



# INSIGHTSIAS

SIMPLIFYING IAS EXAM PREPARATION

## SECURE SYNOPSIS

### MAINS 2018

## GS-III

# JANUARY 2018

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IAS SELF STUDY GUIDE

**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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## GENERAL STUDIES - III

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

Q1) “Public value does not mean simply redistributing existing wealth or correcting issues affecting public goods. Instead, it means co-creating value in different spaces.” Elaborate the sentence and discuss significance of collective creation of public goods. (250 Words)

[Livemint](#)

### Explanation of the statement:-

- Mainstream economic theory holds that governments should intervene only in cases of “market failure.” The state’s role is to establish and enforce the rules fund public goods such as infrastructure, defense, and basic research and devise mechanisms to mitigate negative externalities such as pollution.
- When states intervene in ways that exceed their mandate to correct market failures, they are often accused of creating market distortions. This thinking has caused many governments to outsource functions to the private sector altogether, in the name of efficiency.
- But this approach has not only failed to achieve its goals; it has undermined confidence in public institutions.
- So public institutions are not there just for correcting issues and becoming market fixers but to take risks and create value.

### Significance:

- When mission-driven public-sector actors collaborate to tackle large-scale problems, they co-create new markets affecting both the rate of growth and its direction.
  - For instance , NASA and the Defense Advanced Research Projects Agency were given ample funding and clear goals. Their mission-oriented approach allowed them to attract top talent, and their staff were told to think big and take risks.
  - Similarly, the US Advanced Research Projects Agency-Energy (ARPA-E) has been responsible for significant innovations in the field of renewable energy, particularly in battery storage.
  - The National Institutes of Health (NIH) has funded the development of many blockbuster drugs.
  - In the UK, the BBC’s ambitious computer literacy project in the 1980s led to its investment in the Micro computer. Procurement of that device’s parts enabled companies like Advanced RISC Machines, later renamed Arm, to scale up and become national powerhouses.
  - Even in the case of India ISRO has played tremendous role in space technology.
- But co-creating value and directing growth require experimentation, exploration, and trial and error

### Way forward:-

- There is a need to focus on promoting risk-taking and experimentation. Such an approach can reawaken the progressive agenda preventing that narrow group of self-acclaimed wealth creators from simply extracting value. And it will generate a more dynamic conversation within civil society .

Q2) Write a critical note on the objectives and provisions of the Negotiable Instruments (Amendment) Bill, 2017. (150 Words)

[The Hindu](#)

### Negotiable instruments (Amendment) Bill 2017:-

- In a move to prevent unscrupulous elements from holding back payment through litigation in cheque bounce cases, the government has come up with a series of amendments to the Negotiable Instruments Act, 1881.
- The Negotiable Instruments (Amendment) Bill, 2017 was introduced in Lok Sabha on January 2, 2018. It seeks to amend the Negotiable Instruments Act, 1881. The Act defines promissory notes, bills of exchange, and cheques. It also specifies penalties for bouncing of cheques, and other violations with respect to such negotiable instruments.



▪ **Interim compensation:**

- The Bill inserts a provision allowing a court trying an offence related to cheque bouncing, to direct the drawer (person who writes the cheque) to pay interim compensation to the complainant.
- This interim compensation may be paid under certain circumstances, including where the drawer pleads not guilty of the accusation.
- The interim compensation will not exceed 20% of the cheque amount, and will have to be paid by the drawer within 60 days of the trial court's order to pay such a compensation.

▪ **Deposit in case of appeal:**

- The Bill inserts a provision specifying that if a drawer convicted in a cheque bouncing case files an appeal, the appellate court may direct him to deposit a minimum of 20% of the fine or compensation awarded by the trial court during conviction.
- This amount will be in addition to any interim compensation paid by the drawer during the earlier trial proceedings.

▪ **Returning the interim compensation:**

- In case the drawer is acquitted (during trial or by the appellate court), the court will direct the complainant to return the interim compensation (or deposit in case of an appeal case), along with an interest. This amount will be repaid within 60 days of the court's order

**Advantages:-**

- To discourage frivolous and unnecessary litigation which would save time and money.
- The proposed amendments will strengthen the credibility of cheques as a financial instrument.
- This is being done to help trade and commerce, particularly the MSME sector
- The move follows representations from the public and the trading community regarding the injustice caused to payees as a result of pendency of cheque dishonour case
- Amendments in the Act will have implications for over 18 lakh cheque bounce cases pending in various courts
- promote less-cash economy

**Concerns:-**

- **Judiciary is already suffering with huge pendency of cases.**
- **The aggrieved person is at a disadvantage as he has to bear all the charges and fight the case**
- The 20% threshold mentioned in the bill may be detrimental for the people who is not involved in the cheque bouncing deliberately.

**Conclusion:-**

- As India is moving faster on the path of digital transactions and cheque payments, government needs to ensure the payees of dishonoured cheques are able to realise the payments. The amending of the Negotiable Instruments Act suitably is necessary.

Q3) The proposed Financial Resolution and Deposit Insurance (FRDI) Bill may introduce instability into the existing financial regime. Analyse. (250 Words)

[EPW](#)

**FRDI bill:-**

- The FRDI Bill proposes to set up a financial resolution authority namely "Resolution Corporation" to resolve failures of service providers across the financial spectrum.

**How it may introduce Instability:-**

- The FRDI Bill **seeks to dilute government guarantees with respect to the debt resolution of public sector banks (PSBs)** and public sector financial institutions in India that act as the cornerstone of financial stability.
- **It proposes to divest the government and the RBI of the powers to plan and execute recovery and resolution processes for stressed PSBs** and financial institutions, and create a Resolution Corporation.



#### ▪ **Bail-in provision**

- could convert uninsured bank deposits and other debt liabilities into equity-like instruments in order to recapitalise banks.
- changes the nature of relationship between the customer and the bank. It would mean that money is no longer safe in a bank.
- The possibility of a bank run cannot be ruled out has already caused disquiet among bank depositors
- There is **potential for regulatory conflicts** between the resolution authority and the central bank on the risk assessments of stressed financial firms as well as the methods and instruments of their resolution.
- **The absence of any amount specifying the deposit insurance threshold in the FRDI Bill**, even as it proposes to repeal the existing deposit insurance legislation added to the uncertainty surrounding the resolution regime
- The dilution of the explicit and implicit government guarantees for PSBs and financial institutions can only **enhance the fragility of the PSBs** at a time when the massive accumulation of bad loans has severely affected their balance sheets.
- The FRDI Bill further empowers the Resolution Corporation to decide the amount insured for each depositor. **Thus, it is possible that the insured amounts will not only vary for customers in different banks, but may also be different for different customers of the same bank.**
- **It is just an imported idea and does not suit Indian conditions**
- In its current form, the FRDI Bill disallows the proposed corporation's resolution process from being challenged in courts.
- The overwhelming presence of government representatives on the corporation's board (including regulators' representatives) can convert the corporation into a blunt tool of vengeful political action leading to further conflict with the public interest.

#### **Why the bill is needed?**

- It helps resolve the bad loans problem
- The proposed financial resolution regime attempts to pre-empt any outbreak of a banking or financial crisis by putting in place a **new regulatory framework that will ensure the orderly exit of failing financial firms** and insulate the larger financial system from possible contagion
- It sets in motion a separate mechanism for depositors resolution when a contingency arises. What was part of the commercial model of banks is now being institutionalised and formally regulated.
- **Creditors/depositors will need to consent in advance to have their liabilities bailed-in.** Even when liabilities are being bailed in, the Bill makes it incumbent upon the Resolution Corporation to follow the prescribed route.
  - **Uninsured depositors are placed higher over unsecured creditors and amounts due to the Central and State governments.**
- The Bill gives **aggrieved persons a right to be compensated by the Resolution Corporation** if any of the safeguards have not been followed during a bail-in or in the conduct of any other resolution action.

#### **Conclusion:-**

- With its thrust on initiatives such as the Jan Dhan Yojana and demonetisation, the government has nudged more people towards the formal banking system. To ensure that those gains are not lost, the government must communicate more clearly the rationale behind the bail-in provision, and the circumstances in which it may ultimately be used, if at all.
- Government must enhance the amount of bank deposits that will remain safe under the new dispensation.

Q4) Both central and state governments own huge swathes of land properties whose actual measurement is unclear. Examine critically the issue of land hoarding by government agencies and its impact on economy. (250 Words)

#### **The Hindu**

#### **Background:-**

- Various Central Ministries admit to owning only about 13,50,500 hectares of land however disparate official sources suggest that the correct figure is several times more than what is disclosed. So it is necessary to dig this issue in detail

### Land hoarding in India:-

- **None of the government agencies maintains adequate ownership records.**
  - For instance, the 13 major ports have failed to produce title deeds for as much as 45% of their land holdings.
- The information provided by the Government Land Information System (GLIS) is both **incomplete and patchy**.
- **Large proportion of government land lies unused.**
- Land hoarding by government agencies has **created artificial scarcity** and is one of the main drivers of skyrocketing urban real estate prices.
- **Most Indian cities defy the basic tenets of urban planning.** The main reason is the large areas of unused or underutilised government land with an irresponsibly low Floor space index.

### Impact:-

- The allocation of unused land is **rife with corruption**.
  - Scams involving the Adarsh Cooperative Housing Society, the Srinagar airfield project, and the Kandla Port Trust are a few of the many examples of alleged complicity between private developers and local officials to misuse government land.
- **Large part of the unused land is high-value property in prime areas in major cities.**
- High land prices also **reduce competitiveness by increasing the cost of industrial and development projects.**
- The investment per square metre gradient of Indian cities is very low and haphazard. **This is bad as solving the problem of wastage could generate employment and pull masses out of poverty, thereby aiding the economy to grow fast.**
- **Middle and lower class households find it difficult to own house.**

### Way forward:-

- People have the right to know the size and use of land holding by government agencies, since most of the official land has been acquired from them by paying pittance by way of compensation
- The Centre has asked departments to identify surplus land. Unfortunately, agencies are not cooperating. This needs change.
- A comprehensive inventory of land resources and usage patterns for all government branches is needed.
  - It should include information on the location of each property, its dimensions, the legal title, current and planned use, and any applicable land use restrictions.
  - This will enable effective identification of suboptimal land use, as well as of the land that is surplus
- Surplus land should be utilised to meet the ever-growing demands for services, such as water and waste disposal, as well for government-sponsored housing and transportation projects.
- **Case study from Britain:-**
  - A public-government partnership is necessary.
  - The government has pledged to provide details of ownership, location, and intended use for all properties.
  - Citizens are invited to contest official land use and suggest alternatives.

Q5) Government of India should create human capital by empowering youth through skilling and quality education to avert anti-reservations sentiment that's spreading across country. Analyse. (250 Words)

### The Hindu

### Why human capital has to be the focus and why anti reservation protests are taking place?

- The vocational training schemes in the country are inadequate and woefully behind the times with many not addressing today's needs. Good schemes like those offered by the Nettur Technical Training Foundation (NTTF) in Bengaluru are simply too few.
- Technical training is also constrained by a small educational base as 70% of India's workforce is without tertiary education and a crippling lack of well-qualified trainers.
- Politicization of reservation to garner votes has put the motto of socio-economic development on back seat where reservation is extended to any community without properly scrutinizing its historical, socio-economic status.

- **Less than 4% of GDP is spent on education.** Appallingly, Indian students spend more in the US than their government spends on higher education in total.
- There is intensive competition among Indian students to get into the top universities but the reservation policy creates a hurdle for merit students.
- loopholes in the implementation of creamy layer category of OBC
- The reservation policy is actually benefitting the relatively well off and not the marginalised
- There is no effort to complement the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) with a bigger skill development programme to train the young for employment.
- Beyond student representation in specific fields of study, there are structural problems with India's education system.

#### **What needs to be done ?**

- There is a **need for more investment on Indians by Government.**
  - Structural transformation including the flow of capital investment into more productive, high-tech sectors is necessary.
- **Health:-**
  - Concurrent investment in health and nutrition for maximising the impact of structural changes to India's economy, and trigger growth that is swift, inclusive, and sustained.
  - The emphasis needs to shift from current massive levels of out-of-pocket spending to **pooled spending**.
  - The country needs to develop a stronger primary healthcare and nutrition system, ensure that both private and public sector providers offer high-quality services, and complete the unfinished agenda on infectious disease control.
  - With these changes, India will derive more value from its health expenditures and increase their impact on people's lives and their collective economic future.
- **Education and skill development:-**
  - Need for improvement in the quality of India's tertiary education.
  - Firms can invest in programmes aimed at developing great school leaders, and also draw on their knowledge of leadership training.
  - Public-private partnerships can also help demonstrate high quality schooling and introduce innovation in the government school system.
  - Improving the quality of education will benefit all companies and industries alike by contributing to a better talent pool for our economy.

#### **Way ahead:-**

- There is a strong need for policymakers to go beyond human capital, pushing for knowledge capital development while transforming India's comparative advantages in demography and cheaper labour cost.

Q6) The World Bank's latest "Global Economic Prospects" report shows that the second wave of change in the global labour market will play out over the next two decades, with developing economies contributing to all of the addition in the global skilled labour force, as the number of skilled workers in advanced economies is expected to decline. How should India gain from this employment shift? Analyse. (250 Words)

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#### **Background:-**

- Post economic crisis in 2009 developing countries started to play a very important role by being fastest growing economies when developed countries were suffering to main financial stability and economic growth

#### **Second wave of change in the global labour market :-**

- The rising level of skill and education in developing economies will also lift potential global growth and continue to reduce global inequality.

- Additional workers will get employed in multiple industries. With adequate demographic dividend this might play in favour of developing countries. This will be a big challenge for India. It has not been able to create enough employment opportunities for people moving out of agriculture.
- **Impact would be**
  - Improvement in the level of education and skill tends to increase income
  - Rising income in the developing world will lead to a reduction in inequality
  - The global Gini coefficient is estimated to decline from 65.8 in 2012 to 62.6 by 2030

#### How should India gain :-

- Since improvement in the level of education and skill tends to increase income, rising income in the developing world will lead to a reduction in inequality.
- Policymakers will need to work on different levels to be able to create a competitive labour force and make India benefit from the emerging global situation.
- India urgently needs to focus on **education and skill development**.
  - The **skills and employability** of the 250 million young people joining the workforce over the next decade will be crucial. It is estimated that six out of 10 young people entering the workforce by 2025 will be in professions that do not exist today.
  - **Improvement in vocational training programmes** as at present only 5% of young people aged 20-24 have obtained vocational skills through a formal training system.
  - The Indian government and businesses need to work together to **develop apprenticeship models** able to provide the employable skills markets require.
  - India should **invest more in talent development**, starting with formal higher education, where courses should align more closely with real world business needs, including more focus on soft skills.
- To be able to absorb its rising workforce, India needs to remove impediments in the **manufacturing sector by removing land and labour issues**.
- India will need to protect **its interest in environment of protectionism** and look for opportunities to increase trade at both bilateral and multilateral forums.
- Also, **adequate attention should be paid to currency management** in the world of volatile capital flows.
- **Exports are an important driver of growth** and job creation.
- **Self employment** needs to be promoted with initiatives like start up and stand up need to be implemented effectively.
- Promote **women labour participation**
- Health and nutrition as part of **human capital** needs improvement
- **Digital literacy** need to increase especially in the light of recent technologies like block chain, big data etc.
  - Given the speed of progress, lifelong learning is essential. And an emphasis on digital skills is required across the board, with **digitalization** increasingly affecting every sphere of work.

Q7) What do you understand by bond yield? What factors influence variation in bond yields and how these variations impact economy? (150 Words)

[The Hindu](#)

#### Bond yield:-

- A bond yield is the amount of return an investor realizes on a bond.
- When investors buy bonds, they essentially lend bond issuers money. In return, bond issuers agree to pay investors interest on bonds throughout their lifetime and to repay the face value of bonds upon maturity.
- The money that investors earn is called yield.
- Investors do not have to hold bonds to maturity. Instead, they may sell them for a higher or lower price to other investors, and if an investor makes money on the sale of a bond, that is also part of its yield.
- As bond prices increase, bond yields fall

#### Factors influencing variation in bond yields :-

- Generally, investors see **bond yields fall when economic conditions push markets toward safer investments**. Economic conditions that might decrease bond yields include high rates of **unemployment and slow economic growth or recession**.

- India saw a fall in bond prices on expectation of the Central government breaching its fiscal deficit target .
- **As interest rates increase, bond prices also tend to fall.**
- Bonds with lower ratings are considered to be non-investment grade and are referred to as high-yield or junk bonds. **The lower the credit rating, the higher the yield a bond will pay.**
- **Risk of default** usually is the single most important factor affecting bond yields.
  - A bond essentially serves as a loan to a government or company. Just like an individual with bad credit has to pay extra interest on a car loan to compensate the lender for the additional risk of a default, so too do governments and companies issuing bonds on the private market.
  - In 2015, for example, yields on short-term Greek bonds were very high, because investors saw Greece as a very risky economic environment..
- **Private sector's saving rate :-**
  - A measure of how much money businesses and individuals are socking away for the future.
  - **When the savings rate is very low, bond yields tend to rise.** That's because bonds are a form a savings.
  - **Bond yields tend to drop dramatically because investors are competing for the chance to lend money, which drives the price of debt down.**
- When investors think that growth across the whole economy will be very strong, bond yields tend to go up. Investors have lots of options available, so they demand higher rates of returns on bonds to compensate for opportunity cost of not investing in other areas like stocks. **When the overall economy looks weak, the opposite is true. Bond yields tend to fall because investors don't see any productive alternatives for their money.**
- **The perceived risk of inflation influences bond yields.** That's because inflation can completely erase earnings if the rate of inflation is higher than the rate of the bond. **High inflation risk means higher bond yields**

#### How this affects economy :-

- The sharp rise in bond yields **has hit banks with losses on treasury operations dominated by sovereign bond holdings**
- **It affects money market stability.**
- With surging yields, many top-rated public-sector companies are not tapping the debt market in a hurry.
- The bond market weakness will remain unless either oil prices, or global yields, stabilize
- Higher bond yield increases the cost of production which in turn will affect earnings going forward.
- Historically, rising bond yields have had an inverse co-relation with markets.

Q8) What is e-way bill system? How will it work? Examine its merits and demerits. (250 Words)

[The Indian Express](#)

#### Electronic way bill system :-

- It offers the technological framework to track intra-state as well as inter-state movements of goods of value exceeding Rs 50,000
- Under the e-way bill system, there will be no need for a separate transit pass for every state one e-way bill will be valid throughout the country for the movement of goods.
- All consignments moving more than 10 km from their origin will require prior registration and generation of an e-way bill through the GST Network, which will be valid for varying durations depending on the distance travelled.

#### Working:-

- According to notified e-way bill rules, every registered supplier will require prior online registration on the e-way bill portal for the movement of these goods.
- Any supplier/recipient/transporter can generate an e-way bill. Once this is generated, there will be no need to fill the requisite information in the GST return, as there will be an automated filing of GSTR-1 .
- A unique e-way bill number (EBN) as well as a QR code will be generated for tracking.
- Digital facilities via SMS/Android apps will also be provided for the generation of e-way bills.
- The National Informatics Centre (NIC) has developed a separate portal for the e-way bill.
- The rules also specify that the permits would be valid for one day for the movement of goods for 100 km, and in the same proportion for following days.
- Tax officials will have the power to scrutinise the e-way bill at any point during transit to check tax evasion.
- Ten states have started trial runs of the e-way bill system.



### Merits :-

- With the move towards the e-way bill, the **organised part of the long-distance logistics industry would contribute towards the rapid growth of the Indian economy** (the organised section) as a whole.
- **Plugging tax evasion**
- The e-way bill will **boost revenues by 15-20 per cent**
- **Easy use:-**
  - e-way bill can also be generated or cancelled through SMS
- **Will bring uniformity** across the states for seamless inter-state movement of goods.
- The government has highlighted the powers provided to transporters in the e-way bill rules to report detention of vehicles beyond 30 minutes on the portal.
- Also, the e-way bill **rules facilitate online reporting of inspection and verification of documents.**

### Demerits:

- The industry views the e-way bill as a system that will check tax evasion to some extent, but **may not be able to stop it completely.**
- Also, it adds another layer of compliances for GST payers and, in case of technical glitches, may result in **supply chain bottlenecks.**
- The system may not be able to **handle the large volume of e-way bills** that will have to be generated.
- **Companies are worried about their preparedness**
- Another concern is **how the system will be adopted at the stockist level and if it will lead to supply shocks.**
- **Compliance at the wholesale could be impacted initially.**
- Connectivity could be an issue in the smaller towns. Challenges will be infrastructure related.
  - **Would lead to delays in transportation**
- The Confederation of Indian Industry (CII) pointed out that **any disruption in the GSTN will bring operations to a standstill.** In such a situation, it wouldn't be feasible to contact state officers and get waivers instantly.
- **Fears of Arbitrary Inspections**
  - Tax consultants raised fears of arbitrary inspections by mobile squads that were prevalent in the earlier regime.
- **Understanding of the rules** by stakeholders including small traders and transporters is also a worry.
- The **e-way bills further dilute the benefits accruing out of an efficient GST model**, simply because the matching envisaged through the GSTN portal has not successfully happened.

### Way forward:-

- The provisions should be made applicable only to select, notified products which are prone to evasion and not to all products.
- Instead of the e-way bill, the government could use quick response (QR) codes to validate the goods being transported.

Q9) Analyse the self-employment scenario in India and its significance to India's economic growth and development. (250 Words)

[Livemint](https://www.insightsias.com/livemint)

### Self employment in India:-

- Nearly half of the labour force is self-employed in India
- India is ahead of the US; about 75% of India's labour force is self employed
- In India a self-employed person is anybody who is working for oneself instead of working for a wage or salary in an organization run by others, which is the case of wage employment.
- **Reasons are:-**
  - **Lack of suitable jobs and the lack of suitable avenues for investment, people opt for self-employment** and use their funds in owner-managed enterprises. Owner-managed enterprises can include units run by hawkers, shopkeepers, merchants in wholesale trade, and distributors etc.
  - **Especially in lower income families** they take whatever job they get making them self employed.
  - Self employment is large in India also because **government policies encourage owner-managed enterprises.** This is clear from the policies related to small and medium enterprises; street vendors etc

- India does not have appropriate training and education, a credible certification process, and a flexible and discerning way of recruitment. Many skilled and talented people are not well recognized. **So, they migrate or they need to set up on their own here even if they are not entrepreneurs.**
- In rural areas, **women periodically enter and exit from agricultural work.** Quite often, women's participation in agricultural activities as self-employed workers is to supplement the falling incomes of their families during times of agrarian distress.
  - For instance during 1999-2000 to 2004-05 the growth of agricultural incomes in the country was stagnant, yet the number of self-employed female workers engaged in agriculture and related activities increased by 17 million, possibly indicating 'distress employment'..

