense fluid. This eases the transport and storage of the captured CO₂.*
- *The dense fluid is transported via pipelines and then injected into an underground storage facility.*
- *Captured CO₂ can also be used as a raw material in other industrial processes such as bicarbonates.*
- *The CCS has significant backing from the International Energy Agency and the IPCC.*
- *However, it still is hanging in uncertainty due to high upfront costs in the instalment of such plants.*
- *A growing number of corporations are pouring money into so-called engineered carbon removal techniques.*
- *However, these technologies are at a nascent stage and need an overhaul to be exploited.*



- Carbon dioxide may be stored deep underground. Reservoir design faults, rock fissures, and tectonic processes may act to release the gas stored into the ocean or atmosphere leading to unintended consequences such as ocean acidification etc.

solar radiation modification:

- This process does not affect atmospheric greenhouse gases but aims to reflect the solar radiation coming to the earth.
- The science of the method is, however, largely model-based, and the impacts of deflecting the solar radiations could be unpredictable.
- Additionally, due to the thermal inertia of the climate system, removal of the radiation modification could result in the escalation of temperature very quickly, giving significantly less time to adapt.
- Another side effect of the radiation modification process could be natural vegetation.
- Since solar radiation is responsible for photosynthesis, sudden masking of solar radiation could significantly affect the process.
- While these questions remain unanswered, the futures of these technologies remain uncertain.

Disaster and disaster management.

What is a flash flood? Analyse the causes and consequences of flash floods and suggest measures to mitigate their impact. (250 words)

Difficulty level: Tough

Reference: [Indian Express](#)

Why the question:

The article explains the meaning and causes of flash floods and landslides. It highlights that flash floods occur when there is sudden heavy rainfall, causing an overflow of water and rapid flooding in low-lying areas.

Key Demand of the question:

To write about the causes, consequences and steps needed to mitigate the impact of flash floods.

Directive word:

Analyse – When asked to analyse, you must examine methodically the structure or nature of the topic by separating it into component parts and present them in a summary.

Structure of the answer:

Introduction:

Briefly define flash floods and their characteristics

Body:

First, write about the causes of flash floods – Heavy rainfall, Steep terrain and drainage patterns, River and dam failures etc.

Next, write about the Consequences of flash floods – Loss of life and infrastructure damage, Environmental impact Economic implications etc.

Next, write about the Measures to mitigate the impact of flash floods – Early warning systems, Reforestation and watershed management, Community preparedness and awareness etc

Conclusion:

Conclude with a way forward.

Introduction



Flash flooding is a specific type of flooding that occurs in a short time frame after a precipitation event – generally less than six hours. It often is caused by heavy or excessive rainfall and happens in areas near rivers or lakes, but it also can happen in places with no water bodies nearby.

The Chandigarh-Manali highway was blocked on Monday (June 26) following flash floods and landslides since Sunday morning in parts of Haryana and Himachal Pradesh. Flash floods were witnessed in Khotinallah near Aut (in HP) on the Pandoh–Kullu stretch due to a heavy downpour and the commuters have been stranded as a result.

Body

Causes

- flash floods are often associated with cloudbursts, sudden intense rainfall in a short period of time.
- Himalayan states additionally face the challenge of overflowing glacial lakes, increasingly formed due to the melting of glaciers.
- It happens more when rivers are narrow and steep.
- It also occurs in urban areas located near small rivers, as concretization prevents percolation of water as seen in cities of Bangalore, Chennai, Mumbai, etc.
- Depression and cyclonic storms in the coastal areas of Orissa, West Bengal, Andhra Pradesh, and others also cause flash floods.
- Wildfires, whose frequency is increasing with climate change, destroys forest and other vegetation, which in turn weakens the soil and makes it less permeable for water to seep through. It may result in increased Flash floods.
- Climate change/global warming has increased the frequency/numbers of the above events.

Consequences

- Flash floods can have devastating effects and a wide variety of side effects, from infrastructure and building damage to effects on vegetation, human and animal life, and livestock.
- Large debris and floodwaters can cause structural damage to bridges and roadways, making travel impossible.
- Power, telephone, and cable lines can be taken out by flash floods as well.
- Flood waters can disrupt or contaminate ground water, making tap water unfit for consumption.
- In urban locations, the consequences are particularly challenging to define.
- Rapid soil erosion can be a result of flash floods.
- Short-duration flash floods primarily affect the floodplain through sedimentation, causing little to no bedrock erosion or channel widening.
- Some wetland plants, like some types of rice, are prepared to withstand rapid flooding.



- However, floods can harm plants that grow well in drier environments because the excess water stresses the plants.

Way forward

- Monitoring on the ground in hilly areas.
- Planning development works in a way that is sensitive to the region's ecology.
- Mitigation to reduce the extent of damages.
- India has launched first-of-its-kind Flash Flood Guidance services for India and other South Asian countries – Bangladesh, Bhutan, Nepal, and Sri Lanka.
- The Flash Flood Guidance is designed to provide warnings for flash floods about 6- 12 hrs. in advance.
- A comprehensive strategy of monitoring, planning development works in a way that is sensitive to the region's ecology, and mitigation to reduce the extent of damages.