#### Significance:-

- **Self-employment** programs emerged as an **important** bridge from unemployment to sustainable economic activity
- **Advantage of small business**
  - The self-employment involving activities on a small-scale is a good alternative to large scale business which has brought various evils like environmental pollution, development of slums, exploitation of workers, and so on.
- **Preference over wage employment**
  - **In self-employment there is no limit of earnings as is the case with wage employment. In self-employment one can use one's talent for own benefit.** The decisions can be taken quickly and conveniently.
- **Developing the spirit of entrepreneurship**
  - Self-employment involves either no risk or very little risk. But, as soon as the self-employed person starts becoming innovative and takes steps to expand his business it becomes a launching pad for entrepreneurship.
- **Promotion of individualised services**
  - Self-employment may also take the form of **providing individualised services** like tailoring, repair work, dispensing of medicines etc. **Such services are helpful in providing better consumer satisfaction.**
- **Reducing the problem of unemployment**
  - Self-employment provides opportunities of gainful occupation to those who otherwise remain unemployed. Thus it reduces the problem of unemployment
- **A boon to under-privileged in respect of higher education**
  - Such persons can start their career as self employed in occupations that do not require higher education. **It may be noted that self-employment has been given high priority in government policies and programmes. A number of schemes have been initiated all over the country to encourage entrepreneurship and self-employment**
- An entrepreneur is not just creating self employment but also building a structure for small to large scale employment. As these enterprises grow, the employment opportunities increase. In India, **many start-ups that started out as home based ventures are today employers to hundreds of individuals**
- Women who are self employed are financially secure leading to growing role of women in India's labour force and shift towards gender equality.
- **Government schemes:**
  - It gives fillip to Indian initiatives like Make in India and helps in boosting internal economy of India
  - Measures like stand up and start Up India are providing opportunities for the unemployed to contribute to the economy and also uplift the socio economic backward communities.

#### However:-

- Self employed are mostly part of informal economy with no necessary protection.
- It is relatively easier to evade taxes for the self-employed than in the case of true entrepreneurs who operate with the help of independent-minded professionals, possibly on a large scale, which makes tax evasion difficult.

#### What needs to be done:-

- India needs to reduce bad self-employment by massively creating formal, non-farm, wage employment and good self-employment. There need to be reforms of building infrastructure, reducing regulatory control, and raising human capital.
- Reforms in labour laws, education needs to be undertaken immediately for encouraging good self employment.



Q10) Examine the components of reforms and recapitalisation plan that the union government has unveiled for public sector banks (PSBs). Do you think recapitalisation will revive banking sector? Critically comment. (250 Words)

[The Hindu](#)

[Livemint](#)

**Background:-**

- The government recently announced the details of the Rs. 2.1 lakh crore recapitalisation plan for public sector banks (PSBs) including a reforms package across six themes including aspects like customer responsiveness, responsible banking, and increasing credit offtake.

**Components of recent reforms :-**

- **Mission Indradhanush**
- **Banks board bureau**
- **Introduction of the insolvency and bankruptcy code** to help public sector banks sanitize their balance sheets in a time-bound manner
- **A massive recapitalisation of Rs2.11 trillion over the next two years** via recapitalisation bonds (64%), budgetary support (8.5%) and mobilization from the market (27.5%).
  - Recapitalisation package would be spread across the current financial year 2017-18 and the next year 2018-19. The capital infusion plan for 2017-18 includes Rs. 80,000 crore through recapitalisation bonds and Rs. 8,139 crore as budgetary support.
  - The capital infusion for the PSBs would be contingent on performance, and the whole-time directors of the PSBs would be assigned theme-wise reforms to oversee

**Concerns:-**

- **The government as the major owner is free to recapitalise but the issue is, at what cost, for how long, and whether recapitalisation alone is enough.**
- The government is finding it increasingly difficult to recapitalize public sector banks **due to the compulsion to adhere to the stringent budgetary deficit benchmarks.**
- **Bankers become lackadaisical toward debt recovery and tend to escalate provisions and contingencies to be adjusted against the fresh capital.**
- In different-banks-same-pay situations, employees in the loss-making, but recapitalized, banks become unenthusiastic while those in profit-making, but not recapitalized are demotivated.
- It also implies cross-subsidization: dividend-paying PSU banks subsidizing the non-dividend paying. Ultimately, **systemic efficiency suffers.**

**Yes, recapitalisation will work:**

- Recapitalisation amount for Prompt corrective action banks **would be used for support to maintain their regulatory capital requirements, and to strengthen their governance and operations.** The amount for non-PCA banks is to be used for investment in growth capital.
- **Recapitalisation bonds would not have an impact on the fiscal deficit** as they would be cash neutral.
- This could give the banking system a good breathing time to enhance its credit portfolio and restore value out of the NPA accounts.

**No, it will not work:-**

- In making this move, there was an implied acceptance that the recovery process set up through the Insolvency and Bankruptcy Code (IBC) reform had not been working at the desired pace.
- The government is not taking tough action on defaulters so this measure is not going to result in the recovery of bad loans.
- **Banks cannot recover loans through the IBC route.** Thus, the banks capital gets eroded and the capital adequacy ratio (CAR) becomes adverse.
- When the government recapitalise PSBs, **it is all people's money and out of public savings kept in trust in the banks.** People's money need to be for people's welfare .
- It is debatable whether public sector banks, post-recapitalisation, would augment credit deployment.
  - **Credit offtake is strongly a function of overall economic environment and policies.**

- It also depends upon the evolving credit culture and bankers' propensity to take risk which is bad in the present scenario
- It is testimony to short-termism as there is lack of follow-up reforms that are systemic or bank-specific to tackle the problems.
- **Banks will not take adequate precautions when they are lending when they know that the government will step in to help if the loans turn sour.** The government should be selective about which banks get the additional capital on offer.

#### What reforms are further needed:-

- **Consolidation:-**
  - The banking structure, which was outlined by the Narasimhan Committee-I, i.e., (a) Three or four large "international" banks, (b) Eight to 10 "national" banks, (c) "Regional" banks and (d) "Rural" banks, holds relevance for any fresh endeavour.
- Going forward, if some PSU banks cannot mobilize the required resources for their profitable growth, **they should be either privatized or merged.**
- **Banking structure reforms:-**
  - For improving governance of PSBs, questions like the tenure of senior management have to be addressed. **This was the recommendation of the Narasimhan Committee of 1991 and 1998.**
  - Public Sector Bank chiefs and their managing/executive directors must have a fixed tenure of at least five years.
  - **Salary structure of senior management:**
  - To offer incentives by way of very good annual bonus based on performance should enable them to take the right decisions.
  - **Professionalization through lateral entry at the level of general managers** and not at the ED/MD level.
  - **The banking boards need to be manned by professional directors rather than political nominees.**
  - Accountability needs to be fixed by removing senior management for non-performance.
  - Motivational aspects like variable pay, employee stock ownership plan (ESOP), etc. need to be introduced forthwith. Re-skilling the existing staff, along with direct recruitment of specialists, is needed to address the talent issue, especially in domains like forex, treasury, IT, data and research, and HR.
- **Autonomy for banks:**
  - For a durable remedy to NPAs, **PSU banks must be given adequate functional autonomy and operational flexibility.**
- **Modern HR management:**
  - The public sector banks approach to the entire HR process needs overhauling and made bank-specific.
  - The individual banks need to take care of their recruitment. **The current collective bargaining should be replaced by the "different-bank-different-pay" model and link the remuneration to the individual bank's "ability to pay".**
- **Digitalization challenge needs to be resolved:-**
  - Digitalization of the payment systems is inescapable, but only a handful of PSBs are truly active in National Electronic Funds Transfer (NEFT), point of sale (POS) ownership and card transactions space.
- **Public sector banks must create or purchase the expertise for excellent project evaluation. Certification agencies are needed,** but their track records must be scrutinised, with penalties and prosecution in suitable cases. Banks must insist on global tendering for equipment to thwart cost inflation by promoters.
- Greater diligence in project screening and a quick exit for bad promoters must be the two main aims of purposive bank reform.

Q11) India ranks 62 among emerging economies on an Inclusive Development Index, much below China's 26th position and Pakistan's 47th. Why do you think India's rank is not improving in this index? What needs to be done in this regard? Critically examine. (250 Words)

[Livemint](https://www.livemint.com)

#### Background:

- India was ranked at the 62nd place among emerging economies on an Inclusive Development Index, much below China's 26th position and Pakistan's 47th, according to the World Economic Forum (WEF).

### Reasons why India is not improving:-

- India has **prioritised economic growth over social equity**, This has led to historically high levels of wealth and income inequality and caused governments to miss out on a virtuous circle in which growth is strengthened by being shared more widely and generated without unduly straining the environment or burdening future generations.
- **Excessive reliance by economists and policy-makers on GDP** as the primary metric of national economic performance is part of the problem,
- **Poverty:**
  - Six out of 10 Indians still live on less than \$3.20 per day.
- **Employment growth has slowed.**
- **Country's debt-to-GDP ratio is high**, raising some questions about the sustainability of government spending.
- **Educational enrolment rates are relatively low** across all levels, and quality varies greatly, leading to notable differences in performance among students from different socioeconomic backgrounds.
- While unemployment is not as high as in some other countries, the **labour force participation rate is low, the informal economy is large, and many workers are in vulnerable employment situations with little room for social mobility.**
- **New business creation continues to be held back by corruption, underdeveloped infrastructure**, and the large administrative burden involved in starting and running companies

### Measures taken :-

- Many measures like RTE, NHRM, Jan Dhan Yojana for financial inclusion, NREGA have been implemented but still inclusive development is still a concern in India.

### Measures needed:-

- India must increase finance and credit to the 58 million tiny, non-farm units. A 1 per cent increase in credit to them will increase employment by roughly 10 million and output by about 0.4 per cent of GDP. **As only 10 per cent of that product is exported, there will be no problem in absorbing that in the domestic economy.**
- Social indicators need focus-health care needs to be revamped with more investment and especially quality healthcare in rural areas.
- Gender gap needs to be reduced by imbibing gender sensitive values from childhood.
- Structural reforms like land reform, land acquisition, flexible labour laws, faster clearance of projects, well-designed community development programme that aimed at the all-round development of the village etc are needed.
- Expanding the scope of the National Rural Employment Guarantee Act (NREGA) can also effectively increase domestic demand.
- A more progressive tax system would help raise capital for expenditure on infrastructure, healthcare, basic services, and education.

Q12) India's tax-to-GDP ratio is on the lower side when compared to major economies. Examine why. (150 Words)

[Livemint](#)

### Background:-

- India's has low share of tax revenues as a proportion of the gross domestic product (GDP) of the Indian economy.
- The data on tax revenues does suggest that India's tax-GDP ratio is indeed lower when compared to other major economies (those with GDP above \$100 billion as of 2017).

### Why?

- **Structural factors** such as low per capita income keeps tax collections low. *Low average incomes and a high poverty rate result in a very small portion of the labour force being eligible to pay personal income taxes*
- A large proportion of economic activity is generated by small and medium enterprises (SMEs). Although these enterprises have enjoyed strong profitability growth over the past decade, the **government has not captured their earnings in tax revenues due to a variety of exemptions and compliance issues.**
- **A lack of policy initiatives has also kept the tax take low.** *This includes certain tax exemptions on agriculture related activity and until the mid-nineties, on most services as well.*

- The tax collections are always sensitive to growth trends. **The corporate taxes are hit by recession, decreasing domestic demand etc.**
- **Tax** compliance in India is extremely low.
- **India has relatively large informal/unorganized sector**, and tax evasion is more rampant in informal sector compare to organized sector.
- **India has one of highest number of disputes between tax administration and taxpayers**, with lowest proportion of recovery of tax arrears.
- **Loop-holes in double tax avoidance treaties:**
  - Provisions for tax exemptions from short term capital gains are often misused by companies to re-route their investments from such countries (called round tripping of funds). Similarly issues related to tax-evasion, double non-taxation and transfer pricing need to be fixed.
- **Flourishing informal market ecosystem:** informal sectors like paying guest accommodations, Kirana stores, Stationary shops, etc. evade taxation.

#### No, its not:

- India's tax-GDP ratio does not appear low when compared to other developing countries or emerging markets.
- When India is compared with other economies at a similar stage of development as India, India's tax-GDP ratio appears quite respectable,
- India's tax collections are slightly above average, given the average income of the country.
- India's tax-to-GDP ratio appears respectable among developing countries which are also democracies, adjusting for income

#### Way ahead:-

- The most potent solution for raising India's tax-GDP ratio is to **raise economic growth and average incomes.**
- **Raising the taxes, lowering the tax exemption slabs, imposition of new taxes or cesses or surcharges, boosting the demand etc.**
- The combination of reduced cash intensity, a focused strategy of tax administration (without spooking companies and individuals with the spectre of "tax terrorism") and GST holds the promise of giving the much needed long-term boost to India's tax base.
- **Widening tax base:** GST will widen the tax base and generate additional revenues.
- GAAR (General Anti-avoidance rules) provisions may be useful in dealing with tax evasions where tax benefits exceed certain limit.
- **Efficient targeting of subsidies and phasing out of tax exemptions:**
  - Subsidies to the well off need to be scaled back, similarly tax exemptions to be reviewed and phased out, reasonable taxation of the better off regardless of where they get their income from like industry, services, real estate or agriculture.
- **Fast tracking of tax disputes**, reducing discretion of taxman and creating a predictable dispute resolution mechanism.

Q13) Lately India is witnessing dismal growth in the manufacturing sector. What measures should be taken to revive manufacturing sector? Examine. (250 Words)

[Livemint](https://www.livemint.com)

#### Background:-

- The projected growth at 6.5% in 2017-18 is mainly due to high growth in services in the next two quarters and manufacturing growth may remain subdued.

#### Reasons for dismal performance of manufacturing sector are:

- **Banks are reluctant to offer credit for industrial activity**
- **Excess rigidity in the formal manufacturing labour market and rigid labour regulations** has created disincentives for employers to create jobs
- **Industrial Disputes Act has lowered employment in organized manufacturing** by about 25% (World Bank Study)
- Stringent employment protection legislation has pushed employers towards more capital intensive modes of production, than warranted by existing costs of labour relative to capital. Therefore, **the nature of the trade regime in India is still biased towards capital-intensive manufacturing.**

- The labour intensity of **MSME** is four times higher than that of large firms but they have poor access to credit and they are plagued by many serious problems which has limited their growth potential.

#### **Measures needed:-**

- **Skill development :-**
  - Building skills among the large population of minimally educated workforce
- **Enacting laws** that focus on improving workforce relations together with greater flexibility,
- Improving **infrastructure** including development of world class clusters
- **Reducing uncertainties** and providing stability and predictability in regulatory, legal, environmental, taxation areas
- Providing **access to capital at competitive prices**
- **Importance to electronic sector :-**
  - An already conceived programme on silicon manufacturing for fabrication must be revived. This will ensure competitive domestic production of chips, leading to a reduction in imports of electronic items .
  - Focus on Electric vehicles is necessary .
- **Items for which merchandise export incentive scheme (MEIS) was not granted so far may be revisited**
- Attention may be **focused on assistance to states for export-related infrastructure** through assistance to states for development of export infrastructure and allied activities (ASIDE) type schemes
- Financial and technical assistance to export industries to improve their standards is needed.
- **The inverted duty structure must be attended to** and negotiations of items getting hit under current free trade agreements (FTAs) should be focused upon.
- **Banking system:-**
  - The autonomy of bank management and enhancement of banks professional capabilities is needed.
- Increased use of technology to reduce costs, improved whistle blower system is also necessary.

Q14) The new Economic Survey provides compelling evidence of how the Indian economy is becoming more formalised. Discuss the causes and significance of formalisation of the Indian economy. (250 Words)

[Livemint](https://www.insightsias.com/livemint)

#### **Background:-**

- According to International labour organisation, a major challenge in India is the quality of jobs .Also the overall proportion of informal workers in total employment has remained relatively stable, at around 92 per cent.
- However based on the economic survey statistics this seems to have changed.

#### **Causes:-**

- The introduction of the goods and services tax (GST) has brought more firms into the tax net. **The number of enterprises paying indirect taxes has gone up by 3.4 million, an increase of 50%.**
- The Indian workforce is more formalized than most people believed till recently. **Nearly a third of the non-farm Indian workforce of 240 million has some social security coverage.**
- **More than half of the non-farm workforce is employed in firms that now pay taxes.**
- **Demonetization** is one of the reasons why Indians are putting a greater proportion of their savings in the formal financial sector.
- **Bank deposits** swelled after November 2016, **though the** booming stock market has also made financial savings through mutual funds more attractive compared to gold or real estate.
- Also government push for **cashless economy** through digital India, Aadhaar streamlined the businesses and brought them into the formal sector.

#### **Significance:-**

- Higher tax revenues for the government to spend
- More direct tax payments by individuals as well as enterprises will not only create fiscal space for lower GST rates but also provide incentives for citizens to demand better governance.
- This shows that there will be more firms paying indirect taxes and more individuals filing income tax returns etc
- Demonetisation saw a bump in the number of people paying taxes, but a majority of these people are **earning so little they don't go past the minimum exemption limit.**



- In the case of new enterprises entering the GST system, **the survey also notes most of these firms aren't engaged in business-to-consumer transactions, but instead do transactions in what is called the business-to-business (B2B) sector and exports.**
- Due to more revenues to the government the tax to GDP ratio will increase which might lead to more investment in social sector.
- It becomes tough to involve in money laundering and illegal activities as transparency has increased.
- It is also about a profoundly different social contract between citizens and the state.

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

Q1) India's electronics manufacturing has been unable to respond to the rising demand, increasing the import bill while the country loses an opportunity to create employment for millions. Discuss the causes and remedies. (250 Words)

[Livemint](#)

**Background:-**

- **Electronics manufacturing** in India is expected to touch USD 104 billion by 2020 and domestic manufacturers will benefit from **GST** implementation as cost will significantly come down

**Electronic manufacturing in India:-**

- Growing middle class, rising disposable incomes, declining prices of electronics and a number of government initiatives have led to a fast-growing market for electronics and hardware products.
- However, India's weak manufacturing base has not been able to respond to this increasing demand, leading to a growing trade deficit.

**Concerns:-**

- Inverted tax structure for electronic goods. Due to a limited base of local component suppliers, manufacturers are **dependent on importing parts.**
- The **positive custom duties on the components** used in electronic products make it expensive for domestic manufacturers to compete with foreign competitors who can access the components at lower prices.
- Foreign direct investment (FDI) in electronics is less than 1% of the total FDI inflow because of **onerous labour laws, delays in land-acquisition and the uncertain tax regime**
- The numerous forms, fees, inspections and the associated time discourage domestic producers from exporting and keep them out of the international supply chain.
- The United States, home to General Electric and Westinghouse, imposed penal anti-dumping duties on Chinese power plant equipment. **Yet, the Indian government could not take action as BHEL lost 30 per cent market share by 2014**
- **Poor innovation and also the raw materials are not largely available in India.**

**Remedies:-**

- **Increase the country's general competitiveness in the export market** instead of pursuing sectoral policies. India's share in the global electronics market was a minuscule 1.6% of the market in 2015 that is currently valued over \$1.75 trillion.
- **Bring the duties on components down to the level of the product.** Some parts might be used for multiple products that may have different duties, but it's important to rule in favour of simple rules and apply the rate-cut regardless of use.
- **Laws need to be liberal and predictable.**
  - In the case of taxation, it is important to clearly establish the tax liabilities under different circumstances in full detail.
  - A possible experiment could be special economic zones like the Dubai International Financial Centre. Dubai's normal civil and commercial laws do not apply in this area and a British chief justice ensures the practice of British common law.
- **Targeted initiatives launched by the government** have provided much needed impetus to local manufacturing but to make it self sustainable more support must be provided.

Q2) It doesn't augur well for an aspiring market economy that the government should provide goods that competitive markets can provide effectively. With reference to debate on the privatization of Air India, comment on the statement. (150 Words)

[Livemint](#)

**Background:-**

- Recently parliamentary panel in its draft report postponed the privatization of Air India by five years. This brought the issue of whether government should still goods in competitive market

**Yes, government need not run :-**

- Indian state need not run commercial enterprises for the simple reason that it tends to compromise profit for achieving overall welfare of the people
- In the case of Air India The airline needs better management so as to not be a burden on the country's finances.
- Air India is operationally inefficient and unable to compete with private sector operators. The airline has been grossly mismanaged over the years. so it's better for private sector to take over it as their motive is profit.
- The airline has not been able to achieve the targets set in the turnaround plan
- The government will have to keep bailing out Air India with taxpayers' money if it decides to hold on to it.
- In the case of Air India, the cost is a lot higher as it is consistently making losses and is dependent on the government for survival. Further, the presence of state-owned enterprise distorts the market.
- A firm with access to government finances and practically no fear of failing affects price discovery in the market and can hurt private sector operators in the business.
- Divesting the loss-making Air India will send a strong signal to investors that India is serious about reforms and is no longer willing to throw good money after bad.
- The government has fiscal constraints and needs to spend more in important areas such as health and education.

**No, government's role is necessary:-**

- The draft report of the parliamentary panel expressed displeasure with implementation of the turnaround plan (TAP), and cited concern over potential layoffs should the privatization go through.
- International example:-
  - After being privatised British rail has gained a reputation for poor services and management.

**Way forward:-**

- There is need to revamp air India especially in the light of growing standard of people and increasing urbanisation.

Q3) Following judicial intervention in 2G and captive coal block allocations, it was decided that all natural resources should be auctioned to ensure transparency and fairness in allocation. Do you think introduction of reverse bidding in the allocation of coal blocks and linkage has benefited consumers? Critically examine. (150 Words)

[The Wire](#)

**Background:-**

- Reverse bidding is the process where bidders had to compete on the discount they would give electricity boards on their cost of mining.
- In other words, if two companies cost of mining is Rs 500 per ton and one offers to charge the electricity board Rs 350 while the other wants to charge Rs 400, the first one will win.

**Benefits:-**

- The bidder who promises to charge least from the consumer wins the block and it was with the stated aim of ensuring that **consumers get the benefit of low coal prices.**
- Shakti (Scheme for Harnessing and Allocating Koyala Transparently in India) **would be a transformational policy for auction and allotment of coal linkages, and will lead to affordable power, access to coal and accountability in the allocation of co**



- These auctions are an improvement over the discretionary allotments of the past, and the government has shown swiftness in moving ahead with them.

#### Concerns:-

- Reverse auction may not have lived up to those promises. While private power producers have benefited immensely from allocation of coal through reverse auction held under the Shakti scheme recently, **electricity consumers have been fobbed off with token tariff concessions.**
- **Some private developers were benefitted (private competition was less).** Coal India (CIL) has allocated long-term linkage of over 27 million tonnes of coal to ten private power plants but bidders have made token concessions by offering to reduce current electricity tariff by 1-4 paise.
- According to industry watchers, benefit only a section of power consumers because most of the captive mines are controlled by state utilities.
- Competitive auctions are meant to provide a market-based mechanism to discover the value of a resource. But poor design could impede price discovery

#### Way forward:-

- **Price Index needed:-**
  - As in the case of mineral auctions under the Mines and Mineral (Development and Regulation) Act, where premium is a percentage of the prices notified by the Indian Bureau of Mines, there should be a price index for coal for such linkage.
- Clear guidelines are needed regarding preparation of coal blocks before bidding.
- Fully explored ones with clear demarcation of boundaries and all approvals in place will go a long way in attracting bidder interest.
- A nodal agency at the State level, with representation from all stakeholders, could be set up to facilitate land acquisition. It must complete identification of land for compensatory afforestation, enumeration of trees and cost-benefit analysis before auctions begin.
- Easing the issue of supply of coal will not address the various problems that are associated with Indian power sector. Hence government should solve other problems associated with power sector like reckless populism, rampant theft of electricity, non-billing etc.

#### Topic: Agriculture

Q1) It is argued that, to save agriculture only an overhaul resembling the industrial liberalisation of 1991 will work. Do you agree? Justify why. (250 Words)

#### The Hindu

#### Reasons why agriculture needs overhaul in India:-

- **Farm incomes are unattractive :-**
  - Due to the absurdity of policies features among them.
  - The overriding objective of price stability has tilted farm policy in favour of the consumer, the numerically larger vote bank.
  - Trade and price controls are highly restrictive and mostly anti-farmer.
- **Protection afforded to the inefficient fertilizer industry** ensures that input costs are high.
- **Agri-markets are not free.** Governments seek to influence prices. In the absence of state intervention, prices soar in bad weather years and plunge in good weather years, hurting consumers and farmers.
- **MSP related issues:-**
  - Despite a bumper harvest, after a steep MSP hike and good rains, export controls and stocking limits for private traders were retained and a record volume of imports allowed to be shipped in. The resulting glut sent the market price down, below the MSPs, rendering it pointless. The looming losses set off farmer protests seeking even higher MSPs.
  - High MSP also edged out private traders, forcing a scale-up in procurement. Wheat and rice stocks surged but were not used to dampen market prices.
  - Indian MSPs of rice and wheat are less than support prices in China and other Asian countries.

#### ▪ **Failure of government schemes:-**

- The government has had several schemes for decades now to help farmers modernise their holdings. **Unfortunately, the high initial investments required, in combination with negative incentives such as input subsidies (fertiliser, pesticide, water, electricity), have meant that small farms could not reap the benefit of these schemes and remained unmechanised**, without micro-irrigation, and with poor crop storage facilities.
- Small holdings continue to be unviable and the input subsidies do little to change this fact.
- It is also a myth that frequent bank loan waivers alleviate the penury of small farmers. Most small farmers have any collateral. As a result, they turn to local moneylenders who charge exorbitant rates of interest leading to farmer's suicides.
- **Dependency of Indian agriculture on monsoon and the severe depletion of groundwater** in States like Rajasthan, Punjab and Haryana as a result of massive exploitation of ground water for irrigation
- **Weak Producer – Consumer Linkages:**
  - The farmer is not connected to aggregators, food processors and retail chains to help shape the nature of his produce.
- **Weak Supplier Power:**
  - The farmer is barely empowered as a supplier. He continues to be small & marginal, inadequately resourced, ill-informed on markets and marketing, ill-equipped to manage risk, burdened with credit & debts and is dependent on traders to reach the buyers.
- **Overdependence on Agriculture**
- **Lack of enabling infrastructure along the value chain:**
  - There is a staggering lack of infrastructure across the entire agricultural value chain
- **Technology Starved:**
  - Lack of new technology solutions keeps the farmer from gaining an equal footing globally.
  - Low investment in Research & Development:
  - Less than 1% of the Agricultural GDP in India is spent on research. That is abysmal considering this sector is critical to food security of the country and provides livelihood to 60% of population.
- Crop insurance scheme is almost a total failure.

#### **Efforts are being made:-**

- 'Make in India' programme is vital. If industry and manufacturing can absorb labour, with a little regulatory help, farm holdings can grow larger and become viable.
- And the government has introduced many agro-centric initiatives like
  - Pradhan Mantri Fasal Bima Yojana
  - Soil health cards
  - Pradhan Mantri Krishi Sinchayee Yojana
  - National Agriculture Market (eNAM).
  - Minimum Support Price (MSP) for different crops have also been enhanced regularly.
  - The government also pledged to double farmers' incomes by 2022 and this certainly makes for a rosy picture.

#### **Suggestions:-**

- A sensible policy would be to **buy from farmers when market prices are depressed and sell stocks in the open market when prices are elevated.**
  - In the first scenario, if the MSP is pegged higher than the market price, the procurement will raise the market price, boosting farm incomes.
  - In the latter, by offloading its stocks at a price lower than the market price, government can cushion consumers against excessive inflation.
- **Invite technological investments in the farm sector** both by the Government and the private sector. For increasing productivity, scientific innovations specially a well designed foolproof mechanism for implementation of genetically modified crops will have to be established in the country.
- The **credit system needs to be revamped** and the Pradhan Mantri Jan Dhan Yojana should be utilised. The private sector agro-processing players should be given incentive to provide credit to the farmers.
- There is a **need that State-specific problems and innovations be allowed and flexibility** and new approach should be rewarded.
  - For example the cost norm for Manipur, Tripura and Rajasthan and Uttar Pradesh cannot be the same.

- **Adopting a holistic and integrated approach in ensuring convergence in the management of animal husbandry, fisheries, agro-forestry, minor forest produce and agro-minor forest-based micro and medium enterprise** specially in the rain-fed areas.
- There is need for immediate steps to **create brooder houses in each block for the marginal farmers** and landless agricultural workers and tenant farmers to augment their income and to increase the production of eggs and protein.
- Indian cows produce A2 milk which is genetically and health wise better. The **Government must review its policy and revive the indigenous milk producing cow breeds** like Shahiwal, Gir, Red Sindhi, Tharpakar, Rathi, Kankrej, Ongole and Harijana to name a few by taking up breed improvement programmes.
- **Private sector players should be invited to set up cold storages and silos** to prevent damage of food grains and vegetables and fruits.
- There should be a **separate Budget for agriculture** considering the situation of farming sector in the country and its potential.
- **A 20 Year Vision & Implementation Road Map to enable suppliers:**
  - Essential to this would be consolidation of farmers and their land into large groups without them losing land title. This will help in gaining collective scale and can be implemented in two ways
- **Large Farmer Producer Organizations (FPOs)** need to be properly networked and federated, regionally as well as centrally.
- **Encourage Land Banks** in especially hills and semi-arid areas where farming is difficult.
- **State of the art infrastructure in areas** like storage & transportation, knowledge & information, credit & insurance etc. needs to be established.
- **A clear plan to reduce dependence on agriculture** from an untenable 60% to a more sustainable 30%. Agricultural policies would do well to address the need to make agriculture more efficient and less burdened. Also, enabling supporting professions for people looking for alternate careers would go a long way.

Q2) Government reports say 2004-14 had the highest agriculture growth that has fast slipped back to near-zero growth despite normal monsoons and bumper yields. Critically examine the reasons for agriculture distress in recent years and urgent measures needed to salvage the crisis. (250 Words)

#### Down to Earth

#### Background:-

- Agricultural distress seems to have reached a tipping point, with scenes of dejected farmers throwing agricultural produce such as vegetables and milk on the roads becoming a routine feature in .

#### Agricultural distress in recent years:-

- **Economic issues:-**
  - Price issues:
    - The non-availability of remunerative prices to farmers on agricultural produce.
  - Capacity issues:-
    - A farmer is now without any base capital to invest, and nor has he the capacity to take the risk of going back to agriculture. This has added to the crisis that manifests in extreme resentments.
  - Import and export issues:-
    - Agricultural import has reported constant growth.
      - According to Dalwai committee the **government's move to import foodgrains to curb inflation has majorly distorted the market against the domestic farmers.**
    - India's export of agricultural produces has dipped.
  - The limited availability and high cost of high-yielding seed varieties also hampers agricultural productivity. **Given such constraints, farmers have limited scope for crop diversification**, choosing to focus primarily on staple crops such as wheat and rice
  - The increasing market orientation and reforms in the input sector have resulted in a **substantial rise in input costs.**
  - Income from the cultivation of even horticultural crops is uncertain due to the heavy investment involved and the **high volatility in market prices.**

- The promotion of traditional farming at this juncture of agricultural development will take the sector to where it was decades ago. **Most existing modern crop varieties will not respond to these practices in the medium term.** Consequently, yield and income will decline.
- Further, facilities to produce adequate organic inputs have not been developed either.
- Last three years are also known for restrictions on **livestock trade**.
  - livestock is the best insurance against agrarian distress as the sector is the source of sustained income and generates income more frequently than the crop sector but across north India, due to the restrictions and raids from cow protection groups, livestock trade and prices have crashed and agrarian crisis deepened.
- **Land issues:-**
  - **Small Landholding:-**
    - With **average landholding size decreasing** from 2.3 ha in 1971 to 1.16 ha in 2011, and average input prices rising, cultivation costs have also increased.
    - Cultivation on such small area is not economically feasible. **Such small farmers have become vulnerable.**
  - In many cases, the farmers are not even the owners of the land, which makes profitable cultivation impossible because significant portion of the earnings go towards the payment of lease for the land
- **Governance and political issues:-**
  - Due to the failure of not only elected governments to find a lasting solution but also local institutions such as community or social networks which are supposedly weakening because of increasing individualisation.
  - On most occasions the marketing season of bumper crops gets over by the time a bureaucratic decision on procurement is taken. **Ultimately, the farmers are left at the mercy of unscrupulous traders to sell at whatever price they offer.**
- **Geographic reasons:-**
  - Availability of water, soil suitability and pest management:-
    - All these factors create a narrow window of economic benefit for the marginal farmer.
  - Since 2015, India has witnessed two major droughts, some 600 incidents of crop losses due to unseasonal rains and other related incidents.

#### **Urgent measures needed :-**

- **Greater subsidies could be extended** for the purchase of agricultural equipment, fertilizers and pesticides, while the **medical insurance coverage could be expanded through the Rashtriya Swasthya Bima Yojna.**
- The **scope of the Mahatma Gandhi National Rural Employment Guarantee Act could be increased.**
- **Allowing marginal farmers to be paid for tilling their own fields** could reduce their input costs. Such measures could also increase their net income.
- There is a **need a national conversation on rural distress.**
- **Farmer education programme and prevention of exploitation of farmers by middle men and vested interest.**
- The services of non governmental organisations should be utilised effectively by the government to take the message to the farmers and establish healthy communication channel with them.
- **Government of India may also consider providing hotline** to the farmers with Prime Minister's office ,so that quick initiatives can be made to de-stress the farmers in quick time at the time of any crisis faced by them, that will go a long way in preventing the farmers suicides.
- The government should promote the plan called "ulavar santhai" (Farmers Market), where the farmers can directly sell their products at reasonable price to the consumers.
- **Multiple crops**
  - Cultivation of multi crops such as coconut, turmeric, pine apple, banana, apple, papaya, ginger will yield profitable results to the farmers.
- **Special agricultural zone**
  - Just like industrial zone, there is an urgent need to establish special agricultural zones, where only farming and agriculture related activity should be allowed.
- **Need to modernise agriculture**
  - By introducing farm techniques which guarantee a definite success, more number of youth participation in the agricultural field is possible. This can be attained only by implementing new technologies.
  - Research efforts should continue, to produce crops with higher yield potential and better resistance to pests.
  - Technological advancement in agriculture should be passed down to the small farmers.

- Index based insurance has the advantages that it is transparent and all the insurers within the defined geographical area are treated equally. It has low operational and transactional costs, while also ensuring quick payouts.
- **Better water management:-**
  - Improved modern methods of rain water harvesting should be developed.
  - Water management can be made more effective through inter state co operation on water resources, where surplus water from perennial rivers can be diverted to the needy areas.
- **Need for national weather risk management system/disease alert system**
  - Water Watch Cooperative, a Netherlands based organization, has developed a disease alert system that sends an alarm to farmers, if probability of a pest/disease would be detected.
  - Similarly, system that detect the amount of water to be provided to a field based on the field water content, biomass and rainfall probability, would aid in optimization of water provision to the crop and ensure efficient crop management.

Q3) Apart from the agriculture sector, there needs to be increased focus on agriculture-allied sectors if we want to improve overall rural income. Discuss the potential of agriculture-allied sectors which government can tap into to address rural distress in India. (250 Words)

[Livemint](https://www.livemint.com)

**Background :-**

- Agriculture is overburdened with disguised employment , lack of productivity etc leading to farmer's suicides. To avoid this the potential of agriculture allied sectors need to be carefully studied.

**Agricultural allied sectors potential :-**

- **Livestock sector:-**
  - The livestock sector contributes around 4% to India's gross domestic product (GDP)
  - India has a mixed crop livestock farming system, with livestock becoming an important secondary source of income.
  - Small and marginal farmers have high dependence on the livestock sector.
  - Hence, measures to boost livestock sector growth and productivity will have a significant impact in alleviating rural distress.
  - Even today women are employed in this sector on a significant scale.
- **Diary sector:-**
  - Nearly 80 per cent of India's milk production is contributed by small and marginal farmers.
  - Milk procurement is an important source of secondary income for over 80-90 million milk producers, signifying its role to alleviate rural income and employment.
  - Processing the milk through the organised channel will facilitate standardisation of product quality and strengthening the direct supply channel will eliminate the intermediaries, both of which will ensure better compensation to small and medium milk producers.
- **Concerns:-**
  - In India, there is high dependence on family labour and limitations to deploying mechanised mulching systems, given the small herd size holding. Dairy farming and newer concepts on herd aggregation, both of which support collective animal management and mechanisation, are at a very nascent stage in India.
- **Way forward:-**
  - Increasing focus from the private sector on establishing last-mile linkages will complement the dairy development initiatives of the co-operatives and thereby lead to a larger share of the organised sector in milk processing.
  - Penetration of technology and banking systems will ensure that dairy farmers get compensation on the same day, unlike the delays in physical settlement systems.
  - Since dependence on small and marginal farmers will continue, ideas for herd aggregation, scientific cattle management, deployment of mechanisation and improving the quality of cattle breed all require momentum.



- Penetration of cattle insurance needs a heavy push by educating dairy farmers on the schemes and driving the use of technology, given that the insured cattle are in remote locations.
- **Fisheries:-**
  - This is another sector which can provide alternate employment to the farmers.
- **Sericulture :-**
  - Sericulture has helped many farmers to become debt-free. Especially in dry areas of Karnataka and Andhra this has benefitted more.
  - Sericulture not only empowers the rural women but also provides excellent self employment opportunities to the educated youth including women from the rural community.
- **Horticulture:-**
  - Fruit and vegetables provide more income than food grains.
  - **Concern:-**
    - fluctuations in this segment can be wild, rendering farmers vulnerable to crashing prices, like, say, tomatoes selling at ₹2 a kg as it recently happened in Maharashtra.
  - **Way forward:-**
    - Additional measures should include a price stabilisation fund for vegetables and fruits which should be used to scale up prices (to cushion farmers) as much as to scale down prices to ease food inflation.
    - This points to the urgent need for beefing up rural infrastructure — warehouses, metalled roads connecting up to the last village, cold storages, pack houses, chains and silos, and so on. Of course, micro-irrigation is crucial too
  - Food processing sector will give impetus to the necessary infrastructure in the rural areas and ensure the quality of food products to benefit.
    - SAMPADA scheme needs to be implemented effectively

*Topic: Storage, transport and marketing of agricultural produce and issues and related constraints; e-technology in the aid of farmers; Public Distribution System- objectives, functioning, limitations, revamping;*

Q1) Agriculture policy should focus on reducing volatility by allowing futures trading and encouraging investment in cold-storage facilities, along with a national market for agriculture. Discuss. (250 Words)

[Livemint](https://www.livemint.com)

**Background:-**

- India's farm economy is undergoing a structural shift for the sixth straight year, horticulture crop output has exceeded foodgrain production. But price volatility is a major problem.

**How futures will help farmers:-**

- Futures markets perform two key functions which can be helpful for farmers
  - **Risk management**
  - **Price discovery.**
- **Risk management:**
  - Futures contracts give farmers the possibility to 'lock in' a certain harvest price for their agricultural production, thus **excluding the possibility that their selling price will fall in the future.**
  - As a result, farmers do not have to cope with price volatility for these commodities anymore, as the risk of price changes is transferred from the farmers to speculators, who are willing to accept this risk in the hopes of making a profit out of it.
- Futures can also be valuable as an instrument for **price discovery**. As futures markets reflect the price expectations of both buyers and sellers, they allow farmers to estimate the future spot prices for their agricultural products.
- These hedging and price discovery functions thus enable farmers to fix their prices for the future, reduce their risks, and better plan their production and investment decisions.

### Concerns with future trading:-

- Farmers who engage in futures contracts are unfortunately also confronted with a variety of **costs**.
  - Buyers and sellers of futures are required to act through a brokerage firm to conclude their transactions, and these firms receive commissions and fees for conducting these services.
  - Additionally, farmers have to pay in order to open an account with their **broker**
- Futures are a complex risk management tool which requires a significant amount of technical know-how of the markets and regular **information** on daily price changes
- It is possible that the futures price will diverge from the price on the commodity markets, resulting in a lower price for the farmers than the one agreed on in the futures contract.
- **Price volatility is necessary** for futures markets to be an effective instrument. If price variations did not occur or were only very limited, futures exchanges would not be attractive for speculators.
- Moreover, speculation on futures can even lead to sudden **price rises**, and more generally to **higher levels of price volatility**.

### How national market of agriculture helps farmers:-

- The present government's goal is to create a one-nation, one-market model for farmers
- These include allowing setting up of private markets, direct sale of produce by farmers to bulk buyers and capping market fees and commission charges payable by a farmer.
- It withdraws the power to issue trading licences from the *mandis* managed by a board of traders and vests it with the state's director of agriculture marketing.
- With a national market farmers can expect returns that are remunerative and transparent
- **Concerns :**
  - Agriculture marketing is a state subject and the centre can only propose a blueprint. The eventual rollout will depend on the state governments.
  - A model Agricultural Produce Marketing Committee (APMC) law was first proposed in 2003 but made little progress.

### How encouragement of investment in cold storage will help farmers:-

- India has around 6,300 cold storage facilities, with a capacity of 30.11 million tonnes. However, some 75-80 per cent of these refrigerated warehouses are suitable only to store potatoes, a commodity that produces only 20 per cent of agricultural revenue. So India needs expansion of cold storage infrastructure in an affordable, reliable and sustainable way to increase the contribution of agriculture to the economy.
- India's vast produce rot due to lack of cold storage resulting in increased cost of the same produce as they die before they could even enter the market
- **Wastage of fruits and vegetables**
  - Only 10-11 per cent of the fruits and vegetables produced in India use cold storage. Storage capacity needs to be increased by 40 per cent to avoid wastage.

### How to proceed further:

- Establishment of supply chains required prioritisation of investment in affordable, reliable and sustainable cold chain infrastructure.
  - This includes combining renewable energy with innovative technologies for producing both power and cooling, such as for example cryogenic energy storage using liquid air or nitrogen,
- Haryana launched the Bhavantar Bharpai Yojana for vegetables. Under the scheme, the government will announce prices for four vegetables before the sowing season and compensate farmers if there is a price deficit in the market. Similar schemes need to be prepared by other states as well.

Q2) The forthcoming Pesticide Management Bill 2017 should address the many anomalies that exist in the pesticide industry and protect interests and lives of farmers. Analyse. (250 Words)

[The Indian Express](#)



### Background:-

- Farmers continue to commit suicide in large numbers and the sale of misbranded pesticides is one of the prominent reasons.
- The Pesticides Bill has been pending before Parliament since 2008. The proposed legislation replacing the 1968 Insecticide Act, would regulate the manufacture, quality, import, export and sale of pesticides.

### Anomalies existing in the pesticide industry which the new bill has to look into:-

- Larger pesticide companies generally outsource production to smaller manufacturers. But they can't be prosecuted because the **Central law only stipulates prosecution of the manufacturer**.
- When the license to sell pesticides is issued, applicants declare a **responsible person** to be held accountable for violations. The person is usually a low-paid employee, who over time becomes unreachable. So, even serving the prosecution notice becomes difficult.
- Most pesticide samples don't fail the test due to conniving officers not following procedures.
- The **cumbersome documentation procedure** allows the second sample to expire before it's tested, rendering the process invalid. Thus, the crime cannot be established.
  - Less than 40 pesticide-related convictions have been possible in Punjab in 10 years.
- Currently, only a magistrate can order suspension of pesticide sales over an evident violation but there were allegations of manipulation in this process
- The pesticide industry rewards retailers for increased sales, but greater pesticide sales are affecting farmers adversely. The use of imported, untested pesticides and unregistered technical procedures could be a reason for the farmer deaths in Maharashtra.

### Provisions in the draft bill:-

- It would create **mechanisms to make pesticides available, minimise produce contamination by pesticide residue**, minimising risk to human beings, animals and the environment, and ensure regular monitoring of registered pesticides and review of safety.
- The statement of objects and reasons of the draft intends to **provide for an elaborate definition of pesticides to cover any substance of chemical or biological origin** intended for preventing, destroying, repelling, mitigating or controlling any pest, including unwanted species of plants or animals, which will enable regulation of existing pesticides as well as new discoveries.
- The Bill **proposes to address all aspects of development, regulation and quality monitoring**, production, management, packaging, labelling, distribution, handling, application, use and control, including post-registration activities and disposal of all types of pesticides.
- It would also **define household pesticides**, in order to prohibit their field applications and to enable delicensing of their retail sale for easy availability to the consumer.
- The Bill would provide for the **effective and efficient working of the Central Pesticides Board and Registration Committee**, fix tolerance limits of pesticides, detail the minimum qualification of licensees and accredit private laboratories to carry out any or all functions of the Central pesticides laboratory.
- The **Bill proposes stringent punishments to check production and sale of misbranded, sub-standard and spurious pesticides**, besides providing for the disposal of expired, sub-standard and spurious pesticides in an environment friendly and safe manner.

### What needs to be done ?

- The responsible person has to be among the top five financial beneficiaries of the firm and the fine should be computed as a percentage of the total sales in the state. The guilty can also be served a rigorous 10-year jail term.
- Mandatory e-documentation (as per the IT Act, 2000) for agriculture departments will expedite the process and increase transparency in pesticide sample testing
- The powers for suspension of pesticide sales need to be delegated to a pesticide inspector. The magistrate's judicial process should only begin once the prosecution for punishment starts.
- The **Central Insecticide Board and Registration Authority should be restructured** and many of its powers be transferred to the states.
- The Centre should make it mandatory for all **agriculture-input packaging to have a bar code** giving product information. The bar code will sync with the GST and the e-way bill.
- **States should make retailers log all agriculture input sales onto state government servers**, allowing for traceability from the factory floor to farmer's field and for regulation enforcement.

- **A data bank of agriculture input sales will give unparalleled benefits.**
  - Digitisation at the ground-level will drive personalised and data-driven farm extension, realistic crop loss compensation and insurance. Most importantly, it will facilitate a farmer grievance redressal mechanism to make the system accountable.
- The Centre and the states must invest in **capacity building for farmers**, to help them choose the right pesticide combinations, handle and store pesticides and inspect the gear used for delivery.
- **Farmers must have access to information and expert advice.** A strong extension service programme could help guide and nudge farmers towards practices that are both safe and beneficial.
- Research laboratories, universities and agricultural institutions need to focus on developing pesticides that are safe and effective

Q3) For India, among the largest food producers globally, the challenge is to counter the effects of erratic rainfall, raise productivity and use water efficiently. Examine how Indo-Israeli Agriculture Project (IIAP) seeks to address these challenges through technological interventions. (250 Words)

[Livemint](#)

#### Background:-

- Agriculture, the backbone of Indian economy has been facing various challenges in recent years – lower productivity, resource crunch and erratic weather, all of these translating into lower returns, water crisis with agriculture accounting for nearly 84-85 percent of water withdrawal in India
- India and Israel have had a very strong partnership in Agriculture. Under the India-Israel Agriculture Project, Centres of Excellence were established in various states which are helping the farming fraternity in India to adopt the latest technologies such as micro irrigation systems.