Understanding the link between deforestation, ecological challenges, and the severity of landslides is essential in developing comprehensive strategies to reduce the risks and impacts of these disasters. Analyse. (250 words)

Difficulty level: Moderate

Reference: [Insights on India](#)

Why the question:

The question is part of the static syllabus of General studies paper – 3.

Key Demand of the question:

To analyse the natural anthropogenic causes of landslides and to account for their increased risk.

Directive word:

Analyse – When asked to analyse, you must examine methodically the structure or nature of the topic by separating it into component parts and present them in a summary.

Structure of the answer:

Introduction:

Briefly introduce landslide by defining them. Give examples of some major landslides in the recent past.

Body:

Mention the natural factors behind the causes of landslides in India with a few examples. Mention the areas which are most prone to landslides. Draw a small illustrative map showing the same.

Next bring in the instances of human activity induced landslides. Bring forth the anthropogenic factors responsible for causing Landslides. Substantiate with facts and figures regarding the incidence of landslides. For eg: a 2018 report from Copernicus Publications, which states that 18% of global human-induced landslide casualties occur in India. Mention the stats from recent NCRB report on casualties from Landslides.

Reason as to why the increase in anthropogenic induced landslides is alarming and cause of concern. Give solutions to overcome the same.

Conclusion:

Conclude with a way forward.

Introduction



A **landslide** is defined as the movement of a mass of rock, debris, or earth down a slope. Landslides are a type of “**mass wasting**,” which denotes any down-slope movement of soil and rock under the direct influence of gravity.

Body

Vulnerability of India to landslides

- About 12.6 per cent of the total land mass of India falls under the landslide-prone hazardous zone, according to a study by the **GSI**
- The most recent report by the **Intergovernmental Panel on Climate Change (IPCC)** stated that a global rise of 1.5 degrees Celsius (from pre-Industrial times) was inevitable in the next two decades. This would increase glacier melt and more water would flow over the steep slopes, thereby generating more landslides.
- **Highly unstable, relatively young mountainous areas in the Himalayas and Andaman and Nicobar, high rainfall regions with steep slopes in the Western Ghats and Nilgiris, the north-eastern regions, along with areas that experience frequent ground-shaking due to earthquakes, etc.**, which can result in an increased number of landslides.
- The rivers in Himalayan regions are mighty and in their youthful stage. They do a lot of downcutting, which enhances the occurrence of landslides.
- Landslides due to mining and subsidence are most common in states like Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, Goa, and Kerala.
- India was one of the countries most affected by human-triggered fatal landslides in the 2004-16 period, found a study by researchers at Sheffield University, UK.
- A 2011 estimate suggested that India suffers Rs 150-200 crore of monetary loss every year from landslides, said a study by the National Institute of Disaster Management (NIDM)

link between deforestation, ecological challenges, and the severity of landslides

- Deforestation of steep slopes may temporarily reduce evapotranspiration and lessen root reinforcement thus potentially enhancing landslide susceptibility.
- Deforestation adds to landslides because the roots of trees and plants hold the soil.
- The presence of vegetation on steep hillslopes contributes to the mechanical stability of the soil mantle primarily by root reinforcement that enhances soil strength and by reducing wetness conditions through evapotranspiration and rainfall interception.
- Evidence suggests that forest removal enhances landslide occurrence.
- For example, forest clear-cutting in regions with steep topography and high rainfall has been reported to increase landslide events by 2 to 10-fold relative to vegetated slopes
- On clearing the vegetation, the mountain slope loses its protective layer due to which the rain water flows with very high speed on the slopes which results in landslides.
- Increased grazing has led to wiping out of many grassland areas causing soil erosion and easy prey for landslides.



- In the regions of North East India, landslides occur because of shifting agriculture (jhum cultivation) as it involves clearing the forest areas.

The measures to control landslides are

- **Structural measures:**
 - Stopping Jhum cultivation.
 - Store Excess water in catchments areas to reduce the fury of flash floods, recharge the ground water and improve the environment. Dig runoff collection ponds in the catchments.
 - Grow fuel / fodder trees in all of the common lands.
 - **Plantation in barren areas**, especially on slopes, with grass cover is an important component of integrated watershed management programme.
 - Grazing should be restricted. The grasses of industrial importance should also be planted so that there is some economic return to the farmers as well.
 - Use the **surface vegetative cover** to protect the land from raindrop's beating action, bind the soil particles and decrease the velocity of flowing water.
 - Construction of engineering structures like **buttress beams, retaining walls, geogids, nailings, anchors** to stabilise the slopes.
- **Non-structural measures:**
 - **Environmental Impact Assessment of the infrastructure projects** before commencing the work.
 - Declaration of **eco-sensitive zones** where mining and other industrial activities are banned. **Eco-tourism** should be promoted.
 - **Hazard mapping** of the region to identify the most vulnerable zones and take measures to safeguard it.
 - **Local Disaster Management** force for quick relief and safety of the people affected by landslides.
 - Teaching people about landslides & ways to mitigate.
 - Constructing a **permanent assessment team comprising scientists & geologists** for better mitigation and adaptation techniques.
 - **Involving the local people** for sustainable development of Himalayas

Conclusion

Himalayas are of vital importance to India in terms of climate, monsoon, water source and a natural barrier safeguarding the peninsula. The **National Mission for Sustaining the Himalayan Ecosystem** under NAPCC is a step ahead to address a variety of issues Himalayas is facing today.