#### How India Israel partnership address this challenges :-

- Success of the 10-year-old Indo-Israeli Agriculture Project (IIAP) include growing cherry tomatoes in Haryana, rejuvenating mango orchards in Maharashtra and demonstrating to Indian farmers the effectiveness of state-of-the-art irrigation technologies.
- **Lot of focus on drip irrigation** and how to design better farms by using canopy management and use of improved irrigation and fertigation technologies.
- A unique focus is to teach farmers the language of irrigation – when to irrigate and by how much – to increase water use efficiency.
- Further, the plan is to establish a partnership on water conservation that includes waste-water treatment and its reuse for agriculture, desalination, water utility reforms, and the cleaning of the Ganga and other rivers using advanced water technologies.
- According to a MASHAV document, **vegetable intervention in Haryana showed how crop productivity could be increased 5-10 times under protected cultivation** of tomato, capsicum and cucumber, coupled with **65% decrease in water use** and substantial reduction in fertiliser and pesticide costs.
- Key ways to boost overall agricultural production is to **implement better soil-water management techniques that would provide the arid and semi-arid lands better access to irrigation water**, without actually increasing the stress on available water resources.
- **A new action plan for the years 2018-2020** envisages joint development of new crop varieties and sharing of post harvest technologies
- Micro irrigation has proven to be a technology which has the potential to change the face of Indian agriculture.
- The collaboration with Israel technologies helped in bringing the most advanced innovations to the India farmers at affordable prices by adopting the concept of Technology transfers leading to “Make in India” combined with extension support by Agronomists from Israel.

#### Concerns :-

- The centre and state governments also need to push these technologies with more funding. Last year’s budget announced a Rs5,000 crore micro-irrigation fund, but it took almost a year to operationalise it.

- States which are water-stressed such as Maharashtra, Karnataka, Telangana and Gujarat, adoption of drip irrigation has been faster but so far, **adoption of these technologies among north Indian farmers has been lower due to easy water availability.**

#### Suggestions:-

- The cost effective adaptation of Israeli technology to India's needs could create new solutions that we could use to help address the water challenges of other developing nations across the globe.

Q4) In the name of reforms, recent disruptions of the PDS have taken different forms, from compulsory biometric authentication to so-called direct benefit transfer (DBT). Critically analyse implications of these PDS reforms on people. (250 Words)

[The Hindu](#)

#### Background:-

- Recently PDS reforms in the form of authentication by Aadhar, Direct benefit transfer have been piloted in some states like the Jharkhand government made Aadhaar-based biometric authentication compulsory for PDS users

#### Positives of these reforms:-

- PDS was prone to corruption and leakage:**
  - Proponents of substituting PDS grain transfers with cash argue that PDS is an inefficient mode of transfer of subsidies, prone to enormous leakages into the black market, and high waste in costs of transferring subsidies in the form of food transfers.
  - They argue that replacing food with direct cash transfers would greatly reduce corruption and leakages.
- Better targeting:**
  - It would enable the poor to access goods currently denied them by a PDS beset by corruption.
- More Choice for consumers:**
  - It would enable people to buy better quality food of their choice from the open market and not be restricted to items sold in the PDS, which are often inferior in quality and limited in range.
- Reduce wastage:**
  - Providing subsidies directly to the poor would both bypass brokers as well as reduce the waste and holding costs of storing grains in government silos.
  - The amount of grain actually required for India's buffer stock needs could be held in better-quality warehouses, eliminating waste and rotting.
- Fiscal deficit will be reduced:**
  - Cash transfers would help reduce fiscal deficit by curbing expenditures earmarked for the PDS that are siphoned off through corruption, as well as avoiding substantially higher costs of transferring food rather than cash.

#### Negatives :-

- Direct benefit Transfer:-**
  - The main problem with DBT is that **people waste enormous time shuttling between the banks, pragra kendas (common service centres) and ration shops** to get hold of their money and then use it to buy rice at the ration shop. **For many of them, this is a three-step process.**
- Vulnerable groups:-**
  - Due to these reforms **vulnerable groups** such as widows and the elderly, found themselves excluded from the PDS.
  - Those who were still able to buy their food rations faced considerable inconvenience due to connectivity and biometric failures.
  - Elderly persons with rough fingerprints are deprived of food rations without compensation**
  - Pensions are discontinued** without the victims being told what the problem is.
- There was a **revival of corruption**, as PDS rice meant for those who failed the biometric test was siphoned off with abandon.

- **Government cancelling ration cards not linked to aadhar:-**
  - The Jharkhand government did this and many of the cancelled ration cards actually belonged to families that had been unable to link their card with Aadhaar for no fault of their own.
  - The monthly PDS rations of 5 kg per person were restricted to those whose individual names had been linked with Aadhaar in the ration-cards database.
- **Growing centralisation and technocracy:-**
  - **Aadhar authentication** involves installing “Point of Sale” (PoS) machines at PDS shops, and verifying the identity of cardholders by matching their fingerprints against the Aadhaar database over the Internet.
  - This is a wholly inappropriate technology for rural India, especially in the poorest States.
  - Even in State capitals, network failures and other glitches routinely disable this sort of technology.
  - Note that Internet dependence is inherent to Aadhaar since there is no question of downloading the biometrics.
  - Recent developments in Rajasthan illustrate the dangers of forcing biometric authentication on the PDS which failed.
  - PDS dealers often give people less than what they are entitled to, and pocket the rest. **PoS machines are ineffective in preventing quantity fraud.** They may help in reducing identity fraud, such as it is, but that does not justify depriving people of their food entitlements when the technology fails.
- **Weak Banking Infrastructure:**
  - There is **no clarity on which account is selected for DBT** when a household has several bank accounts.
  - There are also worries about how genuinely inclusive of people in remote rural regions is India’s banking system. Fair price shops exist in three of every four villages, and are therefore generally accessible.
- **PDS a shield against Inflation:**
  - Another advantage of PDS over cash transfers from the perspective of the poor is that PDS supplies rations at a constant price, irrespective of the fluctuations in market prices. **This therefore provides a shield against inflation, a benefit that cash transfers cannot match.**
- **PDS ensures stable income for Farmer’s:-**
  - PDS requires the government to procure food from farmers. The government builds up stocks of grains which are also useful for price stabilization
  - The guarantee of minimum support price purchase by the government for wheat and rice is the most important instrument for the protection of farmers’ income in India
  - **This would become unfeasible if the government could not offload a lot of this grain back through the PDS.**

#### **Conclusion:-**

- Instead of cash transfer Government should give food coupons as this will solve the problem of misuse of cash for buying non-food things and it will also give poor people choice to buy food from the retailer of their choice.
- Digital literacy need to be promoted for effective implementation of biometrics in PDS

Q5) Discuss the potential of solar technologies in transforming agriculture in India and the ways by which India should proceed with this impactful technology. (250 Words)

[The Hindu](#)

#### **Background :-**

- In the light of growing challenges of food security, clean energy for sustainable development solar integrated farming is the way forward

#### **Solar technology and agriculture :-**

- **Incentives for farmer :-**
  - There are a number of incentives that are designed to further benefit farmers who want to switch to solar power.
- **Irrigation becomes much easier :-**
  - Where there’s solar power, remote water pumping becomes a possibility because it enables farmers to bring the energy to the equipment.
- Making additional money from solar power would ensure greater income stability for farmers.

- Solar pumps hold potential to **enhance irrigation access, advance low-carbon agriculture, reduce the burden of rising electricity subsidies, and improve the resilience of farmers against a changing climate.**
- **Solar energy saves farmers money:-**
  - Case studies indicate that dairy farmers could save up to 33 percent on their electric bills by converting to solar power.
  - Building a solar system now enables farmers to lock in current power rates because it gives them a way to generate some of their own energy.
- **States example:-**
  - Maharashtra is solarising its agricultural feeders by installing solar power plants at the substation level, through competitive bidding.
  - Karnataka is promoting solar pumps for existing grid-connected farmers under a net-metering regime, allowing them to generate additional income by feeding back surplus energy into the grid.
- **Even China** is also figuring that agriculture is the best way to increase the roll-out of solar panels. The sight of thousands of solar panels fixed to metal platforms above the rows of eggplants or giant ponds for fish and shrimp is visible in China.

**However despite the diversity of approaches and significant government subsidies, only about 1,42,000 pumps have been deployed till date against a target of one million pumps by 2021. So India should move further with this technology in the following way:-**

- **Target marginal farmers with smaller solar pumps**, particularly in areas with good groundwater development potential.
- **Couple solar pump deployment with micro-irrigation and water harvesting interventions** at the farm and community levels.
- **Fish ponds are probably best suited to integrated solar power because they don't have to be ploughed or tilled every growing season.**
- Farmers who manage the panels **will need training in the technical specifications** and education on the economics of solar power.
- **Coherent national policy** will first have to be in place to encourage investors to install the solar panels on the farms.
- **Focus on technology demonstration** and deploy at least five solar pumps in each block of the country. Such efforts could have a profound effect on farmers' willingness to adopt solar pumps and **spur bottom-up demand.**
- In regions with already good penetration of electric pumps, **prefer feeder solarisation through competitive bidding over solarisation of individual pumps.**
- In regions with prevailing local water markets, **promote community-owned solar pumps.**
- **Encourage sharing of solar pumps** among farmers through farmer extension programmes.
- **Lessons:-**
  - **More schemes like "Surya Raithu" Scheme of Karnataka where farmers can become solar power producers and sell to the grid need to be emulated.**
  - **World Bank irrigation project in West Bengal** is exploring a service contract model for solar pumps, where payments are made to the contractor depending on the amount of water delivered from the pumps. This can be monitored through inexpensive GPRS and remote sensing technologies. This business model can help put a price on the use of water and help maintain ground water levels.
- **Provide interest-subsidy to farmers** combined with reduced capital subsidy to enable large-scale deployment of solar pumps in a shorter span of time. Such an approach would cover a greater number of farmers, helping them reap the benefits of solar pumps sooner and increase overall returns to the economy
- **Addition of solar power to a hydroponic system** makes it one of the most energy-efficient, eco-friendly ways to grow food. In addition to the environmental advantages – no pesticides, reduced reliance on trucked-in food, fewer carbon emissions hydroponic systems open up a world of agricultural possibilities.

#### **Conclusion:-**

- Government should continuously improve and innovate its support mechanisms on solar for irrigation.
- India must exploit the potential of this decentralised technology to achieve the dual national targets of 100 GW of solar and doubling farmers income by 2022 and setting a world-class example of greening the economy .



Q1) Critically examine why is a urgent need for asset creation and reorientation of the present agricultural credit policy for greater inclusiveness. (250 Words)

[EPW](#)

**Background:-**

- Credit is an important mediating input for agriculture to improve productivity. Strengthening formal credit is one of the important tools in the target set by the Government of India in 2016 to double farmers' incomes by 2022.

**Measures taken :-**

- Government has launched various farm credit programmes over the years such as the Kisan Credit Card scheme in 1998, the Agricultural Debt Waiver and Debt Relief Scheme in 2008, the Interest Subvention Scheme in 2010-11, and the Pradhan Mantri Jan-Dhan Yojana in 2014.
- It is encouraging to see a robust increase in institutional credit from ₹8 lakh crore in 2014-15 to ₹10 lakh crore in 2017-18. Of this, ₹15 lakh crore is meant for capital investment, while the remaining is for crop loans.
- Actual credit flow has considerably exceeded the target. The result is that the share of institutional credit to agricultural gross domestic product has increased from 10% in 1999-2000 to nearly 41% in 2015-16.

**However there is a need for revamp of agricultural credit policy and focus on asset creation:-**

- Reserve Bank of India reveals that out of total advances to agriculture, **the share of indirect finance has increased substantially over time**, while that of direct finance to farmers has declined
- The **outreach of formal credit agencies in agriculture is still limited in India**. Higher dependence on money lenders for credit by the smaller farm-size class results in higher exploitation since they charge higher interest rate.
- **The flow of agriculture credit has not been inclusive** as the share of marginal and small farmers in agricultural credit disbursed has declined, and there has been a non-inclusive stance of commercial banks in disbursing credit towards marginal farmers.
- While commercial banks do not discriminate against lower caste farmers in lending, **cooperative banks do**, as they are prone to interest group capture at the local level .
- **Access to formal institutional credit also tends to enhance farmers' risk-bearing ability** and may induce them to take up risky ventures and investments that could yield higher incomes.
- **A major proportion of farmers remain outside the ambit of a policy of a subsidised rate of interest, and of loan waiver schemes announced by respective State governments.**
- Farm waivers only act as a temporary relief from debt but largely fails to contribute to farmers' welfare in the long run

**What needs to be done ?**

- For asset creation ,Union and State Governments should create a favourable environment
  - By investing adequately in connecting all villages by roads, with a progressive transport and communication network
  - Strengthening research and extension services
  - Establishing state-of-the-art agricultural meteorology in all regions
  - Developing flood and drought codes and irrigation facilities
  - Creating food processing, storage and marketing infrastructure
  - Not vitiating repayment climate.
- Each bank should focus on farmer-friendly lending procedures, systems and methods; human resources development and training, and concentrate on financial literacy and credit counselling of farmers.
- It is important to revisit the credit policy with a focus on the outreach of banks and financial inclusion.
- Sincere efforts to protect farmers from incessant natural disasters and price volatility through crop insurance and better marketing systems is necessary.
- Accelerating investments in agriculture research and technology, irrigation and rural energy, with a concerted focus in the less developed eastern and rain-fed States for faster increase in crop productivity and rural poverty reduction.
- Public and private investments are required to grow at an annual rate of 14.8% and 10.9% in the next seven years.

Q2) The boom-and-bust cycle in the agriculture prices is the result of a broken supply chain that is over-regulated. Discuss. (250 Words)

[The Hindu](#)

**Background:-**

- In the recent years there have been instances where many distressed farmers have left their produce to rot on the roads, and in cold storage facilities when prices have fallen despite bumper production.

**Broken supply chain that is over regulated :-**

- Farmers tend to increase the production of certain crops in **response to their high prices during the previous season**, which in turn leads to a supply glut that causes prices to crash.
- The lag between price and production causes a huge **mismatch between supply and demand**.
- The present fall in potato prices comes against the backdrop of a **slowdown in the rural economy**.
- Agricultural production is broadly categorized into these sub- systems; input supply, production, processing, sales and distribution to consumer, and quality and food safety measures. **Integration between these components is negligible throughout the agriculture sector in India.**
- The agribusiness food processing industry is facing constraints and barriers such as:
  - Non-availability of adequate critical infrastructure facilities (cold chain, packing and grading centres).
  - Lack of adequate quality control and testing infrastructure.
  - Lack of suitable varieties of farm produce for processing.
  - Seasonality of raw materials.
  - High inventory carrying cost.
  - High taxation and packaging costs.
- Private sector organization investment in the agribusiness sector is low due to the high **level of government regulations including procurement and movement**, storage, warehousing and marketing of major commodities, plant- scale restriction in food processing, and restriction on contract farming and land leasing.
- In the **absence of a robust market for buying and selling forward-looking contracts**, farmers are left to fend for themselves against severe fluctuations.
- **The domination of the wholesale market by cartels** prevents farmers from receiving a fair price even when their produce is sold at much higher rates to consumers.

**Way ahead:-**

- Problem of agricultural distress will have to deal with the challenge of price fluctuations.
- **Farmer education programme and prevention of exploitation of farmers by middle men and vested interest.**
- **Allowing marginal farmers to be paid for tilling their own fields** could reduce their input costs. Such measures could also increase their net income
- **Greater subsidies could be extended** for the purchase of agricultural equipment, fertilizers and pesticides, while the **medical insurance coverage could be expanded through the Rashtriya Swasthya Bima Yojna**
- **Multiple crops**
  - Cultivation of multi crops such as coconut, turmeric, pine apple, banana, apple, papaya, ginger will yield profitable results to the farmers
- **Need to modernise agriculture**
  - By introducing farm techniques which guarantee a definite success, more number of youth participation in the agricultural field is possible. This can be attained only by implementing new technologies.
  - Research efforts should continue, to produce crops with higher yield potential and better resistance to pests.
  - Technological advancement in agriculture should be passed down to the small farmers.

**Topic:** *Economics of animal rearing*

Q1) It is found that India's poultry farms are spawning global superbugs. Discuss the causes and consequences. (250 Words)

[The Hindu](#)



### Background:-

- India has been called the epicentre of the global drug resistance crisis. A combination of factors have come together to hasten the spread of superbugs.

### Causes :-

- Unregulated sale of the drugs for human or animal use accessed without prescription** or diagnosis has led to unchecked consumption and misuse.
  - Of tested birds destined for meat consumption, 87% had the super germs based on a study published in the journal Environmental Health Perspectives.
- Farms supplying India's biggest poultry-meat companies **routinely use medicines classified by the World Health Organization (WHO) as "critically important"** as a way of staving off disease or to make them gain weight faster, so that more can be grown each year for greater profit.
  - One drug typically given this way is Colistin which is used to treat patients critically ill with infections that have become resistant to nearly all other drugs.
- In India, the poultry industry is booming.** The amount of chicken produced doubled between 2003 and 2013. **Chicken is popular because it can be eaten by people of all religions** and affordable. Experts predict the **rising demand for protein will cause a surge in antibiotic use in livestock.** India's consumption of antibiotics in chickens is predicted to rise fivefold by 2030 compared to 2010.
- Lax regulation:-**
  - In 2014 the Agriculture Ministry sent an advisory letter to all State governments asking them to review the use of antibiotic growth promoters. However, the directive was non-binding, and none have introduced legislation to date.
  - Even the **guidelines of the Central Pollution Control Board (CPCB)** on poultry waste management do not adequately address ABR.
- In India, at least **five animal pharmaceutical companies are openly advertising products containing Colistin as growth promoters.**
- In Europe, Colistin is available to farmers only if prescribed by a vet for the treatment of sick animals. In India there is **no such thing.**
- India, level of awareness regarding antibiotic resistance is very low.**
- Other causes (General):-**
  - India has a large population, some of whom defecate in the open, and waste is often poured untreated into rivers and lakes, creating the perfect conditions for bugs to share resistance.
  - Poor sanitation means people often catch infections that require treatment with antibiotics.
  - Overuse of the drugs in hospitals has created antibiotic resistant hotspots, and poor infection control means these bugs spread within the hospital and into the community.
  - Some of the pharmaceutical companies manufacturing antibiotics have also failed to dispose of antibiotic-ridden waste properly, fuelling the spread of resistant bugs in the environment.

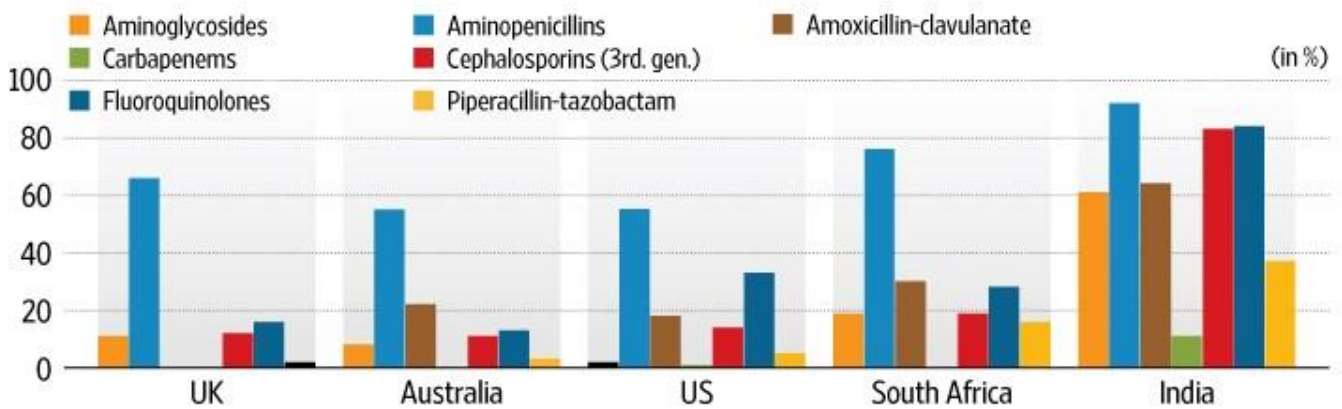
### Consequences :-

- Huge ramifications for the **nation's food supply.**
- The continued use of antibiotics in farming **increases the chance of bacteria developing resistance to them, leaving them useless when treating patients.**
- Drug-resistant diseases have the potential to cause a level of **economic damage** similar to and probably worse than—that caused by the 2008 financial crisis, the World Bank said
  - It could add as much as \$1 trillion a year to health-care costs by 2050 across the globe.
- Farmhands** who handle the birds often wear open-toe shoes, providing a conduit of entry for resistant bacteria and resistance genes into the community and hospitals, where further person-to-person transmission is possible.
- Antibiotic resistance is an ecological problem that spans humans, food-animals and the environment.
- The study not only establishes that poultry farms are reservoirs of ABR, it also shows that **ABR is moving out of the farms to neighbouring areas**
- Resistant bacteria from poultry farms can directly infect farmers** and meat handlers or indirectly put humans at risk through agricultural produce and water bodies.
- There is also growing evidence that increased antibiotic use in poultry **creates reservoirs of resistance genes that can be transferred to other pathogens through a phenomenon called horizontal gene transfer.** This means resistance in one bacterium can be passed on to other kinds of bacteria, even for multiple antibiotics.

- The tropical climate and poor sanitary conditions in India will result in high incidence of infections, which in turn, increases the chances of antibiotic use and ABR.

## WHERE THE SUPERBUGS ARE

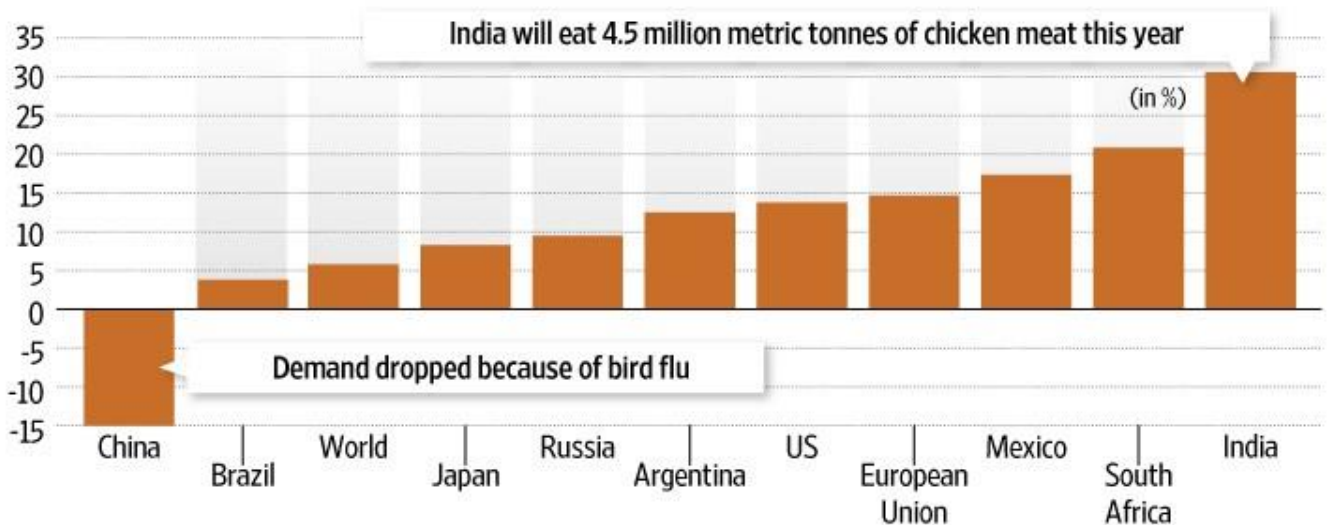
Proportion of pathogenic E. coli resistant to key antibiotic classes



Source: Center for Disease Dynamics, Economics & Policy (CDDEP.org)/Bloomberg

## CHEAP PROTEIN SOURCE

Change in total domestic broiler-meat consumption in major markets from 2013 to 2017



GRAPHIC: VIPUL SHARMA/MINT

Source: USDA/Bloomberg

### Way forward:-

- **India needs concrete measures to be able to contain ABR due to antibiotic misuse in rearing food animals.**
  - The first critical step should be that the Department of Animal Husbandry, Dairying and Fisheries regulate to limit the non-therapeutic use of antibiotics in poultry.
    - The department should also adopt alternatives to antibiotics and implement bio-security measures.
    - It should also ban the use of poultry litter as feed for aquaculture.
  - The sector requires ABR-centric environmental regulations, which can happen through a greater role by MoEF&CC and CPCB.
  - CPCB, along with state pollution control boards, should prohibit the use of untreated poultry litter as manure and ensure the adoption of waste to energy measures such as biogas generation
  - The government should invest in research to better understand the impact of manure treatment on ABR and resistance transfer mechanisms.

- In its National Action Plan on AMR published in 2017, the Centre banned using antibiotics as growth promoters. The plan is not currently linked to any regulatory action. This needs to be implemented immediately.
- The WHO released guidelines in November 2017 recommending reduced use of critically important antibiotics in food-producing animals and banning their use as growth promoters. It also recommended banning the mass medicating of livestock with antibiotics to prevent disease.
- Consumer pressure, rather than regulation will drive change.
- Nationwide programme to promote community biogas generation plants for small poultry farmers in clusters is needed.

### Topic: Infrastructure

Q1) It is said that among the four verticals in the Pradhan Mantri Awas Yojana-Housing for All (Urban) (PMAY-HFA[U]) scheme, the credit linked subsidy scheme (CLSS) has some important features that make it stand out. In the light of recent modifications made to this vertical, discuss critically. (250 Words)

#### EPW

#### Background:

- In pursuit of the government's intention of providing every family a pucca house with water connection, toilet facilities, 24 x 7 electricity supply and access the union government has launched a comprehensive mission, Pradhan Mantri Awas Yojana-Housing for All (Urban) (PMAY-HFA[U])
- Credit linked subsidy scheme is one of the four verticals of the above scheme

#### How Credit linked subsidy scheme stands out :-

- The CLSS is a **central sector scheme** implemented through primary lending institutions (PLIs). Credit-linked subsidy is credited upfront by PLIs to the loan account of the beneficiary.
- The central assistance provided per household is the highest under the CLSS (₹2.2 lakh) as compared with other verticals (₹1 lakh for "in situ" slum redevelopment and ₹1.5 lakh for the remaining two).
- The scheme is demand driven with maximum scope for the household to choose the design and structure of the house. A beneficiary can apply for a housing loan directly or through the ULBs or local agencies identified by the state/ULBs, for facilitating the applications from intended beneficiaries.
- The role of the state governments/ULBs is limited to being a facilitator, verifying sanctioning of land and other documents.
- The CLSS is **designed to expand and augment institutional credit through interest rate subvention to back up the demand of the economically weaker section (EWS) and low-income group (LIG)** for acquisition and construction of a new house or incremental housing, including extension, expansion, and repair.
- While the CLSS stipulates loan amounts up to ₹6 lakh, it does not constrain the beneficiary from taking loans above ₹6 lakh, as long as the person pays the market rate for the additional amount

#### Recent modifications:-

- The government has raised the income limits for eligibility of loans
- There is an increase in the amount of subsidised loans
- Norms are relaxed with regard to built-up area
- middle-income group have also been included diluting its core agenda of being "pro-poor."
- The maximum tenure of loans under the CLSS for the EWS/LIG (renamed and recategorised) and for the MIG have now been placed at 20 year

#### Success:-

- The new measures will be effective in
  - **spurring housing and construction activities**
  - **providing relief to real estate developers**
  - **bringing gains to the urban middle class.**
- Would attract private and foreign investments in the housing sector, which will have a positive multiplier effect on gross domestic product and the labour market.

- In the CLSS, for administrative ease and effective monitoring of the scheme, the subsidy is paid into the account of beneficiary. **Since there are no intermediaries involved, the entire benefits are expected to reach needy households.**
- The scheme is expected to help millions of urban poor own a house, and **help the governments in reducing housing shortage in the country.**
- CLSS **indirectly catalyses the construction sector.**

#### Problems :-

- While this would boost the housing sector, there is risk that subsidies will be cornered by real estate developers, private builders, and the urban middle class. The planners must view this development with concern.
- A matter of serious concern is that this will pivot away from the core pro-poor character of the PMAY-HFA(U). The allocated funds under the mission may thus be spent without the benefits reaching the targeted population.

#### Way forward:

- The government must strictly adhere to tighter restrictions with regard to income ceiling and, the permitted built-up area for self-targeting.

Q2) Why is India facing a housing crisis despite governments spending huge money through centrally sponsored schemes? Also discuss what course correction is needed. (250 Words)

[Livemint](#)

#### Reasons why there is housing crisis even when government is spending huge money through schemes:-

- 17% of the houses constructed under centrally sponsored schemes were vacant in 2017 because of **poor relocation planning and missing infrastructure.**
- **Supply-side constraints** for low-cost and affordable housing include
  - lack of availability of land
  - finance at reasonable rates
- The demand drivers include the growing middle class and growing urbanisation
- Real estate developers, private players in particular, have primarily targeted luxury, high-end and upper-mid housing segment owing to the higher returns that can be gained from such projects.
- Several **structural issues**
  - The high gestation period of housing projects
  - limited and expensive capital
  - spiralling land and construction costs
  - High fees and taxes as well as unfavourable development norms are bottlenecks restricting the desired growth in housing stock in India.
- 90% of India's problem is that most of the people are living in houses that are not fit for human habitation.
- **People are forced to live in slums in the heart of cities because of economic, safety and commutation needs.** That is the primary reason why housed built by government are lying vacant in the outskirts of cities.
- Schemes for the poor have failed because the dwellings are not safe, decent and convenient.
- There is a certain degree of empathy and firmness that these projects lack, which consequently takes away effectiveness.
- **Ownership is often not completely handed over to the residents**, which generally kills their enthusiasm to take personal initiatives in upgrading the houses and neighbourhoods
- lack of planning and poor management of welfare projects .
- **Failure of the government in allotting land for transit camps in the case of on-site rehabilitation** where slum dwellers are moved to temporary shelters until new homes are built in the same place they lived in earlier.

#### Course correction needed:-

- Reforms on
  - land and housing policy
  - delegation of power to urban local bodies
  - fostering innovative housing finance
  - reduction in project costs and schedule overruns.

- Housing other than ownership housing needs attention too like the rental housing ,working women/men hostels etc
- Factors such as access to public institutions, social inclusiveness and home security will have to be given equal attention.
- States and Centre's schemes on affordable housing will have to find a common thread so that logistical hurdles are bypassed.
- Social integration is the most crucial component that has to be assimilated into any affordable housing scheme so that the poor get a sense of belonging and strive to improve their neighbourhoods.
- Sustainable Development Goals (SDGs) proposed for all-round urban development looks at deploying a list of guidelines that are targeted at making human settlements safe, resilient and sustainable. If acquiring separate land isn't viable, upgradation of the slums can be a feasible way of providing decent housing to the poor.

Q3) Owing to its scope, the Jawaharlal Nehru National Urban Renewal Mission is an excellent window for understanding the evolution of urban governance in India, despite its closing in 2014. Analyse. (250 Words)

[EPW](#)

#### **Background:-**

- Over the past decade, the government has devoted a great deal of effort to establish programmes in order to steer urban infrastructure development.
- Unveiled in 2005, the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) was an ambitious and landmark manifestation of this interest. Under the JNNURM, the government committed 50,000 crore over 2005–14.

#### **How it transformed urban governance:-**

- It **focused on physical manifestations**, infrastructure across urban India such as provision of buses, flyovers and also **focused on technologies of governance**.
- Thus, the JNNURM's **enormous scope and flagship status, in terms of not only its implementation dimensions but also its reform proclivities**, have exerted powerful influences on the governance architecture in Indian cities.
- JNNURM has **emerged as a template for national-level urban initiatives post 2014**, such as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and the Smart Cities Mission (SCM).
- For **making cities equitable**, the JNNURM established two channels for intervention.
  - Urban Infrastructure and Governance (UIG) which funded city-wide infrastructure such as water supply, sewerage, urban transport, and solid waste management and
  - Basic Services for the Urban Poor (BSUP) which targeted housing, water supply, and sanitation for the poor.
- The JNNURM intervened by requiring state governments to comply with the provisions of **the 74th Amendment Act**, and by making the full involvement of city authorities in operational decisions a key organising principle of the programme which transformed urban governance.
- The JNNURM's role in urban decision-making was heightened by **its multilevel architecture that tied together city, state, and national governments for the approval, funding, and monitoring of project development and implementation**.

#### **Concerns with JNNURM which needed change with respect to urban governance :-**

- **Vital sectors such as health, education, and social services, fell outside its scope.**
- Despite the stated objective of promoting decentralised planning and governance, and the **devolution of operational and fiscal powers to cities**, the JNNURM ironically **furthered centralised decision-making**.
- The JNNURM's implementation has resolutely **promoted uneven development both across and within cities as major cities captured a major share of the funding**.
  - Smaller towns received only about 20% of the funds got by the larger and more global mission cities.
- Due to the lack of local capacity, there was more reliance on consultants and this **exacerbated intercity and inter-state inequalities**.
- Despite the stated objective of poverty alleviation, the **JNNURM prioritised market- oriented policies focused on efficient land markets** and cost recovery in the provision of public services



- JNNURM caused **local bureaucracies to expend their limited energies** on forging partnerships with domestic and international markets rather than on providing infrastructure that addressed people's needs.
  - **The repeal of urban land ceiling regulations and the displacement of the urban poor due to infrastructure projects could make their lives and livelihoods more precarious.**
- Although the objective of the JNNURM was citizen inclusion and transparency, unelected and unaccountable actors representing urban NGOs, international funding agencies and consultancies drove policymaking.

#### Evolution of new schemes post JNNURM

- With AMRUT and the Pradhan Mantri Awas Yojana (PMAY), there appears to be greater scope for decision-making and for variations in programme design and implementation at the state and local levels
- The states, and not the central ministry unlike in the JNNURM, are responsible for the evaluation and approval of specific projects, which are **proposed by municipalities**
- **Citizen participation in urban planning** and project prioritisation are now made mandatory. About one crore citizens contributed to the making of 'smart city' plans. Urban planning is now made **'bottom up' and the results are showing.**
- Under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Smart Cities Mission meant for improving urban infrastructure, **there shall be a comprehensive assessment of infrastructure deficit before drawing up city-level action plans. Cities have been empowered to add to their technical capabilities.**
- The focus has **shifted from a project-based approach to area-based outcomes.**

#### Conclusion:-

- The early shoots of urban renaissance are quite visible with a new churning among cities that are thinking and acting differently. **Making a perfect urban future is a daunting task but a definite beginning has been made.**

Q4) Examine how the Motor Vehicles (Amendment) Bill that was passed by the Lok Sabha in 2017 is an improvement over the Motor Vehicles Act, 1988. (250 Words)

#### The Hindu

#### Background:-

- The motor vehicle bill 2017 which will repeal motor vehicle act 1988 has been passed in Lok Sabha and is waiting passage in Rajya Sabha

#### Benefits over the previous act are :

- The Amendment Bill is robust and **rectifies several systemic issues**
  - **by providing for a uniform driver licensing system**
  - **protection of children and vulnerable road users**
  - **rationalising penalties**
- **Introducing technology in the licensing procedure.**
  - A digitised, uniform and centralised driver licensing system will go a long way in ensuring ease of access, efficiency and transparency in the filtering process.
- **Bill also proposes to introduce digitisation in the monitoring and enforcement of traffic laws.**
  - Kerala has a 'city surveillance and traffic monitoring system', and automated traffic enforcement systems to detect traffic light violations as well as speeding. **The enactment of the Bill will facilitate the replication and creation of such digitised systems for all other States.**
- **Safety of children:**
  - The Bill **proposes to mandate the use of protective headgear by every person above the age of four driving, riding or being carried on a two-wheeler.**
  - **In 2016 alone, 7% of road crash deaths were attributed to children below 18 years**
  - Similarly, **the Bill mandates the use of safety belts and child restraints for those under 14 years** and introduces a fine of Rs. 1,000 for the driver or guardian for the violation of the same.
- **Penalties:-**
  - This Bill promises to rationalise the fines. For instance, the penalty for drunk driving has been increased to Rs. 10,000 for the first offence and Rs. 15,000 for the subsequent one.



- **The Centre assumes a direct role in the reforms**, since it will introduce guidelines that bind State governments in several areas:
  - notably in creating a framework for taxicab aggregators
  - financing insurance to treat the injured and to compensate families of the dead in hit-and-run cases
- **Road design and engineering:-**
  - The 2017 Bill provides that any contractor or consultant responsible for the design, construction, or maintenance of the safety standards of roads must follow design, construction and maintenance standards specified by the central government.
- Failure to comply with such standards will be punishable with a fine of up to one lakh rupees, and such amount will be credited to the Motor Vehicle Accident Fund.
  - The 2017 Bill also specifies certain road design characteristics that the Courts should consider when looking at such cases.
- **Road safety agencies:-**
  - The 2017 Bill provides for a National Road Safety Board, to be created by the central government through a notification
- The 2017 Bill **specifies a time limit of three months to submit the accident information report.**
- **Settlement of claims:**
  - The 2017 Bill passed by Lok Sabha, provides that the insurance company can process claims on receiving information from the claimant also. Further, the insurance company must settle claims within a time limit of 30 days.
- Removal of Second Schedule:
  - **The 2017 Bill removes the Second Schedule to the Act.** This Schedule provides for the manner of calculation of compensation for road accidents resulting in death or injury.

**Concerns and points which remained same as the previous act are:-**

- Under the 1988 Act, third party insurance is compulsory for all motor vehicles and the liability of the third party insurer is unlimited. The 2017 Bill removes the cap on liability for third party insurance as well.
- **States have concerns** about their powers being curtailed in the Motor Vehicle (Amendment) Bill, 2017.
- Sub-section(3) introduced to Section 166 states that the claim petition has to be filed within six months of the date of accident. In 1988 act there was a similar provision but provision fixing time limit was deleted as per 1994 amendment. **Now, that provision has been brought back.**
- Application of compensation: A time limit of six months has been specified for an application of compensation to the Claims Tribunal with regard to road accidents. **The Act did not provide for any such time limits**

**Suggestions:**

- There is a need for an accountable and professional police force then only the record of traffic fatalities is likely to change.
- State governments must prepare for an early roll-out of administrative reforms prescribed in the amended law, **such as**
  - **Issuing learner's licences online**
  - **Recording address changes through an online application**
  - **Electronic service delivery with set deadlines.**
- To eliminate corruption, **all applications should be accepted by transport departments online, rather than merely computerising them.**
- Protection from harassment for good samaritans who help accident victims is something the amended law provides, and this needs to be in place.

**Conclusion:**

- As a signatory to the Brasilia Declaration on Road Safety, India has committed to reducing, by 2020, the number of road crash fatalities and serious injuries by 50%. This will be possible to achieve with the passage of the Motor Vehicles bill 2017 .

Q1) There should be differential regulatory mechanisms to deal with cryptocurrencies and blockchain technology respectively. Comment. (150 Words)

[The Hindu](#)

**Background:-**

- The news that bitcoin had broken the \$10,000 barrier reflects the way that mainstream investors have been flocking to cryptocurrencies over the past year. Investment in bitcoin and other cryptocurrencies increased tremendously in India over the past year as well hence the need for regulation.
- In India a lot of work is going on to integrate Blockchain technology into various sectors of the economy including the financial and health sectors. In 2016, the Indian bank, ICIC Bank, announced that it had completed a cross-border transaction executed on a Blockchain.

**Why differential regulatory mechanisms are needed?**

- **Crypto currencies:**
  - Most new users know close to nothing of the technology, or how to verify the genuineness of a particular cryptocurrency. So there is a need for proper regulatory mechanism.
  - Crypto currencies may or may not emerge as a useful tool, especially since the government may not want to encourage the proliferation of anonymous, non-fiat currencies as its anti-black money fight intensifies.
  - Anything from a failed initial coin offering (or ICO, where funds are raised for new cryptocurrency ventures) to a rogue cryptocurrency exchange will result in a public confidence crisis
  - But hard-to-track criminal activity isn't the only threat from the use of cryptocurrencies, there's also the possibility of their use to finance terrorism, given that the formal banking sector is now adept at spotting suspicious movement and mobilisation of monies through the banking system
  - The global nature of this payment mechanism is the biggest challenge.
- **Blockchain:**
  - But blockchains, basically digital ledgers of financial transactions that are immutable and instantly updated across the world, are worth looking at as aids to ease doing business.
  - They have the potential to greatly streamline payment mechanisms and make them transparent.
  - The Blockchain technology almost entirely eliminates the need to belong in the tradition financial system, in order to be financially included.

**Way ahead:**

- **International examples:-**
  - A progressive example of short-term regulation is being set by Japan and Singapore. The Japanese have quickly shed insecurities around "preserving" the Yen and gone on to declare bitcoin as legal tender without the excess baggage of central bank control on circulation.
- The fact that cryptocurrencies can be converted into pounds, dollars and euros does make regulation of them more feasible. It can be done at the point of their conversion through virtual currency exchanges which, as financial institutions, can be regulated.
- International financial regulation and a growing number of national measures across the globe, such as "Know Your Customer" (KYC) and anti-money laundering (AML) directed at financial institutions, have been strengthened. And, when implemented effectively, it's now easier to track down individuals engaging in illegal transactions.

Q2) Cryptocurrency transactions have led to concerns regarding consumer protection, money laundering, and financing of criminal activities. Discuss the challenges that exist in regulating cryptocurrencies. (250 Words)

[Livemint](#)

### Background:-

- Even though the cryptocurrency provides certain benefits and comes along with certain drawbacks, there is a malignant side to it as well.
- Cryptocurrencies are being used for nefarious purposes like hacking, money laundering, obtaining illegal goods and services and fraudulent activities.

### Concerns:-

- Cryptocurrencies allow anonymous funding potentially acting as conduits for money laundering and terror financing. The consumer protection, in particular retail consumer protection concerns, stem from their volatile nature.
- **Consumer protection :-**
  - As the number of users and transactions are increasing, **the hackers** are getting into the personal wallets or even to the entire transaction.
  - **Fraudsters** are finding new ways to deceive consumers and loot them. Some of those techniques are **Ponzi schemes, imitation websites and phishing emails**—
    - One of the predominant ways includes a person sending their wallet file and private key to a user and requesting them to forward the bitcoin to another address.
    - The bait for the user is that they will be tempted to retain the bitcoin sent to them and not forward it. If they get greedy and end up accepting the wallet, it releases a file that drains all their bitcoins.
  - The anonymity of cryptocurrency has made way for **cybercriminals to hold victims hard drives hostage to extort payment** from them in terms of bitcoins.
- **Money laundering :-**
  - **Silk Road**, a bitcoin based online market was seized for money laundering. The website comprised of over 13,000 listings for drugs, listings for spiteful software programs, fake passports, pirated media content and computer hacking facilities.
  - **Face-to-face trading of bitcoins** are a matter of concern as they are becoming a platform to launder money. **The issue with these transactions is that people can either purchase bitcoins or exchange them for something else.**
  - As a result, one could easily sell illegal services or products strictly for Bitcoins, or purchase large amounts of digital currency with regular currency, then transit the digital currency offshore and either exchange it for more illegal products and services or convert it to another nation's currency then deposit it into a bank.
- **Financing of criminal activities :-**
  - Since cryptocurrency is borderless, it can be really attractive **for terrorist finances** as they can transfer funds across countries in a cheap way.
  - They can **avoid legal barriers**, which makes it really beneficial for the efficiency of terrorist attacks.
  - Terrorists can hide their financial activities under the garb of anonymity or pseudonymity.
  - Certain characteristics of cryptocurrency like speed, cost, security make it a lucrative source to finance such activities
  - Cryptocurrencies like Bitcoins allow **human traffickers** to buy and sell girls for sex without the fear of legal consequences. Child sex trafficking is becoming wide spreading as traffickers believe that they can work anonymously using bitcoins.
  - Cryptocurrency is being used to fund child pornography, sexual exploitation, and human trafficking

### Challenges existing in regulating cryptocurrencies :-

- Apart from the above mentioned issues, most new users know close to nothing of the technology, or how to verify the genuineness of a particular crypto currency. So there is a need for proper regulatory mechanism.
- The global nature of this payment mechanism is the biggest challenge.
- Intense volatility of cryptocurrency.
- No single location of buyers and seller.
  - The buyer can be from one country and seller from the other country so regulation becomes difficult.
- Without the regulatory authority like Bank regulation become difficult.
- Cryptographic content makes it difficult to be tracked.

### Way ahead :-

- In countries such as the US, the SEBI-equivalent regulatory body is looking into crypto currencies. Experts say, **considering crypto currencies are looked at as a commodity, SEBI should look at regulating them**
- There is a need for clear regulations or proper jurisdiction so that tax has to be paid on all crypto currency transactions.
- **International examples:-**
  - A progressive example of short-term regulation is being set by Japan and Singapore. The Japanese have quickly shed insecurities around “preserving” the Yen and gone on to declare bitcoin as legal tender without the excess baggage of central bank control on circulation.
  - The fact that crypto currencies can be converted into pounds, dollars and Euros does make regulation of them more feasible. It can be done at the point of their conversion through virtual currency exchanges which, as financial institutions, can be regulated.
  - International financial regulation and a growing number of national measures across the globe, such as “Know Your Customer” (KYC) and anti-money laundering (AML) directed at financial institutions, have been strengthened. And, when implemented effectively, it’s now easier to track down individuals engaging in illegal transactions.