[What are the potential consequences of climate change-induced migration? Suggest urgent actions needed to mitigate these challenges. \(250 words\)](#)

Difficulty level: Tough

Reference: [The Hindu](#)

Why the question:

The article discusses the potential consequences of climate change on migration patterns in South Asia.

Key Demand of the question:

To write about the impact of climate change-induced migration and actions needed to mitigate it.

Structure of the answer:

Introduction:

Begin by defining climate change-induced migration.

Body:

First, write about the consequences of climate change-induced migration – humanitarian crises, social tensions, economic disruptions, and political challenges. Cite statistics and examples to substantiate.

Next, write about the actions that are needed to mitigate the above – International cooperation, adaptation and resilience measures, sustainable development practices, capacity building and support, and climate change mitigation efforts.

Conclusion:

Conclude by writing a way forward.

Introduction

Extreme weather events and conflict are the top two drivers of forced displacement globally, together responsible for the annual movement of nearly 30 million people from their homes.¹⁰ There is a strong correlation between countries and regions most vulnerable to climate change and those that are fragile and/or experiencing conflict or violence.

Body

Climate induced migration

- By 2050, globally there could be 1.2 billion climate refugees.
- In South Asia, there have been over nine million internal displacements in 2020, making it the region having the highest number of new displacements due to climate change.
- In 2020, **95% of conflict-related displacements** were reported in **climate vulnerable**

Potential consequences of climate change-induced migration

- Climate-related impacts may further **stress vulnerable communities, increasing the risk of conflict and displacement** in the absence of effective prevention efforts, and vice versa.
- Climate-related impacts also pose an increased risk to marginalized communities displaced by conflict related to the impacts of climate change. **This risk is more acute in regions with weak governance and dispute resolution infrastructure, and in growing peri-urban areas where many migrants are heading.**



- Climate migration creates a multiplier effect on **pre-existing threats such as overcrowding, and conflicts over resources sharing.**
- Climate change can **cause or exacerbate resource scarcity**, which may drive conflict directly as well as induce migration of populations in vulnerable situations attempting to secure safety or livelihoods elsewhere.
- Moreover, changes to **biodiversity** have strong intersections with climate change that also can affect migration, and **threaten food and economic security.**
- The subsequent movement of large numbers of people, by force or by choice, brings new groups into contact with one another, **potentially shifting power balances, causing further resource scarcity, or igniting tensions between previously separated groups.**
- Where climate-related migrations occur within or near population centers, or in locations important for political or economic stability, such as within **many nations' coastal zones, the destabilizing forces associated with climate change may result in outsized affects overall.**
- Climate displacement results in job losses, food insecurity, and an overall overcrowding of resources, creating further migration and incurring other social and economic costs.
 - Changes in **agricultural patterns and water availability force people to migrate to urban areas.** Such rural-urban migration **overburdens cities that already operate at capacity.**
- Inadequate policy frameworks to manage large migration flows may exacerbate resource inequalities, **stress public budgets, and contribute to xenophobia that increases political tensions.**
- Anti-immigration political actors may seize on both real and perceived challenges of uncontrolled or large migration flows to improve political standing, inflaming existing tensions and undermining efforts to appropriately respond to acute migration or refugee crises, such as those caused by the Syrian civil war or extreme weather and violence in Central America

Challenges and inaction

- Despite the alarming magnitude of climate displacement in the region, responses from **governments and international agencies have been inadequate.**
- Most countries in South Asia **lack comprehensive policies** to address climate displacement, and **international aid has been insufficient** to meet the needs of affected communities.
- **Missed targets of climate funding** also hold back developing nations from financing their climate goals and building resilience.
- Building climate-resilient infrastructure and improving disaster preparedness are essential to support adaptation and mitigation measures.

Urgent measures required

- The importance of improving resistance and resilience by introducing sustainable solutions such as adopting **salinity-resistant crops, making coastal areas resistant, and strengthening infrastructure** will be deterministic.



- Such structure gaps need to be corrected to ensure that communities are not forced to
- The underlying economic reasons of poverty and poor infrastructure play a crucial role in the efficacy of a climate adaptation method.
- Further, governments in the region must **develop targeted policies** that address the specific needs of climate-displaced communities.
- Apart from developing resilience, policies should focus on providing **alternative livelihood opportunities and social protection programmes** to help affected communities cope with the impacts of climate change.