Q3) What are the characteristics of 5G technology? Examine what significant changes in the national spectrum policy and regulation are needed for rolling out 5G technologies. (250 Words)

[Livemint](#)

### Background:-

- Recently the government has announced that India would roll in 5G in the time frame that has been accepted by international standardization bodies, vendors, and service providers in many

### Characteristics of 5G technology :-

- Ultra-reliable, very fast speeds -Up to 10Gbps data rate – > 10 to 100x improvement over 4G and 4.5G networks
- It is also designed to provide latency at 10 times lower than 4G. Low latency is required in applications dealing with critical emergency health care, autonomous vehicles or disaster management, success of self driving cars etc
- High bandwidth mobile connectivity -1000x bandwidth per unit area
- Supports massive interconnected devices spread across wide areas -Up to 100x number of connected devices per unit area (compared with 4G LTE
- The main evolution compared with today’s 4G and 4.5G (LTE advanced) is that new IoT and critical communication use cases will require new types of improved performance – Up to 10-year battery life for low power IoT devices
- Low power consumption is what will allow connected objects to operate for months or years without the need for human assistance-90% reduction in network energy usage
- 999% availability
- 100% coverage

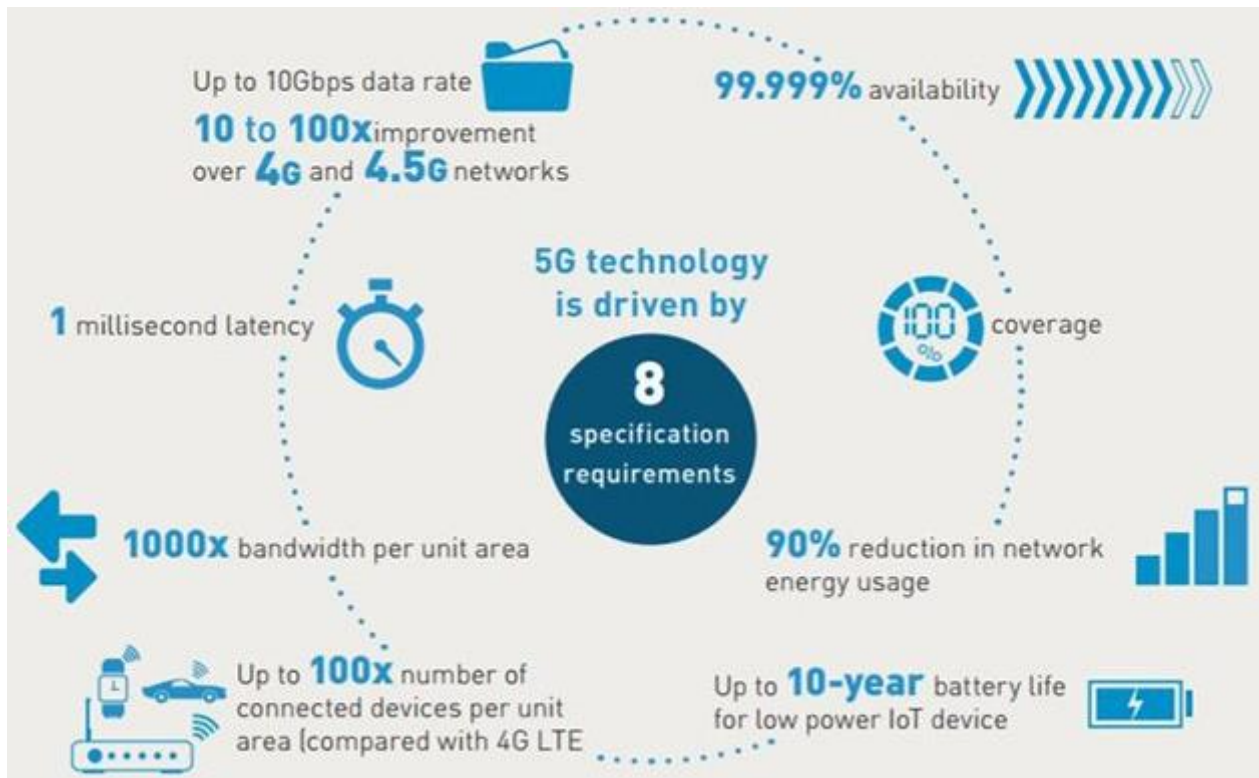
### Challenges present not to adapt to 5G are:-

- Indian operators have far less spectrum in comparison to international operators. This increases their cost of operations.
- Many of the Indian operators are also weighed down by debt.
- Faster rounds of new technology introduction when prior technology investments have not been recouped add further complexity.

### Changes needed in national spectrum policy and regulation :-

- High reserve prices need to be done away with.
- **Innovative licensing arrangements**, including mechanisms to share spectrum, should be worked out in the Indian context, to mitigate the effects of high auction prices
  - There is a need to make spectrum available by delicensing new bands.

- As delicensed band is free, greater innovation and low cost delivery are possible. Thus, bands in which sensors transmit wirelessly may be delicensed.



- The **Wireless Planning and Coordination (WPC) Wing** responsible for spectrum management at the national level must review its decision-making framework for efficiency and efficacy.
  - It should make a large number of spectrum bands and large chunks of spectrum per operator available (which is a requirement of 5G) within this band.
  - These bands need to be globally harmonized in a short span of time.
  - Harmonization would allow Indian operators to exploit the benefits of lower cost of equipment and, hence, provide lower cost services for 5G.
  - To make more spectrum commercially available, WPC would need to reframe spectrum for future applications from those government departments and ministries that are currently not using it.
- **Mandating the switch-over from analog to digital transmission for all users** will lead to lower spectrum usage for existing applications. This would increase the amount of available spectrum.
  - For example, the US Federal Communication Commission had mandated digitalization of broadcasting spectrum several years ago. **The spectrum released through this process has been auctioned for commercial use, while paying incentives to existing users to vacate the spectrum so released. Several other regulators across the world have also adopted a similar approach.**
- The adopted road map for 5G should ensure that the existing and near-future investments in 4G can be leveraged.
- Very large capacities are required in the backhaul to cater to applications enabled through 5G. **So the role of wired infrastructure, especially fibre optic cables, is critical and complementary to growth of wireless.**
  - There is need to accelerate the BharatNet programme for deploying fibre optic cables to gram panchayats and increasing the involvement of the private sector to exploit complementarities and efficiencies of the private sector.

Q4) It is said that the strides that are being made in the areas of machine learning, image processing, and natural language processing are on a scale that resembles the moon landing. Discuss the implications of these technologies for racism, gender biases and other forms of discrimination. (150 Words)



### Background:-

- The technological revolution impacting the world right now in the form of artificial intelligence, Big data analytics has huge ramifications for multiple aspects of the society .
- It is moving at such a fast pace that Google photos is able to positively identify a person in photos which humans might not be able to, a Tesla car by making its own calculations can apply brakes foreseeing a collision between the two cars in front etc

### Latest strides made are:-

- Artificial intelligence has significant impact in software development. The process of **programming and testing will become increasingly automated.**
- Google's machine-learning programme generated machine-learning programmes that were better than what human programmers could code.
- These programmes can study X-ray images for doctors and legal documents for lawyers.
- Companies, government agencies and hospitals are increasingly turning to machine learning, image recognition and other AI tools to help predict everything from the credit worthiness of a loan applicant to the preferred treatment for a person suffering from cancer.

### Implications of these technologies on gender bias, racism and discrimination:-

- **Positives:**
  - From simple AI pieces to more complex problem-solving uses, the technology has multiple benefits that can help make employees more productive, efficient and error-free.
  - By adding AI into the mix, HR professionals can significantly improve and streamline operations, **whether by reducing administrative work or by supporting assessments and corrective actions in a bias-free manner.**
  - Artificial intelligence will unequivocally work as an advocate to HR. **AI will help eliminate human bias by identifying potential bias in job descriptions and HR communication.**
  - Not only will it further protect the company from discrimination litigation, but it also **improves the balance of gender and demographics within the workplace**
- **Negatives:**
  - In 2016, research paper described how two massive image collections can be used to train programmes to process images that **had gender biases**, like associating images of cooking with women. These collections passed on the biases to their 'students', who not only reproduced the bias but even amplified them.
  - Other research shows that **AI also picks up racial bias from online text content, and gender bias from general news.**
  - **A ProPublica report** found that a computer program widely used to predict **whether a criminal will re-offend was discriminated against people of colour.**
  - In a AI beauty contest predominantly **white faces were chose as winners**
  - In May 2017, a report claimed that a **computer program used by a US court for risk assessment was biased against black prisoners and** wrongly flagged them at almost twice the rate as white people (45% to 24%)
  - As machines are getting closer to acquiring human-like language abilities, machine learning algorithms are picking up deeply ingrained race and gender prejudices concealed within the patterns of language use.
  - Some more troubling implicit biases seen in human psychology experiments are also readily acquired by algorithms. **The words "female" and "woman" were more closely associated with arts and humanities occupations and with the home, while "male" and "man" were closer to maths and engineering professions.**
  - And the AI system was more likely to associate European American names with pleasant words such as "gift" or "happy", **while African American names were more commonly associated with unpleasant words.**
  - These biases can have a profound impact on human behaviour



*Topic: Achievements of Indians in science & technology; indigenization of technology and developing new technology.*

Q1) Write a brief note on the origin and contribution of the Indian Science Congress to development of science in India. Also critically comment on its effectiveness today as platform for science popularisation and an exercise in public engagement of science. (250 Words)

[The Hindu](#)

[DailyO](#)

**Background:-**

- Recently Indian science congress has been postponed indefinitely and It's rare for the century-old Indian Science Congress Association (ISCA) to have missed its scheduled annual meeting in the first week of January.

**Origin:-**

- The Indian Science Congress Association (ISCA) owes its origin to the foresight and initiative of two British Chemists, namely, Professor J. L. Simonsen and Professor P.S. MacMahon.
- It occurred to them that scientific research in India might be stimulated if an annual meeting of research workers somewhat on the lines of the British Association for the Advancement of Science could be arranged.
- The first meeting of the Congress was held from January 15-17, 1914 at the premises of the Asiatic Society, Calcutta.
- Post-Independence, Nehru made it a practice to inaugurate the event, every January 3. The tradition has been carried on by successive PMs for the last 70 years.

**Contribution:-**

- It's a record that the Science Congress has been held without a break so far.
- In its initial years, the Congress would discuss the latest scientific developments, but it moved on to the Prime Minister of the day making policy statements on science and technology.
- From the modest beginning with hundred and five members and thirty five papers communicated for reading at the first session, ISCA has grown into a strong fraternity with more than ten thousand members till to date. The number of papers communicated for reading has risen to nearly one thousand.
- Indian Science Congress Association introduced the programme for Young Scientists from the 68th session of the Indian Science Congress in 1981.
- The programme enables Young Scientists to present their research work with opportunities to exchange ideas in the relevant scientific problems with their counterparts and specialist
- ISC has become a platform as members from different disciplines and from different walks of life come and discuss together.

**Effectiveness today**

- ISC remains the only platform for science popularisation and an exercise in public engagement of science. It brings together leaders in science, including Nobel laureates, policy makers, scientists, science students and school kids.
- It's a great opportunity for young people to learn about science and the latest developments in India.
- Many technologies have been discussed which have impact on current problems like reducing carbon footprint, cleaning Ganga, antibiotic resistance etc

**Failure:-**

- Pomp and ceremony take precedence over substance. Few practising scientists of note consider the Congress as an important event.
- The Indian Science Congress has struggled to attract enough contemporary scientists to take it seriously and speak persuasively about their work.
- Over the past decades, sections of the scientific community have expressed unhappiness with the affairs at ISCA.
- Some others felt the entry of governments into the affairs had diluted its strengths.
- Politics seems to have trumped science in the unusual decision to defer India's biggest scientific meet.
- In the last few years the India International Science Festival (IISF) almost replicates the Science Congress in many ways and has tacit support from the present dispensation at the Centre.

### Suggestions:-

- It can become a **prestigious forum to inspire young science students** into meeting leading scientists and learning to find joy and meaning in their careers.
- In the interest of Science, **urgent steps are required to restructure the Congress** and get the President elect known for their scientific accomplishments to restore some meaning to the event
- **International example:**
  - British Scientific Association has a number of scientific events spread over a year unlike ISCA sticking to annual event. India can follow it.
- Given the limited resources, changed times with digital space dominating restructuring the Science Congress is a must to give it a meaning.
- **Scientific departments and national laboratories could use the platform of ISC** to display their achievements in a way people can understand and also crowd source new ideas.
- Science congress would also be the **perfect platform to attract the youth to careers in science.**

Q2) Though innovations such as blockchain are at the heart of creating 'trustless' decentralising technologies, their goal remains efficiency and profit. Comment. (250 Words)

[The Hindu](#)

### Background:-

- In the digital world today new blockchain currencies, technology platforms and ecosystems, beginning with Bitcoin and Ethereum, but now also including Lisk, Kin and many .
- So there is need to be caution about crypto currency on its positives and concerns

### Creating trustless decentralising technologies:-

- The blockchain uses economic incentives to motivate members of the network to do the work of validating every transaction. It does away with the bank's role as an intermediary
- It poses serious issue to central banks as well as states .
- Anonymity in this technology can be exploited by anti-social elements for terror funding, money laundering , human trafficking etc. This is the reason RBI has given warnings.

### How it enhances efficiency :-

- Decentralisation:-
  - Interest in blockchain is also being driven by the belief that eliminating the need for a trusted third party in the transfer of value will enable faster, less expensive financial transactions, with greater privacy.
- **Triple-entry Accounting :-**
  - Blockchain permits triple entry accounting, an enhancement to the traditional double entry system. All accounting entries involving outside parties are cryptographically sealed by a third entry.
  - Rather than occurring separately in independent sets of books, they occur in the same distributed, public ledger, creating an interlocking system of enduring accounting records.
- **Transparency:**
  - The distributed ledger structure gives the control of all their information and transactions to the users. Blockchain data is complete, accurate and consistent with all the members.
- **Faster transactions :-**
  - Blockchain transactions can reduce transaction times to minutes and are processed 24/7.
  - An instantaneous settlement would transform an industry such as transportation and energy, potentially saving billions from increased back-office efficiency and automation.
- **Reduced transaction costs:**
  - A transaction system build using blockchain eliminates third party intermediaries and overhead costs for exchanging assets.

- Opportunities for blockchain go beyond finance and banking. It can transform systems in the fields of Healthcare (Electronic medical records), Entertainment (gaming and music streaming), and Manufacturing (Supply chain management).
- It can even make voting further transparent in India.

#### Conclusion:-

- There is a need to take effective measures on cryptocurrencies and bring some governmental guarantees regarding blockchain to avoid speculation.

Q3) Discuss the significance and contemporary relevance of Nobel Laureate Har Gobind Khorana's contributions to biology. (150 Words)

[The Hindu](#)

#### Har Gobind Khorana:-

- He is an Indian American scientist who inspired the work in many fields.

#### Significance:-

- Khorana was among those **who significantly built on DNA knowledge and explained how this sequence of nucleic acids (better known as the genetic code) goes about making proteins**, which is critical to the functioning of cells.
- Khorana was **able to create nucleic acids in the lab** and did so by figuring out the order in which nucleotides needed to be to make a suite of amino acids, which are the basic units of proteins.
- **Won 1968 Nobel Prize for Physiology or Medicine** that showed how the order of nucleotides in nucleic acids, which carry the genetic code of the cell, control the cell's synthesis of proteins.
- Khorana was the **first scientist to chemically synthesize oligonucleotides**.
- Also renowned for **constructing the first synthetic gene** and received a multitude of awards during his lifetime, including the National Medal of Science.
- He further placed the lab-made gene in a living bacterium and was **in that sense a founding father of biotechnology**.
- Khorana was an early practitioner, and perhaps a **founding father, of the field of chemical biology**. He brought the power of chemical synthesis to bear on deciphering the genetic code, relying on different combinations of trinucleotides.

#### Contemporary relevance :-

- His work has relevance in areas such as **synthetic biology and gene editing**.
- His work on synthetic gene is considered a **forerunner to the method called Polymerase Chain Reaction** that is among the methods used to commercially read the unique genetic structures of organisms today.
- The **CRISPR/Cas9 system**, which is a new technology in genetics and is used alter the functioning of certain genes **refers the work of Khorana as a key influence**.
- The **genetic code which he helped establish, is a foundation of modern molecular biology**, .It is also the basis for a huge number of modern disciplines, including analysis of genomes and understanding of evolution.
- Khorana's invention(s) have become automated and commercialized so that anyone now can order a synthetic oligonucleotide or a gene from any of a number of companies. One merely needs to send the genetic sequence to one of the companies to receive an oligonucleotide with the desired sequence.
- The University of Wisconsin-Madison, the Government of India (DBT Department of Biotechnology), and the Indo-US Science and Technology Forum, in 2007, created the **Khorana Program**,
  - The mission of the Khorana Program is to build a seamless community of scientists, industrialists, and social entrepreneurs in the United States and India.

Q4) Critically evaluate features and performance of the Department of Science and Technology's (DST's) 'Innovation in Science Pursuit for Inspired Research' (INSPIRE) programme. (250 Words)

[The Wire](#)

### INSPIRE program:-

- It was launched in 2008 and aims to attract people to the study of science at an early age and pursuing career in research and help to build the required critical human resource pool for strengthening and expanding the S & T and R & D base in the country.
- It provides an “assured opportunity for research” through two types of 1,000 fellowships every year.
  - INSPIRE fellowship for PhD students
  - INSPIRE Faculty Scheme for post docs through contractual and tenure-track positions for five years.
- Inspired Research (INSPIRE) was approved by Government of India for implementation through Department of Science & Technology to promote science and attract talents for pursuing career in research.

### Features:-

- The program has three components
  - Scheme for early Attraction of Talent (SEATS) for Science
  - Scholarship for Higher Education (SHE)
  - Assured Opportunity for Research Careers (AORC) covering an age-group of 10-32 years of students.
- Each INSPIRE Faculty Awardee receives an amount of Rs. 80,000 per month with an annual increment of 3.3% along with Rs. 7 lakh per year as Research Grant for 5 years.

### Performance:-

- Data released by the department show that 65% of initial INSPIRE fellows have found permanent positions.
- The scheme on the whole has been well designed with the good objective of supporting talented youth in science

### Concerns :-

- The term “**assured opportunity**” has led to expectations by the fellows that they would eventually be absorbed by the institute or department.
  - But about 35% of the initial batches of INSPIRE faculty fellows now find themselves with neither a job in hand nor any encouraging prospects.
- **Problems with delayed research grant disbursal and salary payments**
- **Negative attitude of host institutes:-**
  - There could be a miscommunication between “INSPIRE Fellows who seem to be expecting a permanent faculty position” and institutes “offering only a fixed period postdoc position
  - **Many complaints by fellows** -Host institutions are not considering these fellows as assets even after they perform well, which is an utter violation of the undertaking they endorsed during the fellows joining.
- Their developed research facilities will either be used by other permanent faculties or will be wasted.
- In some cases, a university may be willing to absorb an INSPIRE faculty fellow permanently but a ban by the University Grants Commission on hiring new faculty instituted in 2015 comes in the way.
- **Failure of reverse brain drain:-**
  - One of INSPIRE’s aims is to retain young scientific talent or get them back to India if they travelled abroad for studies but this has not happened because :-
  - There is a mismatch between the interests and expectations of the returning scientists and the institutes
  - There is a huge misfit between the researchers who are returning and the way institutions respond to and handle their applications and research interests.
- Also the **funding is not what it was promised in the beginning,**

### Suggestions :-

- Since the DST is a central government body that has the opportunity to work with other departments, it can further help INSPIRE faculty fellows get a job with their host institutions.
- There are large faculty shortages in several IITs, with no new staff being hired. So these fellows should be given a chance.

Q5) In recent years, China has made breathtaking strides in science and technology whereas India has lagged behind. Can India catch up with China? What should India do to match China in this regard? Discuss. (250 Words)

### Background:

- Based on recent US data China has become or is in the verge of becoming a scientific and technical superpower.

### What did China do:-

- **China is the 2nd largest spender in R&D after the US**, accounting for 21% of the world total which is \$2 trillion. It has been going up 18% a year, as compared to 4% in the US. An OECD report says that China could overtake the US in R&D spending by 2020
- China **has overtaken the US in terms of total number of science publications**. Technical papers have increased dramatically, even if their impact, as judged by citation indices, may not be that high
- **China has increased its technical workforce five times since 2000 to 1.65 million**. It also has more B.Sc. degrees in science than any other country and the numbers are growing.
- **China has begun shifting from being an assembler of high-tech components, to a maker of super computers and aircraft and given the pattern of its investments in R&D and technology development**, it is focusing on becoming the world leader in artificial intelligence (AI), quantum communications, quantum computing, biotechnology and electrical vehicles.
- **China has also become a more attractive destination for foreign students** and is now occupying the third slot after the US and the UK.
- **China now has a serious programme to attract its own researchers back to the country. The thousand talents plan targets scientists below the age of 40** who have PhDs from prestigious foreign universities.
- **In the field of artificial intelligence** the government and Chinese corporates are moving in a big way.
  - Baidu announced its decision of setting up two more AI labs in the US, one focusing on business intelligence and the other on robotics and autonomous driving.

### India lagged behind:-

- China has also developed an OS called Kylin. India is yet to make a mark here.
- China is home to global brands in PC, mobile phones and network equipment manufacturing e.g. Lenovo, Xiaomi, Oppo, Huawei, ZTE etc. **In these fields, visibility of Indian companies is limited to India.**
- Though India has a pool of chip designers, **chip fabrication is non-existent in India.**
- China has similar global ambition in Artificial Intelligence, Robotics and drones manufacturing. **India has no global visibility in these areas.**
- China's efforts in fast trains, aircraft manufacture, development of aircraft carriers, electric cars, higher end telescope, genomics etc implies that it learns IT and controls systems in these areas etc. **India lags China in these technologies and hence in the associated IT and control systems.**
- Knowledge-intensive and high-technology industries contribute the most to long-term growth. It is no accident that the U.S. accounts for 33% of global output of knowledge-intensive services, China 10%, but India only 2%. **In high-technology manufacturing, India barely exists.**
- **There is a lack of scientific expertise across all levels in India** as educational system failed to harness the enormous latent talent and build a solid foundation of science.
- India performs below its potential on just about every indicator of scientific progress like
  - **Public and private funding earmarked for research**
  - **The number of prestigious awards won by Indian scientists working in Indian institutions**
  - **The number of patents registered in the names of Indians or the number of articles published in well-known peer-reviewed journals.**

### India can fight with China as it has its own specialities like:-

- India is playing a significant role in space technology with success like Mangalyaan, Chandrayaan etc. making world look at Indian technology at awe.
- In particle physics India is associated with CERN.
- India is member of Wassenaar, MTCR and Australia group in which China is not part of
- **INDIGO (Indian Initiative in Gravitational-wave Observations)** is a consortium of Indian gravitational-wave physicists. This is an initiative to set up advanced experimental facilities for a multi-institutional observatory project in gravitational-wave astronomy.
- India is brainchild of international solar alliance



- India's recent efforts to shore up its domestic defence manufacturing industry, develop a regional satellite for South Asia and a home-grown GPS, as well as establish 20 world-class universities, are all steps in the right direction.