Conclusion

Policymakers can usher the economies of affected countries towards green and resilient pathways by pursuing far-sighted action to avert distress-driven migration and harness climate-induced migration to foster economic and demographic transitions. Such policies require investments in human capital to support the next generation in productive and sustainable climate-smart jobs.

Linkages between development and spread of extremism.

[What are the causes of separatism in the north-eastern India? Examine the implications of this development on regional stability, political dynamics, and national unity in India. \(250 words\)](#)

Difficulty level: Moderate

Reference: [The Hindu](#)

Why the question:

Ten Members of the Legislative Assembly (MLAs) from Manipur have been issued notices for their alleged involvement in activities promoting separatism.

Key Demand of the question:

To write about causes for separatism in N.E India and its impact.

Directive word:

***Examine** – When asked to ‘Examine’, we must investigate the topic (content words) in detail, inspect it, investigate it and establish the key facts and issues related to the topic in question. While doing so we should explain why these facts and issues are important and their implications.*

Structure of the answer:

Introduction:

Begin by giving context.

Body:

Draw a small map of the north-east showing major insurgent conflicts in the region.

First, Mention the causes of the separatism under various heads such as economic, political, social, cultural/ethnic reasons. Write briefly about its impact highlighting the issues associated with AFSPA, Naxalism and International borders.

Next, write about its impact – peace and stability, implications for national unity and integrity, impact on India’s federal structure etc.

Conclusion:

Conclude with a way forward.

Introduction



The Northeast region of India comprises eight states – Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura – each with its own distinct history and identity. The region shares its borders with Bhutan, China, Myanmar and Bangladesh and has been one of the most sensitive regions in India. Since 1947, the history of this region has been marred with insurgency and under development.

There are over a hundred of ethnic groups in the Northeast each having a strong sense of identity and their uniqueness. They want to retain this uniqueness in their political and social and orientations as well.

Body

Causes/Reasons of separatism in north-eastern India

- **Nationality:** Involving concept of a distinct ‘homeland’ as a separate nation and pursuit of the realisation of that goal by its votaries.
- **Ethnic reasons:** Involving assertion of numerically smaller and less dominant tribal groups against the political and cultural hold of the dominant tribal group. In Assam, this also takes the form of tension between local and migrant communities.
- **Sub-regional reasons:** Involving movements which ask for recognition of sub-regional aspirations and often come in direct conflict with the State Governments or even the autonomous Councils.
- **Developmental issues:** Poverty, unemployment, lack of connectivity, inadequate health care and educational facilities, feelings of neglect and non-participation in governing their own affairs have contributed to the insurgency and separatism in the region.
- **Governance deficit:** Informal economy and governance and shortage of resources.
- **Porous international borders** with difficult topography
- **Sense of alienation from mainstream** due to overwhelming presence of security forces and associated issues of Human Rights.

Implications on stability, dynamics and unity of India

- **Sense of Isolation, Deprivation and Exploitation:** Distance from New Delhi and meagre representation in the Lok Sabha has further reduced the vox populi being heard in the corridors of powers, leading to **more disillusionment in the dialogue process**, thereby making call of the gun more attractive.
- **Demographic Changes:** The influx of refugees from former East Pakistan (now Bangladesh) into Assam led to a dramatic change in the demographic landscape of the region.
- **Lack of Economic Development:** Govt's economic policies have also fuelled resentment and insecurity amongst the people. Due to various factors, the development of NEI has lagged behind thereby resulting in lack of employment opportunities. Thus, the youth are easily lured by various insurgent groups in order to earn easy money.
- **Internal Displacement:** Internal displacement is also an ongoing problem. From the 1990s to the start of 2011, over 800,000 people were forced to flee their homes in episodes of **inter-**



ethnic violence in western Assam, along the border between Assam and Meghalaya, and in Tripura.

- **External Support:** There is ‘increasing evidence’ of China’s revival of its ‘covert offensive’ in the region. Pakistan’s Special Services Group (SSG) also trained the Naga guerrillas in the 1960s through their bases in East Pakistan (now Bangladesh).

Way forward

- **Multi-stakeholder approach:** A wider representation not just of civil society, scholars and others, but also of professionals is required at any forum addressing the concerns in the North-East.
- **Understanding emotional** and psychological aspects of the problems of the different states of the North-East: Any meaningful policy for the North-East should address the specifics of each state and region.
- **Economic development:** Opening up of economy of this region may be expedited making way for new investments, acquiring of productive assets, reaching potential in tourism etc.
- **Tackling illegal immigration** from neighbouring countries: Identity cards and work permits for those who come for work should be made mandatory.
- **Stress on Dialogue** as an ongoing process to reach concrete solutions by involving all the stakeholders and not a single group.

Conclusion

In the past, Government policies and their implementation had proved inadequate for giving shape to the immense inherent potential of the Northeast region. Over the last eight years, the Union Government has been extremely responsive to the needs of this region, by making enhanced connectivity, improved infrastructure and people’s welfare part of its core development agenda. From being on the margins of the India story, the Northeast is quickly becoming one of the country’s growth engines.

[While India has made significant progress in achieving self-reliance in the production of pulses, it continues to rely heavily on imports for edible oil. Suggest measures to make India self-reliant in edible oil. \(250 words\)](#)

Difficulty level: Moderate

Reference: [Indian Express](#)

Why the question:

The article discusses India’s self-reliance in the production of pulses (legumes) while highlighting its dependence on imports for edible oil.

Key Demand of the question:

To write about the reasons for achieving self sufficiency in pulses and write about the key lessons from it to make edible oil production self sufficient.

Structure of the answer:

Introduction:

Begin by giving context.

**Body:**

First, cite statistics to show growth in India's pulses and reduced import dependence. Next, write about the reasons for reduction in Import and how India achieved self-sufficiency in pulses.

Next, throw light on the current status of edible oils. Mention the issues because of which India is import dependent for edible oils.

Next, mention the measures that are needed to remedy this situation.

Conclusion:

Conclude with a way forward.

Introduction

India has achieved over 90% self-sufficiency in dals, thanks mainly to increased chana production. However, India needs 25 million tonnes of edible oils to meet its requirement at current consumption level of 19 kg per person per year. Out of the total requirement, 10.50 million tonnes are produced domestically from primary (Soybean, Rapeseed & Mustard, Groundnut, Sunflower, Safflower & Niger) and secondary sources (Oil palm, Coconut, Rice Bran, Cotton seeds & Tree Borne Oilseeds) and remaining 70%, is met through import.

Body**Import of edible oil vis-à-vis Pulses**

- Between 2013-14 and 2022-23 (April-March), the value of India's vegetable oil imports has soared from \$7,249.85 million (Rs 44,038.04 crore) to \$20,837.70 million (Rs 167,269.99 crore). Much of this has been in just the last two fiscal years
- Out of the 24-25 million tonnes (mt) cooking oil that the country consumes annually, only 9-10 mt is from domestically produced grain. The balance 14-15 mt is imported.
- In quantity terms, India's imports of pulses more than doubled from 3.18 mt in 2013-14 to 6.61 mt in 2016-17. From those peaks, they have come down to 2.70 mt in 2021-22 and 2.52 mt in 2022-23.
- Thus, the nation has actually seen a decline, unlike in vegetable oils, where the quantum of imports too has surged from 7.94 mt to 15.67 mt between 2013-14 and 2022-23.
- The reduction in pulses imports have come essentially on the back of higher domestic production.
- According to the Agriculture Ministry, India's pulses output has increased from 19.26 mt in 2013-14 to 27.50 mt in 2022-23.
- Private trade estimates of production are lower at 23-24 mt.

Reasons for edible oil import dependence in India

- India's import dependence in this has worsened to over 70%. Oilseed growers in India are in distress as a result of increased imports.
- The planted acreage has stagnated and the yields also continue to be abysmally low.
- This is primarily because growers have no incentive to improve agronomic practices.



- The marketability of the crop grown is also weak as the price support mechanism is nearly non-existent.
- Market – Liberal policies with zero or low rate of duty and free market operations of the last 25 years have contributed to unfettered imports.
- This has worked against protecting the interests of domestic growers.
- About 10-15% of the current import volume is speculation driven. It often represents stock transfer from Indonesia and Malaysia to India.
- Huge inventories of as much as 2 million tonnes are often piled up in India, in turn affecting the domestic market.

Measures to boost domestic production of edible oils

India has a serious import dependency in edible oil. One of the biggest constraints to raising oilseed output has been that production is largely in rain-fed areas. Only one fourth of the oilseed producing area in the country remains under the irrigation.

- In 1986, government had launched a **Technology Mission on Oilseed** to improve productivity. This resulted in some growth but then growth in this field has been sluggish only.
- Current Government is promoting **National Mission on Oilseeds and Oil Palm (NMOOP)** during 2012-17. This mission has some clear cut objectives such as:
 - Increasing Seed Replacement Ratio (SRR) in oil crops with focus on Varietal Replacement;
 - Increasing irrigation coverage under oilseeds from 26% to 36%;
 - Diversification of area from low yielding cereals crops to oilseeds crops; inter-cropping of oilseeds with cereals/ pulses/ sugarcane;
 - Use of fallow land after paddy /potato cultivation;
 - Expansion of cultivation of Oil Palm and tree borne oilseeds in watersheds and wastelands;
 - Increasing availability of quality planting material enhancing procurement of oilseeds and collection; and
 - Processing of tree borne oilseeds.
- **National Mission on Edible Oils (NMEO):** To increase domestic availability and reduce import dependency, a National Mission on Edible Oils (NMEO) is proposed for next five years (2020-21 to 2024-25). NMEO covering three Sub-Missions to increase production of oilseeds and edible oils from
 - Primary Sources (Annual Crops, Plantation Crops and Edible TBOs),
 - Secondary Sources (Rice bran oil and Cotton seed oil) and
 - Consumer Awareness for maintaining edible oil consumption constant at 19.00 kg per person per annum.