#### What should India do?

- India needs to invest more in research and development and higher educational institutes need to encourage students to research.
  - India currently spends only 0.9% of GDP on R&D.
- Scientific temper needs to be inculcated from childhood itself
- Strengthening the links between S&T and industry could potentially bring in the resources necessary to boost Indian science.
- Government should focus on improving science education at the school level:
- More specifically, India needs to build the infrastructure which can generate new technologies. **It needs to invest in human capital, maintain a cadre of top scientists and professionals, and develop industry-lab links.**

#### Conclusion:

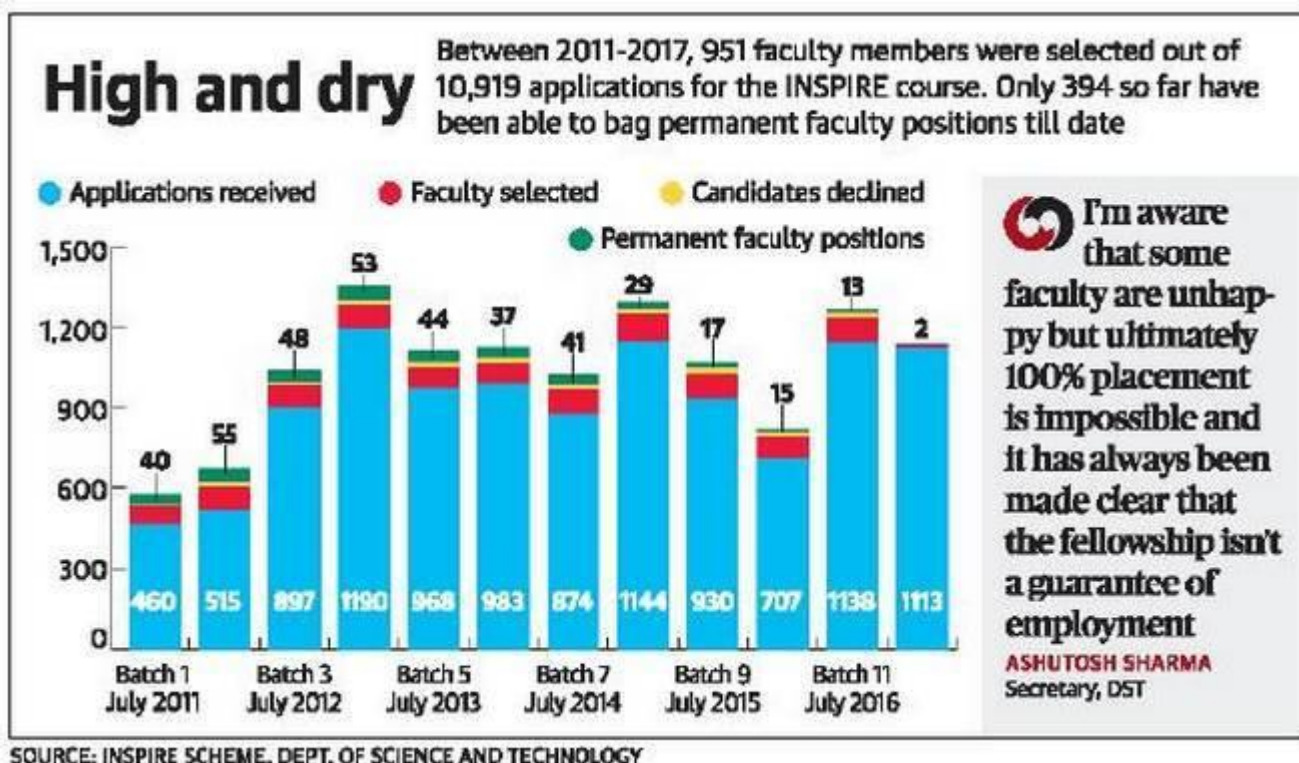
- India needs to understand that high-tech ecosystem serves the triple purpose of boosting economic growth, ensuring national security, and offering international leverage.

Q6) Critically evaluate performance of the INSPIRE (Innovation in Science Pursuit for Inspired Research) program of government of India. (250 Words)

[The Hindu](#)

#### INSPIRE program:-

- It was launched in 2008 and aims to attract people to the study of science at an early age and pursuing career in research and help to build the required critical human resource pool for strengthening and expanding the S & T and R & D base in the country.
- It provides an "assured opportunity for research" through two types of 1,000 fellowships every year.
  - INSPIRE fellowship for PhD students
  - INSPIRE Faculty Scheme for post docs through contractual and tenure-track positions for five years.
- Inspired Research (INSPIRE) was approved by Government of India for implementation through Department of Science & Technology to promote science and attract talents for pursuing career in research.





### Features:-

- The program has three components
  - Scheme for early Attraction of Talent (SEATS) for Science
  - Scholarship for Higher Education (SHE)
  - Assured Opportunity for Research Careers (AORC) covering an age-group of 10-32 years of students.
- Each INSPIRE Faculty Awardee receives an amount of Rs. 80,000 per month with an annual increment of 3.3% along with Rs. 7 lakh per year as Research Grant for 5 years.

### Performance:-

- Data released by the department show that 65% of initial INSPIRE fellows have found permanent positions.
- Globally, 5% to 10% of the doctoral researchers get permanent positions
- The scheme on the whole has been well designed with the good objective of supporting talented youth in science

### Concerns :-

- The term “**assured opportunity**” has led to expectations by the fellows that they would eventually be absorbed by the institute or department.
  - But about 35% of the initial batches of INSPIRE faculty fellows now find themselves with neither a job in hand nor any encouraging prospects.
- **Problems with delayed research grant disbursal and salary payments**
- **Negative attitude of host institutes:-**
  - There could be a miscommunication between “INSPIRE Fellows who seem to be expecting a permanent faculty position” and institutes “offering only a fixed period postdoc position
  - **Many complaints by fellows**-Host institutions are not considering these fellows as assets even after they perform well, which is an utter violation of the undertaking they endorsed during the fellows joining.
- Their developed research facilities will either be used by other permanent faculties or will be wasted.
- In some cases, a university may be willing to absorb an INSPIRE faculty fellow permanently but a ban by the University Grants Commission on hiring new faculty instituted in 2015 comes in the way.
- **Failure of reverse brain drain:-**
  - One of INSPIRE’s aims is to retain young scientific talent or get them back to India if they travelled abroad for studies but this has not happened because :-
  - There is a mismatch between the interests and expectations of the returning scientists and the institutes
  - There is a huge misfit between the researchers who are returning and the way institutions respond to and handle their applications and research interests.
- Also the **funding is not what it was promised in the beginning**. The government released the salary and research funds so late every year, that it became impossible to spend the money before the close of the financial year.
- Universities frequently had opaque hiring procedures and “corruption” was rife at several State universities.
- Moreover, many leading institutions including the IITs didn’t recruit entry-level professors over 35, further queering the pitch for a new INSPIRE faculty member.

### Suggestions :-

- Since the DST is a central government body that has the opportunity to work with other departments, it can further help INSPIRE faculty fellows get a job with their host institutions.
- There are large faculty shortages in several IITs, with no new staff being hired. So these fellows should be given a chance.

Q7) Examine the evolving patterns in funding and gender participation in research and development(R&D) landscape in India. (150 Words)

### Down to Earth

#### Evolving patterns of funding in R&D:-

- A national survey on the status of research and development in the country has shown that the **gross expenditure on R&D (GERD) has more than tripled**.
- The Survey conducted under the Department of Science and Technology (DST) has also shown that the **per capita R&D expenditure has increased and that GERD was mainly driven by the government sector with central government accounting for around 44%**. The private industry accounted for the balance 38.1%.

- The study has revealed that **public sector R&D was led by defense related industries and fuel industry, while the private sector R&D was dominated by drug and pharmaceuticals and transportation.**
- The composition of R&D expenditure in India contrasted sharply when compared with select developed and emerging economies.
- India is dismal in terms of participation of institutions of higher education.
  - The share of institutions of higher education in R&D in the other countries varied from seven per cent in China to 40 % in Canada, as **compared to India's a mere four per cent.**
- As much as 81.3% of R&D expenditures incurred by central government sources **came from just eight major scientific agencies like DRDO, Department of space etc.**
- India occupied the third rank in terms of PhDs awarded in S&T
- The number of researchers per million population in India has more than doubled in India from 2000-15.
- India's R&D expenditure per researcher was as much as 1,78,000 in terms of purchase parity price on dollar basis. This was higher than that of Russia, Canada, Israel, Hungary, Spain and UK.
- **It has also highlighted that India's scientific publication output has shown a rising trend during the past decade with the database of SCOPUS showing that research output from India has increased by 68 per cent**
- SCOPUS has put **the growth rate of scientific publications at 13.9 %** for the period from 2009-13, as against the world average of 4.4% respectively.
- SCOPUS database ranked India sixth in the world in scientific publications ahead of France, Spain and Italy during 2013.
- As per WIPO report 2016, **India is ranked 10th in terms of resident patent filing activity.**

#### Concerns:-

- With the University Grants Commission insisting on Academic Performance Indicators for better promotional avenues, **many teachers are opting for short cuts to get as many research papers published without emphasising either on the quality of the paper or the publication.**
- Plagiarism has become a bane and some so-called international peer reviewed journals are making a fast buck catering to the requirements of these PhD aspirants and teachers.
- **Late arrival of funds and undue delay in filling up of vacancies** are other major areas of concern for the scientific community.
- Although some companies have collaborated with IITs to fund 25 per cent costs of innovative projects, industry participation is lacking

#### Gender participation in research and development (R&D) :-

- Women's participation in extra mural R&D projects has increased significantly from a mere 13% in 2000-01 to 29 % in 2014-15.
- In terms of personnel directly engaged in R&D activities, there were around 40000 women out of the total 282,000 personnel in 2015.

#### Way forward :-

- In fact, **a country the size of India must invest about 2 per cent of its GDP on R&D, instead of the present 0.8 per cent.** This is the case with other countries such as Turkey, Korea, Iran and Israel which have a higher proportion of R&D investment than India when compared to their GDP.
- Private funding can play an important role bridging this gap and boost the R&D capabilities of India. **Lessons can be learnt from Taiwan, where private funding helped it to become a dominant player in global semi-conductor industry.**
- The recent provision of grants worth of Rs 56 crore to create faculty chairs in leading academic institutions across the country by Infosys Foundation is a move in the right direction. More initiatives in this way needs to be promoted.
- **A public-private initiative to launch faculty development programmes in leading universities in India and focus on more outcome-based research is needed.**
- Industry should participate in developing the entrepreneurial culture in India by setting up **incubation centres and research parks for innovative research.**

*Topic: Awareness in field of IT, Space, Computers, Robotics, Nano-technology, biotechnology and issues relating to Intellectual property rights.*

Q1) What do you understand by genomics-informed medicine? What implications do latest developments in genomics have for India and are there deliberate choices that would shape this coming future more advantageously for the country and its people? Examine. (250 Words)

[The Hindu](#)

**Genomics informed medicine :-**

- **Genomic medicine is defined as** an emerging medical discipline that involves using genomic information about an individual as part of their clinical care (e.g., for diagnostic or therapeutic decision-making) and the health outcomes and policy implications of that clinical use.

**Implications for India:-**

- India is more genetically diverse with something like 5,000 ethno-linguistic and religious groups (castes and others), all of which probably have some degree of genetic distinctiveness.
- The genetic distinctiveness of different Indian groups is in part the result of endogamy. Some recent research has shown that endogamy is very likely to be medically significant.
- Castes are not just of the mind. The genetic implication of this is that there are likely to be many recessive diseases stemming from single genes specific to individual groups that can be identified.
- India has amazing genetic variation more than any other country perhaps in the world.
- Decreasing disease burden
  - Include providing new solutions to diseases like malaria, dengue and chikungunya.
  - This knowledge could then also be quickly applied to the task of managing diseases in these groups as well as be used for genetic counselling that could reduce their incidence in future generations.
    - For instance, the founder group of Ashkenazi Jews have almost eliminated Tay-Sachs disease from their population by such means.
  - With large samples the technique of genome-wide association studies that compare genomes of cases and controls could be used to identify genetic risk factors related to common diseases such as heart disease that stem from many genes that affect the health of many more individuals.
  - The data collected as part of these efforts will also help to uncover the basic biological function of genes and their interactions, which are not yet fully understood. This knowledge will be useful to humanity worldwide and also offer India a chance to claim a piece of the global medical and scientific frontier.
  - As a large part of the enterprise would be the application of information technology or bio-informatics the prospects of establishing viable commercial enterprises with synergies to existing IT champions are also promising in India.

**What can India do :-**

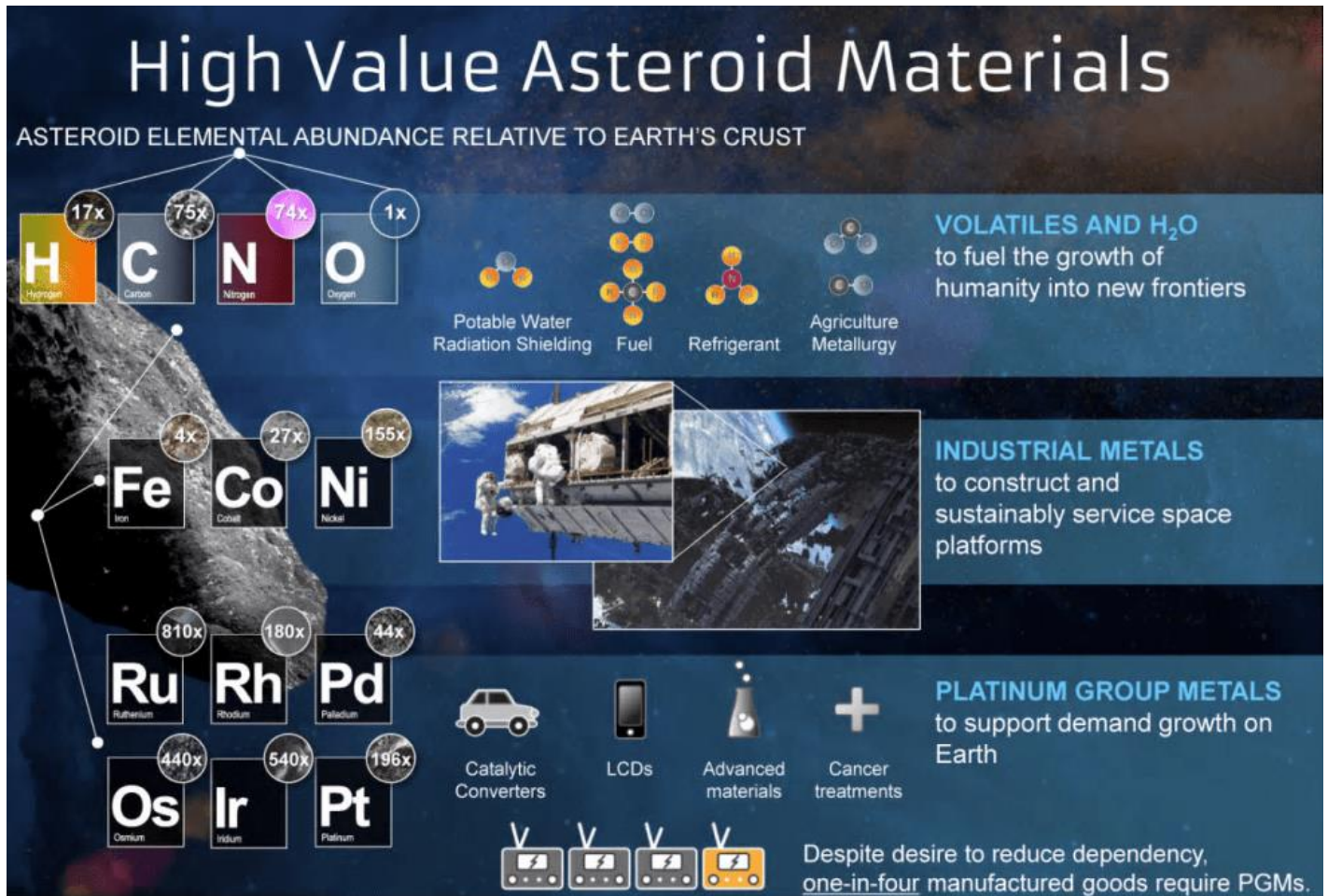
- The age of genomics-informed medicine is now within sight and will also make interventional treatments feasible with the revolutionary advances brought about by the discovery of new gene-editing techniques, such as CRISPR.
- To gain fully from the genomics revolution, **India needs to collect information about the genetics of its population and train manpower capable of interpreting it.**
- **Data bank needed:**
- The **information** that is needed has to come from a large and sustained collection of data fully sequenced individual genomes along with medical histories for the individuals who volunteer for this effort.
- Genetic information to help patients is on a small scale in India so a coherent push is needed at the national level that involves government, academic institutions, the existing health-care industry, the IT industry and the nascent biotechnology industry.
- Indian science allocation has not been growing either. It has been falling. It is 0.8 per cent of the GDP, while in the U.S. it is about 2.8 per cent of GDP. This needs to increase.

Q2) Discuss the potential and challenges of asteroid-mining. (250 Words)

[The Wire](#)

### Asteroid mining:-

- **Asteroid mining** is the exploitation of raw materials from asteroids and other minor planets, including near-Earth objects. Key elements needed for modern industry and food production could be exhausted on Earth within 50–60 years.
- Asteroid mining in particular is regulated, among others, by the Outer Space Treaty and the Moon Agreement.



### Potential:-

- Objective of asteroid-mining is to **find water**. It is also the raw material for rocket propellant.
- An asteroid-mining infrastructure could help to **solve a major impending resource problem**.
- Generating **solar energy** in space will be cheaper than generating energy on Earth through any known method. The energy might then be beamed to the ground via microwaves.
- Looking for elements that are extremely scarce here on Earth. These include gold, silver, platinum, copper, indium, lead, palladium etc
- Resource that would be valuable to Earth is **Helium-3**, an isotope that's a potential fuel source for nuclear fusion.

### Challenges:-

- Number of technological and economic hurdles will need to be overcome. Getting to space is still prohibitively expensive for most nations.
- Space travel prices do plummet. That still leaves asteroid mining companies the heavy lifting of building the necessary off-world infrastructure, like processing facilities that are either in orbit or on another planet.
- **The technological barrier** of building equipment that can handle the rigors of space for decades and perform mining operations with little to no supervision.



- The economic component of asteroid mining looms large over any venture. The cost of developing a mining program, prospecting an asteroid, building infrastructure around a chosen body and setting up an efficient operations regime to deliver materials is staggering.
- High launch and transportation costs of spaceflight
- Inaccurate identification of asteroids suitable for mining, and in-situ ore extraction challenges.
- Late last year, the US government made an attempt to update the law on space mining, producing a bill that allows companies to possess, own, transport, use, and sell extra-terrestrial resources without violating US law. The problem is that putting this into practice violates the OST.

#### **Conclusion:-**

- Recent missions by NASA and the ESA do sound out some hope for the near-term success of off-world mining. Asteroid mining technology might actually be accelerated by humanity's collective need .

**Q3)** Why is Polar Satellite Launch Vehicle (PSLV) one of the world's most reliable space launch vehicles? How is it helping India commercially and technologically? Examine. (250 Words)

#### **The Hindu**

#### **Background:-**

- Polar Satellite Launch Vehicle (PSLV) is the third generation launch vehicle of India. It is the first Indian launch vehicle to be equipped with liquid stages. In the light of the launch of PSLC-C 40 the capabilities of this launch vehicle needs analysis.

#### **Why is it most reliable:-**

- Over the years, the PSLV has played a pivotal role in ISRO's programme, and this February it set a world record **by launching 104 satellites in one go.**
- During 1994-2017 period, **the vehicle has launched 48 Indian satellites and 209 satellites for customers from abroad.**
- **39 consecutive successful launches**
- Due to its unmatched reliability, **PSLV has also been used to launch various satellites into Geosynchronous and Geostationary orbits**, like satellites from the IRNSS constellation.

#### **How it helps India:-**

- The 4-stage craft has also launched 209 foreign satellites since 1999. **Between 2013-15, these foreign satellite launches fetched ISRO \$101 million.**
- PSLV has successfully carried India's high-prestige payloads including its first lunar probe, Chandrayaan-I (2008), the Mars Orbiter Mission (2014) and Astrosat (2015), India's first space observatory.
- It launched a record number of 104 satellites in one go
- PSLV further met with a remarkable success in 2017, when it launched 30 nano-satellites along with military surveillance satellite, Cartosat-2.
- Marketed as the world's cheapest launch vehicle, PSLV has seen a boost in orders through the past decade, especially after the Mars-orbiter Mission. **Compared to European Union's Ariane and SpaceX's Falcon 9, PSLV launches cost far less.**
- As ISRO is engaging in frequent launches and have the capacity to carry small foreign satellites along with the primary satellite, **PSLV is the best choice available in the market.** By carrying small foreign satellites, India is also able to cut the cost of launches.
- Today, the four-stage PSLV operates in three variants, the PSLV Core Alone, PSLV Generic, and PSLV XL. The latter two come with an additional set of strap-on boosters, which allow the PSLV to carry a bigger payload.

#### **Concerns :-**

- The PSLV-C39 mission carrying the replacement navigation satellite IRNSS-1H failed .This was the PSLV's first failure after 39 continuously successful launches and only the second such instance since 1993.
- The failure may somewhat dent the image that the PSLV commands in the global small-to-medium launchers market.

Q4) Unlike all other chromosomes, which we have two copies of in each of our cells, Y chromosomes are only ever present as a single copy, passed from fathers to their sons. What are the salient features of Y-chromosome? Who do researchers believe that Y-chromosome is heading for extinction? Examine. (150 Words)

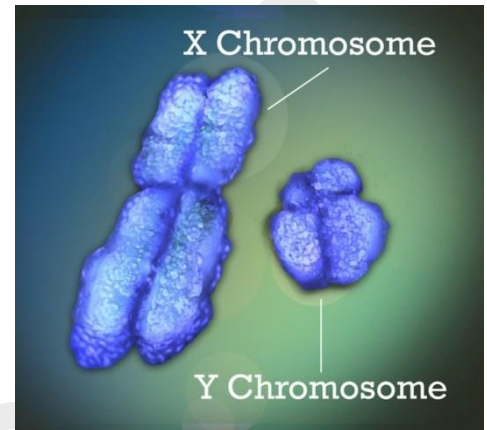
#### The Wire

#### Background:-

- The X and Y chromosomes, also known as the sex chromosomes, determine the biological sex of an individual. However much research has been done on Y chromosomes raising several questions.

#### Salient features of Y chromosomes :-

- The Y chromosome may be a symbol of masculinity, but it is becoming increasingly clear that it is anything but strong and enduring.
- It carries the “master switch” gene, SRY, that determines whether an embryo will develop as male (XY) or female (XX)
- However it contains very few other genes and is the only chromosome not necessary for life.
- Women do not have it.
- Y chromosomes have a fundamental flaw. Unlike all other chromosomes, which we have two copies of in each of human cells, Y chromosomes are only ever present as a single copy, passed from fathers to their sons.



#### Reasons why scientists believe that it is heading for extinction are:-

- The Y chromosome has degenerated rapidly, leaving females with two perfectly normal X chromosomes, but males with an X and a shrivelled Y.
- If the same rate of degeneration continues, **the Y chromosome will disappear completely in 6 m years .**
- Y chromosomes are present as a single copy so **it cannot undergo genetic recombination** which is the shuffling of genes that occurs in each generation which helps to eliminate damaging gene mutations. Therefore **Y chromosomal genes degenerate over time** and are **eventually lost from the genome.**

#### However that's not the case:-

- Despite this concerns the recent research has shown that the **Y chromosome has developed some mechanisms which are slowing the rate of gene loss to a possible standstill.**
- **Scientists** found that Y chromosome is **prone to large scale structural rearrangements allowing “gene amplification”** which is the acquisition of multiple copies of genes that promote healthy sperm function and mitigate gene loss.
- The Y chromosome has developed **unusual structures called “palindromes”** (DNA sequences that read the same forwards as backwards ) **which protect it from further degradation.**
- They recorded a **high rate of “gene conversion events”** (which is basically a “copy and paste” process that allows damaged genes to be repaired using an undamaged back-up copy as a template) within the palindromic sequences on the Y chromosome .
- Y-chromosome gene amplification is a general principle which is taking place in other species which have Y chromosomes as well. **These amplified genes play critical roles in sperm production** and (at least in rodents) in **regulating offspring sex ratio**



Q1) We want economic growth that is 'green'—without damaging or destroying the environment. At the same time, we want improvement of the environment without stopping innovation and economic growth. What are the solutions that can help nations to protect their environment without hurting their economies? Discuss. (250 Words)

[Livemint](#)

**Background:-**

- Around the world climate has already deteriorated to such an extent that it has become costly to society and even dangerous to life
- For instance the violence of hurricanes has risen following the rise of water temperature in the Caribbean. Air quality is deteriorating noticeably around the world. And rising sea levels are threatening many low-lying cities.
- So it has become imperative to balance environment sustainability and economic development

**Solutions for protecting environment without hurting economies :-**

- **India:-**
  - To make the right choices, India needs to have as much information as possible about the environmental impact of development to make intelligent trade-offs, and sustainable choices. For instance the debate on coal versus natural gas as a source of power.
  - India needs to create new institutions or bolster existing ones to drive greater vigilance, compliance and enforcement of environmental laws and policies.
- **Revamping institutions:-**
  - In most countries, there are agencies that ensure compliance and enforcement such as the Environment Agency in the UK and the Federal Environment Agency in Germany.
  - In India, even though Central Pollution Control Board (CPCB) and the associated State Pollution Control Boards (SPCBs) are present these entities need to be revamped to gear up for the challenges ahead.
- **International support:-**
  - India should find ways to mobilize public and governmental support in developed countries to ensure that a balanced outcome can be achieved.
  - It should therefore work with foreign governments and global organizations to find ways and means of subsidizing clean fuel and cleaning our rivers and aquifers.
  - Developed countries can invest in better technology for themselves as well as invest in under-developed nations to improve their quality of life; thus focusing all nations towards a more sustainable future.
- **Reforming laws:-**
  - While India's fundamental environmental laws are comprehensive it lacks an active entity that focuses exclusively on ensuring these laws are adhered to right at the beginning, during the planning process.
  - Many individuals take advantage of loopholes in licensing processes.
- preserving "natural capital" would raise the rate of return on capital in the business sector
- **Innovative solutions:**
  - Regenerative agriculture needs to be encouraged.
  - There is a need to create a marketplace in which the captured carbon is sold for commercial use.
  - Organic farming:-
    - Sikkim becoming India's first fully organic state shows the importance of organic farming for environmental sustainability
  - New forms of farming like hydroponics and aquaculture could go mainstream in a few decades.
  - Treating industrial wastes before discharging into rivers
  - If made profitable, these innovations could create an incentive for private actors to undertake carbon capture far beyond what a national government could afford to conduct.