- The proposed mission will aim to increase production from 30.88 to 47.80 million tonnes of oilseeds which will produce 7.00 to 11.00 million tonnes of edible oils from Primary Sources by 2024-25. Similarly edible oils from secondary sources will be doubled from 3.50 to 7.00 million tonnes.
- The following action point will be initiated for increasing production and productivity of oilseeds and promotion of Secondary Sources of Edible oils:
 - Increasing seed replacement rate and varietal replacement rate
 - Promotion of oilseed in rice fallow/ potato areas
 - Promotion of oilseeds through intercropping
 - Extending oilseed cultivation in non-traditional area
 - Targeting 100 low productivity districts
 - Crop diversification in different regions
 - Promotion of community-based oil extraction unit
 - Value addition and promotion of export
 - Promotion of rice bran and cotton seed oil
 - Consumer awareness for judicious consumption of oils for good health

Conclusion

India must become self-sufficient in edible oil production and this must become a part of India's Atmanirbharta. Certain WTO compliant incentives must be given to farmers in increasing the growth of oilseed production in the country to ensure domestic cultivation.

Challenges to internal security through communication networks, role of media and social networking sites in internal security challenges, basics of cyber security; money laundering and its prevention.

Analyse the multifaceted threats posed by bots in today's digital landscape and discuss comprehensive strategies to counter their detrimental impact. (250 words)

Difficulty level: Moderate

Reference: [The Hindu](#)

Why the question:

Bots on Telegram are small applications that run entirely within the platform and can be designed to support any kind of task or service. However, not all of them are secure and safe. They may collect user data, including personal information and chat history.

Key Demand of the question:

To write about the threats posed by bots and measures to counter them.

Structure of the answer:

Introduction:

Briefly explain the concept of bots and their prevalence in the digital landscape.

Body:



First, write about the diverse range of threats posed by bots across various sectors – Disinformation and propaganda, Bots used to disseminate fake news and manipulate public opinion and Impact on political processes, social cohesion, and trust in information sources.

Next, write about the steps that are needed to counter the above.

Conclusion:

Conclude by writing a way forward.

Introduction

On June 12, reports came out which alleged that a Telegram bot had access to and was presenting the identification numbers of the documents submitted for vaccination purposes which includes Aadhaar, PAN card, and even passport numbers of individuals. In a similar incident, in 2021, a bot on the platform was found selling phone numbers pulled from Facebook. Security researchers reportedly found a network of deep fake bots on the platform that were generating non-consensual images of people submitted by users, some of which involved children.

Bots are computer programs that act as agents of a user or another computer program. Bots on Telegram are small applications that run entirely within the platform and can be designed to support any kind of task or service.

Body

What are bots?

- Simply put, internet bots are software applications that are **designed to automate many tedious and mundane tasks online**. They've become an integral part of what makes the internet tick and are used by many internet applications and tools.
- **For example, internet search engines like Google rely on bots that crawl through web content in order to index information.** Bots go through millions of web pages' text to find and index terms that these pages contain. So, when a user searches for a particular term, the search engine will know which pages contain that particular information.
- **Travel aggregators use bots to continuously check and gather information on flight details and hotel room availabilities** so that they can display the most up-to-date information for users. This means that users no longer need to check different websites individually. The aggregators' bots consolidate all of the information, allowing the service to display the data all at once.

Multifaceted threats posed by bots

- **User data theft:** Bots may collect user data, including personal information and chat history and users should read the terms of service and privacy policy to understand how individual bots handle user data.
- **Distribution of malicious content:** Bots can also be created by threat actors to contain malicious content, such as links to **phishing websites or malware**. Threat actors can also distribute bots to scam users, promising rewards or discounts on purchases to lure users into sharing their personal data.
- **Security and fraud:** Some bots could have security vulnerabilities that can be used by threat actors to compromise the security of users. Introducing a bot to a secure Telegram chat



could also downgrade the level of encryption as they may not be using Telegram's encryption protocol, which works by scrambling and making it illegible while in transit.

- Eg: Stealing credit card details, account takeover etc. Further, 15% of all login attempts in the past 12 months, across all industries, were classified as account takeover. **Cybercriminals use bad bots to facilitate credential stuffing and brute force attacks, as automation can cycle** through credentials quickly until successful.
- **Distributed attacks:** Proxies give bots easy access to millions of IP addresses to abuse. As soon as one IP address is blocked, bots can shift to another one. Attacks from 100 distinct IP addresses are less likely to be caught in filters than 100 attacks from one IP address.
- **e-commerce:** E-commerce websites, mobile apps, and APIs have always been targeted by bots—particularly scrapers and scalpers.
 - Bot problems are even worse on sites with limited-edition products like sneakers, GPUs, and certain game consoles.
 - Scraping and scalping attacks can consume significant bandwidth, pull your IT team away from other important issues, and make it much harder for your human customers to shop for the merchandise they want.

Countering bots

- **Identifying the problem:** Organizations must be proactive in dealing with bad bots. This starts with recognizing and identifying the problem. IT teams can assess if their **networks** are being attacked by bots by taking a **look at their web analytics and review their traffic**.
 - Spikes in bandwidth consumption and log-in attempts can be signs of increased bot activities. Traffic from unusual countries of origin can also hint at bad bots probing a site for vulnerabilities. **Checking IP addresses and geolocations of traffic sources can reveal potential bot activity**.
- **Deploying strict access controls: Multi-factor authentication requires users to provide additional credentials such as one-time-passwords (OTP).** These can be implemented to deter bot attacks such as credential stuffing. Using identity and access management (IAM) also allows administrators to strictly define which resources within their network can be accessed by specific user accounts. This way, in the event that a bot “cracks” the credentials of one account, its access to the network is still limited (thereby minimizing the potential damage).
- **Monitoring activity:** It's important to constantly monitor and test the behavior of all security measures that are put in place. Misconfiguration or faulty implementation does happen. As such, **checks like penetration tests and attack simulations should be performed routinely** to verify if the measures work as intended. Adopting even the most expensive tools and solutions would only lead to waste if they are improperly configured.

Conclusion

Site owners should pay close attention to their traffic considering how malicious bots continue to run rampant. Left unchecked, bad bot traffic can evolve from a nuisance to something more serious



such as a full-on cyber attack in no time. Knowing how to mitigate bad bot traffic can help to safeguard your infrastructure and create a more secure internet for everyone.

Value addition

Bad bots and their uses

- **Web scraping** — Hackers can steal web content by crawling websites and copying their entire contents. Fake or fraudulent sites can use the stolen content to appear legitimate and trick visitors.
- **Data harvesting** — Aside from stealing entire websites' content, bots are also used to harvest specific data such as personal, financial, and contact information that can be found online.
- **Price scraping** — Product prices can also be scraped from ecommerce websites so that they can be used by companies to undercut their competitors.
- **Brute-force logins and credential stuffing** — Malicious bots interact with pages containing log-in forms and attempt to gain access to sites by trying out different username and password combinations.
- **Digital ad fraud** — Hackers can game pay-per-click (PPP) advertising systems by using bots to “click” on ads on a page. Unscrupulous site owners can earn from these fraudulent clicks.
- **Spam** — Bot can also automatically interact with forms and buttons on websites and social media pages to leave phony comments or false product reviews.
- **Distributed denial-of-service attacks** — Malicious bots can be used to overwhelm a network or server with immense amounts of traffic. Once the allotted resources are used, sites and applications supported or hosted by the network will become inaccessible to legitimate users.

[While India needs to enhance its cybersecurity capabilities, focusing solely on building cyber weapons for deterrence may not be the most prudent approach. Critically Examine. \(250 words\)](#)

Difficulty level: Moderate

Reference: [ft.com](#), [Insights on India](#)

Why the question:

A criminal gang with Russian-speaking members has carried out a widespread hack that has compromised the personal data of tens of thousands of employees at major British companies. The hack is expected to extend to the United States, affecting more victims.

Key Demand of the question:

To debate if India should increase its cyberwarfare capabilities to achieve deterrence.

Directive word:

Critically analyse – When asked to analyse, you must examine methodically the structure or nature of the topic by separating it into component parts and present them in a summary. When ‘critically’ is suffixed or prefixed to a directive, one needs to look at the good and bad of the topic and give a balanced judgment on the topic.

Structure of the answer:

Introduction:



Begin by defining cyber-warfare.

Body:

In the first part, mention the various kinds of cyber weapons – Viruses, phishing, computer worms and malware, distributed denial-of-service (DDoS) attacks, hacking, spyware or cyber espionage, ransomware and propaganda or disinformation campaigns etc.

Next, argue the impact Cyber warfare can have on our country. Substantiate with examples. Argue for building cyber armament directly by the state.

Next. Argue on the other side as to unconventional nature of cyber warfare, lack of proper accountability and training etc.

Conclusion:

Conclude by passing a judgement on whether or not India should to work towards building cyber warfare deterrents.

Introduction

Cyber warfare is **computer- or network-based conflict involving politically motivated attacks by a nation-state on another nation-state**. In these types of attacks, nation-state actors attempt to disrupt the activities of organizations or nation-states, especially for **strategic or military purposes and cyber espionage**.

Body

Various types of cyber warfare and attacks

- **Spyware: Pegasus**, a spyware was in news and according to WhatsApp, the spyware was **deployed on at least 1,400 targets**, including lawyers, activists, dissidents and diplomats. The Pegasus spyware is also known to have been used **against several Indian journalists and activists**.
 - Sensitive information was extracted from the target users' phone.
- **Denial of Service: Sapoishi Malware** is capable of taking over electronic devices and turning them into bots (device taken over by malware) which can then be used for any purpose, including DDoS attacks which, with enough firepower, can cripple entire industries.
 - It overloads the server, rendering it non-responsive.
- **Ransomwares:** It is a type of malware that prevents users from accessing their system or personal files and demands ransom payment in order to regain access. **Eg: WannaCry, Petya**
 - This can have a serious harm to critical government infrastructure and its data security.
- **Hacking:** It can occur through phishing, spam mails that mask virus as executables or exploiting a badly written code in the software
 - **Using old Operating Systems:** **Eg :** ATMs with windows XP became vulnerable to network spoofing.
 - **Cyber-warfare leading** to states attacking the information systems of other countries for espionage and for disrupting their critical infrastructure.
 - Monitoring web to trace people in touch with terror operatives is needed for national security. **Eg : Operation Chakravyuh by IB**



- Targeting nation's nuclear installations. Eg: breach in **Kundakulam** nuclear power plant.

Measures needed to combat cyber warfare

- **A Defence Cyber Agency** could be the first step the government plans to for critical infrastructure and military networks that are increasingly becoming dependent on the Internet, thus increasing vulnerabilities.
- The Defence Cyber Agency will work in coordination with the National Cyber Security Advisor. It will have more than 1,000 experts who will be distributed into a number of formations of the Army, Navy and IAF. According to reports, the new Defence Cyber Agency will have both offensive and defensive capacity.
- Equally important is **cyber propaganda**. During the Doklam conflict, China tried its best to unleash cyber propaganda on India and indulged in complex psy-ops
- **Critical cyber infrastructure** needs to be defended and the establishment of **the National Critical Information Infrastructure Protection Centre(NCIIPC)** is a good step in this direction
- Individual ministries and private companies must also put procedures in place to honestly report breaches. It is only then that the NCIIPC can provide the requisite tools to secure these networks. This partnership must be transparent and not mired in the usual secrecy of intelligence organisations.
- The **upgrading of the Defence Cyber Agency to a Cyber Command** must be implemented at the soonest.
- A robust ecosystem must be built to secure India from acts of state and non-state actors, including protocol for grievance redressal in international forums.
- Better capabilities must be built to detect and deflect attacks.
- The **computer emergency response team (CERT)** must be strengthened and aligned with military and foreign affairs operations.
- Building a joint task force between the government and key technology players will be crucial.
- The government should push for the creation of a **global charter of digital human rights**.
- **A national gold standard** should be created, which ensures that Indian hardware and software companies adhere to the highest safety protocols
- Impart cybercrime investigation training and technological know-how to the various law enforcement agencies.
- **Cyber awareness** must be spread and there should be multi-stakeholder approach- technological inputs, legal inputs, strengthening law enforcements, systems and then dealing with transborder crime involves lot of international cooperation.



Conclusion

India must develop core skills in data integrity and data security fields, to ensure protection of user data as well as security of critical infrastructure. Expertise of the private sector must be leveraged to build capabilities. Meanwhile user awareness is equally necessary to prevent them from becoming victims of cybercrime.

New foundation for a global law on cybersecurity must be laid. It will help in guiding national legislation or policy against cybercrimes. Cyber-Deterrence must be ingrained in the policy on cybersecurity with both defensive and offensive approach.

Value addition


Examples of cyberwarfare

- In 2020, the United States (US) department of defence (DoD) exposed an **information-stealing malware, SlothfulMedia**, which they said was being used to launch cyberattacks against targets in India, Kazakhstan, Kyrgyzstan, Malaysia, Russia and Ukraine.
- The most notorious example is that of the **misinformation campaign conducted by Russian bots during the 2016 US presidential elections**.
- Societally, **sowing disinformation through social media disinformation is also cyberwarfare**. Russia has been particularly savvy in this field but recently, China has stepped up its game.
- **Intellectual property (IP) rights are another avenue of strategic competition** — in 2014, the US justice department indicted five Chinese military hackers and accused them of stealing secrets from US Steel, JP Morgan, Alcoa, Westinghouse Electrical Co., and United Steelworkers.
- **Military cyberattacks are perhaps the most associated with cyberwarfare** — the “Sandworm Team”, a group associated with Russian intelligence, has conducted attacks on government sectors in the US, Ukraine, Poland, and on the European Union and NATO.
- A well-documented cyberattack occurred in 2010 when a **malware “Stuxnet”** that was designed to damage Iran’s nuclear capability by making Iranian scientists and government think there were a series of internal engineering mishaps at their enrichment facility.




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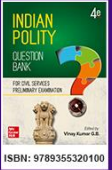
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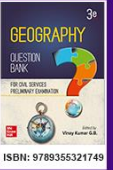
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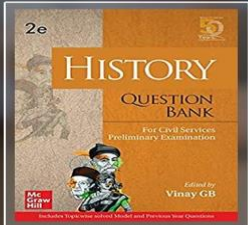


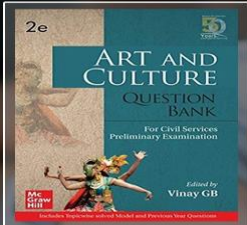
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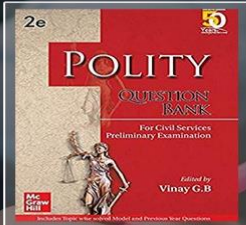
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