- **Green initiatives:**

- By following steps like switching from non-renewable to renewable sources of energy and materials targeting cleaner production, maximising recycling and reuse of wastes and environmentally sound product design, enterprises can significantly work towards sustainable growth.
- Government push for electric vehicles need to be seriously looked into India wants only electric vehicles to run on its roads by 2030. Investment in clean transport needs to increase so that people use more public transport.

- **Awareness :-**

- Other agricultural awareness among farmers to cultivate crops based on the soil and water availability like sugarcane cultivation is not suitable in Maharashtra.
- At the societal level people need to be educated regarding the importance of environment especially in terms of waste treatment and trying to keeping the premises clean thus following the concept of reduce-reuse-recycle.

- **International examples:-**

- **Example from Singapore:**

- SWITCH With Maybank at Central Singapore, engages volunteers to provide low-income households in the Central Singapore District with energy efficient lightbulbs. This had huge benefits .India can learn from this.

- **Example of China:-**

- Solving China's problems requires an approach that integrates ecological and social planning

- **Municipality reforms:-**

- Reforms should feature new property taxes and municipal bonds that will **provide increased fiscal support to local governments** to help wean them off profits gained from paving over arable land.
- China must also embrace a paradigm shift in water policy from a focus on engineering solutions, such as massive canal and dam projects, to an ecosystem-based approach that encourages coordination between government institutions.

**Way forward:-**

- Instead of leaving the quagmire for a later "developed" day, India must adopt a "green vision" as part of the development agenda in full earnest today. The time has indeed come to add "swachh paani" and "hawa" to "roti-kapada-makaan-aur-bijli", so India can begin its journey towards sustainable growth from today.

Q2) With the rate of zoonotic diseases (pathogens that jump from animals to humans) on the rise, migratory animals have been under increasing suspicion of aiding the spread of devastating diseases such as bird flu, Lyme disease and even Ebola. Examine if it's right to put blame squarely on migratory birds for increase in the rate of zoonotic diseases. (150 Words)

[The Wire](#)

**Background:**

- Scientists estimate that more than 6 out of every 10 known infectious diseases in people are spread from animals, and 3 out of every 4 new or emerging infectious diseases in people are spread from animals.
- Emerging zoonoses with pandemic potential are a stated priority for the global health security agenda, but endemic zoonoses also have a major societal impact in low-resource settings. Although many endemic zoonoses can be treated, timely diagnosis and appropriate clinical management of human cases is often challenging.

**Blaming the migratory birds is right:-**

- Pathogens seem to pose some costs on their migratory hosts, which would reduce the chances of migrants spreading pathogens, but perhaps not enough of a cost to eliminate the risk completely.

- Migratory birds facilitate the movement of ticks to new territories. Avian migration has opened the door for many diseases to spread over vast distances each year by carrying disease vectors such as ticks, or by the birds being themselves infected by the disease and spreading it to others as they migrate.
- According to study by Cohen et al in US In the spring of 2013 and 2014 they captured 3,844 birds, of 85 different bird species that were returning north for the summer. Out of these 137, about 3.56%, were infected with ticks.

#### Its not right to blame these birds:-

- **These suspicions are bad for migrating animals**, because they are often killed in large numbers when considered a disease threat. They are also bad for humans, because blaming animals may obscure other important factors in disease spread, such as animal trade.
- Pathogenic microbes are surprisingly bad at expanding their range .**Microbes find it difficult to thrive when taken out of their ecological comfort zone.**
  - For instance Bali might just be a tad too hot for a Tasmanian parasite to handle.
- **There is in fact surprisingly little direct evidence that migrants frequently spread pathogens long distances.** This is because migratory animals are notoriously hard for scientists to track. Their movements make them difficult to test for infections over the vast areas that they occupy.
- Migratory animals must work exceptionally hard to travel. Migrant animals may have to be at the peak of health if they are to survive such gruelling journeys. **If a sick animal can't migrate, then neither can its parasites**
- According to studies migratory shorebirds are exceptionally good at resisting invasion from ingested microbes, even after flying thousands of kilometres .

#### Way ahead:-

- There is no doubt that migrants are involved in pathogen dispersal to some degree, but there is increasing evidence that humans shouldn't jump the gun when it comes to blaming migrants.

Q3) What is surface ozone (O<sub>3</sub>)? Why is it considered as a neglected and dangerous pollutant? Examine. (150 Words)

#### The Hindu

#### Background:-

- **In India, pollution discussion is mainly concentrated with particulate matter but ground level ozone/surface ozone is equally hazardous .A recent study shows that the O<sub>3</sub> levels will continue to rise drastically particularly in North India.**

#### Surface ozone:

- Ground level or "bad" ozone is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOC) in the presence of sunlight.
- Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NO<sub>x</sub> and VOC.

#### Why is it a Dangerous pollutant :-

- Breathing ozone can trigger a variety of health problems, particularly for children, the elderly, and people of all ages who have lung diseases such as asthma.
- Ground level ozone can also have harmful effects on sensitive vegetation especially during the growing season and ecosystems including forests, parks, wildlife refuges and wilderness areas
- It is the main ingredient in "smog."
- According to data by 2050's ozone levels will increase by up to 4.4% in many places in north India particularly Uttar Pradesh.
- Due to this there will be a decrease over forest patches of the Western Ghats in the south of 3.4%
- Climate change will adversely impact soil, moisture, rains ,vegetation density etc. which will further impact the absorption of ozone .
- Man made sources like vehicles, power plants or machines which uses fossil fuels where the O<sub>3</sub> component will increase by up to 45% in parts of North India.

### Way forward :-

- A policy is necessary to successfully reduce the effect of this pollutant.

Q4) What solutions are needed to prevent the growing number of roadkills of protected wildlife in Indian forests? Also discuss why it's necessary to act urgently. (250 Words)

### The Hindu

### Background :-

- An assessment by the Wildlife Institute of India states that tigers in at least 26 reserves face the destructive impact of roads and traffic. Other animals also face similar situation.

### Why it is important to consider about the issue and why it is necessary to act:-

- **Building unsuitable roads** through wildlife habitats has a terrible cost especially when species are protected.
- Good scientific advice to keep them out of wildlife corridors is mostly ignored.
- Protected areas are just 4% of the land. India is committed to such an approach under Article 14 of the Convention on Biological Diversity.
- Indian field research studies have documented that the spectrum of wildlife killed or injured ranges from small invertebrates, frogs, and reptile species many found nowhere else in the world to birds and large mammals such as deer, leopard, tiger, and elephant.
- Estimates from a few studies put it at around 10 animals killed per kilometre per day.

### Legal:-

- There are also Sections 428 and 429 in the Indian Penal Code which make it illegal of main or cause injury to any animal.
- If you do injure the animal, you're expected to pay a fine of Rs. 10.
- For road-kills, the punishment is a fine of Rs. 2000 and/or a jail term of up to five years. So there is not much consideration for animal's life and these punishments/penalties are insignificant.
- The scientifically documented negative ecological impacts of roads through PAs are many, and include:
  - Wildlife killed by speeding vehicles (Road Kills)
  - Disruption of wildlife corridors
  - Modification of animal behaviour, affecting natural movement patterns

### Solutions needed are :-

- Although important for economic development, excessive road expansion into wildlife habitats, and roads that are poorly planned and do not integrate wildlife safety into their planning, will cause irreparable harm to wildlife. Integrated conservation planning that provides long-term solutions for reducing the impacts of linear intrusions like roads on wildlife need to be urgently developed for the country.
  - The sensible response to the growing number of roadkills should be to **stop road construction in wildlife habitat** and reassess the impact.
  - The Centre and the National Highways Authority of India have been repeatedly advised by the National Board for Wildlife, as well as independent researchers, to **realign or modify sensitive roads**.
  - **Curbs should be imposed on traffic on existing roads passing through sanctuaries**. This can be done using speed restraints and by allowing only escorted convoys, with a ban on private vehicular movement at night.
- The **National Tiger Conservation Authority should insist on modification of existing roads to provide crossings for animals at locations identified in various studies**.
- A more robust approach would be to realign the roads away from all such landscapes.
  - **Users can be asked to pay a small price for the protection of vital environmental features, and more areas for nature tourism can also raise revenues**. This would ensure that tigers and other animals are not isolated, and can disperse strong genetic traits to other populations.
- In highways , combination of realignment and **creation of long underpasses** for animal movement.
- Restrictions should be applicable to religious tourism as well.
- **Infra-red animal detection systems coupled to mobile messaging technology** can alert train drivers and help prevent track deaths.

- Structural modification of power line heights and visibility in risk-prone areas can save elephants and birds from electrocution.

Q5) Examine why and how soils can serve as a sink for carbon dioxide? Discuss why ability of soils to sequester carbon as a win-win strategy must be recognised by policymakers. (250 Words)

[The Hindu](#)

#### **Why and how soils can serve as sink for Carbon dioxide?**

- Since **atmospheric concentrations of carbon dioxide have crossed 410 parts per million** and oceans are already turning acidic soil is a viable alternative for storing carbon.
- **Increasing soil carbon offers a range of co-benefits**
- **Significant carbon pools on earth are found in the earth's crust**, oceans, atmosphere and land-based ecosystems. **Soils contain roughly 2,344 Giga tonne** of organic carbon, making this the largest terrestrial pool.
- It's thought that the earth beneath is holding up to three times as much carbon as is found in the atmosphere.
- Planting more annual crops and reducing tillage are some of the ways that soil can be encouraged to hang on to more carbon.

#### **Concerns:-**

- However still scientists do not know much knowledge about the soil as a carbon sink
- Studies emphasise that a lot more research into soil composition and soil cycles is needed if world is going to rely on it to counterbalance global warming effects

#### **Win Win strategy :-**

- Increasing Soil organic carbon through various methods can improve soil health, agricultural yield, food security, water quality, and reduce the need for chemicals.
- Approaches to increase SOC include reducing soil erosion, no-till-farming, use of cover crops, nutrient management, applying manure and sludge, water harvesting and conservation, and agroforestry practices. These are the practices which are needed to revamp agriculture giving impetus to schemes like Soil health card, Paramparagat Krishi Vikas Yojana and sustain environment as well.
- An increase of just 1 tonne of soil carbon pool of degraded cropland soils can increase crop yield by several kilograms per hectare.
- Moreover, carbon sequestration in soils has the potential to offset GHG emissions from fossil fuels by up to 15% annually so India can keep its climate change commitments as well.
- Many scientists say that regenerative agricultural practices can turn back the carbon clock, reducing atmospheric CO<sub>2</sub> while also boosting soil productivity and increasing resilience to floods and drought. Such regenerative techniques include planting fields year-round in crops or other cover, and agroforestry that combines crops, trees, and animal husbandry.

Q6) What are the dangers faced by the Great Barrier Reef? Discuss its natural and cultural significance and measures needed to save it from extinction. (250 Words)

[The Hindu](#)

#### **Background:-**

- Recently Australia called on the world's top scientific minds to help save the Great Barrier Reef, offering hundreds of thousands of dollars to fund research into protecting it.

#### **Dangers faced :-**

- The UNESCO World Heritage-listed reef is reeling from **significant coral bleaching due to warming sea temperatures linked to climate change.**
- Pollution and dredging
- Poor water quality from land-based run-off leading to impacts like outbreaks of crown-of-thorns starfish.



- Coastal development is affecting coastal habitats that support the Reef and producing damaging urban run-off, litter and marine debris.
- Illegal fishing and poaching
- The reef is also threatened by storms, coral bleaching and ocean acidification
- Shipping accidents continue to be perceived as a threat, as several commercial shipping routes pass through the Great Barrier Reef.
- Tropical cyclones are a cause of ecological disturbance to the Great Barrier Reef. The types of damage caused by tropical cyclones to the Great Barrier Reef is varied, including fragmentation, sediment plumes, and decreasing salinity following heavy rains (Cyclone Joy).

#### **Natural significance :-**

- It is one **of the greatest, and most splendid natural treasures that the world possesses.**
- **One of the 7 natural wonders of the world.**
- **Largest living structure on the planet**, so big it's visible from space.
- **World's largest coral reef** stretching 2,300 kilometres along the Queensland coastline and covering an area of 344,400 square-kilometers.
- **World Heritage** Listed in October 1981. 7% of the World Heritage area is made up of coral reefs.
- It also holds great scientific interest as the **habitat of species such as the dugong** ('sea cow') and the large green turtle, which are threatened with extinction.
- **No other World Heritage property contains such biodiversity.** This diversity, especially the endemic species, means the GBR is of enormous scientific and intrinsic importance.
- **Provides some of the most spectacular scenery on earth.**

#### **Cultural significance:-**

- The Great Barrier Reef is important in the history and culture of Australia's Aboriginal and Torres Strait Islander peoples.
- Important cultural sites and values exist on many islands and reefs in the Great Barrier Reef Region
- Animals such as dugongs and turtles have long been part of Aboriginal dreaming and are important in many aspects of Aboriginal and Torres Strait Island culture.

#### **Measures needed to conserve it are :-**

- Recently the Australian government has announced Reef 2050 Long-Term Sustainability Plan and an extra \$100 million for a long-term plan to protect the reef, which would go to landowners near the reef to improve water quality. This needs effective implementation.
- **Permanently ban all dumping of dredge spoil in the Great Barrier Reef World Heritage Area.**
- **Make the Great Barrier Reef Marine Park Authority (GBRMPA) responsible for all aspects of the reef again, including fishing and ports**
- Dramatically increase funding to restore the GBR.
- Place a moratorium on coal.

Q7) Every year, thousands of sea turtles are accidentally captured, injured or killed due to various reasons. Examine what conservation measures are needed to protect sea turtles in India. (150 Words)

#### **The Hindu**

#### **Background:**

- The role of turtles in maintaining the balance of ocean ecosystem is very significant but there are incidents of their deaths increasing especially when turtles begin migrating to their nesting grounds on beaches and in fishing areas that are their feeding grounds.

#### **Reasons for deterioration are :-**

- **By catch**
  - Mechanised boats, trawl nets and gill nets are operated and used by commercial fishermen.

- Nets remain underwater for long periods so trapped turtles are unable to resurface to breathe and hence die from exhaustion and drowning.
- Fatal wounds are often caused by contact with the **high-speed propellers of shipping vessels, resulting in a slow, painful death from bleeding and exhaustion.**
- **Habitat modification and loss :**
  - Sand mining, beach pollution and coastline construction impact marine turtle populations, as does artificial lighting
- **Habitat loss and degradation :-**
  - Exploited for the pet trade as well as for their meat, shells and oil to be used as ingredients in traditional systems of medicine.
  - In addition, eggs and hatchlings face the threat of depredation from crows, dogs and other feral animals.
- Ineffective implementation of laws.

#### Conservation measures needed are:-

- Scientists are now working on programmes such as new fishing nets and gear that reduce the amount of by catch while fishing.
- **Integrated conservation measures like:-**
  - **Beach patrolling, beach clean-ups, protection of eggs in hatcheries** as well as community awareness initiatives that aim to galvanize the local populace to actively participate in turtle conservation.
  - Conservation strategies for freshwater turtles must focus on **enforcement of the Wild Life (Protection) Act.**
  - **Raising awareness about turtle trade**, avoiding the buying of turtles as pets and discouraging others from doing so can make a difference.
- **Implementation of laws needs revamp:-**
  - Under current regulations, mechanised trawl boats are not allowed to operate within 8 km of the shore in Andhra Pradesh, 5.5 km in Tamil Nadu and 5 km in Odisha. **However, these limits are not being enforced.**
  - Similarly, nets set for ray fish are banned under the law during the season. However, their use by some categories of fishermen is widespread.
  - **The ban needs to be enforced at all levels of fishing and monitored by the respective Fisheries departments, marine police and the Indian Coast Guard. All areas where fishing boats land need to be monitored.**
- **Lessons from other countries:-**
  - In the U.S, all trawl shrimp fishing vessels need to be equipped with turtle excluder devices or TEDs with large escape openings for turtles.
  - All trawl boats should be fitted with a vessel monitoring system that must be kept on at all times. This will provide a simple system of monitoring by the Coast Guard.
- **There are closed seasons for certain types of fishing vessels.**
  - Areas where sea turtles forage and congregate need to be identified and additional seasonal closures need to be implemented within these areas.

Q8) Out of the 180 countries assessed, India ranks low in the Environmental Performance Index (EPI) 2018. Analyse the reasons for this low rank. (250 Words)

[The Hindu](#)

#### Background:-

- India ranks low in the Environmental Performance Index (EPI) 2018, slipping from rank 141 in 2016, to 177 in 2018.

#### Reasons for low rank are:-

- **Big gap between policy goals and action:-**
  - The government has gone back on its promise of implementing strict power plant emission norms by December 2017, and may even dilute the norms.
  - Full conversion to electric vehicles is realistically possible only by 2047.
  - Annual electronic waste collection target of 30% of the products sold in the market has now been relaxed to 10%.

- **CAG report**-criticised government for not developing an action plan and for its poor utilisation of allocated funds in the clean-up of the Ganga.
- Too much **focus on economic imperatives** is leading to environment degradation.
- **Lack of political will** to implement even existing environmental laws and regulations.
- **There have been instances of grabbing of forest land by private conglomerates, illegal mining etc.**
- **Environmental impact assessment is not effectively done.**
- The current state of the country's air quality reveals that only seven cities come under the satisfactory annual average **air quality**, as per the latest report by the Central Pollution Control Board (CPCB).
  - Pollution from solid fuels, coal and crop residue burning, and emissions from motor vehicles continues to degrade the air quality for millions of Indians.

#### **Measures taken recently show that India is moving in the right direction:-**

- In 2015, government notified new, strict environmental standards for coal-fired power plants, to be effective from 2018.
- An aggressive target was set to implement Bharat Stage VI emission norms from April 1, 2020, skipping Stage V norms.
- In 2017, a road map was being prepared so that only electric vehicles would be produced and sold in the country by 2030.
- The target under the National Solar Mission for setting up solar capacity was revised from 20 GW to 100 GW by 2021-22.
- The Centre has also assured the Supreme Court of India that the highly polluted Ganga will be cleaned up by 2018.

#### **Reforms needed are:-**

- In terms of curbing dust pollution from roads and construction work, there is a need for action plan for the creation of green buffers along the traffic corridors.
- Experts suggested mechanised vacuum sweeping of roads as well especially in urban areas.
- With commitments under Paris climate change agreement, India focussing on solar energy the fruits are to bear in the years to come.

Q9) Discuss the merits and demerits of the compensatory afforestation programme. (250 Words)

#### **The Wire**

#### **Compensatory afforestation programme :-**

- Compensatory Afforestation (CA) refers to afforestation and regeneration activities carried out as a way of compensating for forest land diverted to non-forest purposes. Here "non-forest purpose" means the breaking up or clearing of any forest land or a portion thereof for-
  - the cultivation of tea, coffee, spices, rubber, palms, oil-bearing plants, horticultural crops or medicinal plants;
  - any purpose other than reafforestation;

#### **Merits:**

- Since forests are being diverted routinely (at the rate of about 20,000-25,000 ha per year according to the Ministry of Environment and Forests) a large sum of money is accruing to the government. **It is to manage this money, and to use it for the designated purposes, that CAMPA is proposed to be set up**
- The legislation will allow states to access nearly 42000 crore rupees that is lying idle and channel it into afforestation projects.
- Compensatory afforestation purports to be a 'win-win' solution: a win for the environment because **lost forests are compensated for**, and a win for business because these **forests can be traded on international carbon markets for their value as carbon sinks**.
- It has provisions **or administration of funds and utilization of funds by the user agencies to undertake plantations**, protection of forests and forest-related infrastructure development.
- The adverse impacts of diversion of forests will get mitigated.
- Will create the much-needed employment opportunities in tribal areas.

- It will result in increase of green cover and creation of productive assets.

#### **Demerits:-**

- Programme will **affect rights granted under the Forest Rights Act (FRA), 2006** by decimating the rights of forest dwelling communities .
- There is **difficulty in finding land**, especially in smaller states, and in heavily forested ones like Chhattisgarh.
- It seeks to use the money for the Green India Programme, wildlife protection and for infra development, etc **which were not the original purposes of creating the fund.**
- **Mis-utilisation of funds and lack of accountability**
- **No community participation**
  - The affected forest communities have no say in the management of CAMPA funds.
  - There is no long-term involvement of locals/tribals with the plantations.
- It allows for an unconstitutional exercise of eminent domain the **principle that the government ultimately has rights over all land in the country**
- Arrangements for land acquisition under the CAF Act **violate existing land acquisition procedures in India.**
  - CAF Act includes no legal provisions that can penalise misuse of land acquired.
  - It also doesn't provide for any accountability mechanisms that oversee plantations.
  - Studies already reveal a startling number of 'ghost' plantations – plantations listed on the government's 'e-Green Watch' website that simply don't exist.
- **Compensatory afforestation renders the forest/non-forest distinction meaningless.**
  - On the one hand, forest land is being clear-felled at lightning speed. While on the other, the forest department is acquiring more and more land under the ruse of compensatory afforestation.
- It's not just 'non-forest land under the FCA' that stands to become forest. **Any and all other types of non-forest land qualify under the scheme.**

#### **Conclusion:-**

- Restoring degraded forest land and wildlife corridors should be the top priority.
- The Act must be harmonised with the extant laws to minimise litigation.
- The top-down bureaucratic approach should be replaced with democratic decentralisation.

#### *Topic: Challenges to internal security through communication networks, role of media and social networking sites in internal security challenges*

Q1) The social media platforms such as twitter are increasingly polarising the world and their claim of being neutral facilitators of online communication is dubious. Comment.  
(250 Words)

#### The Hindu

#### **Background:-**

- Social networking sites have integrated into the daily routine of millions of Indian users. Though social media platforms have been used successively for mobilising people for movements like Arab uprising, India against corruption movement etc. they are largely coming under scanner.

#### **Social media platforms polarize and are dubious because:-**

- **Political:**
  - **Use of technology to alter voters attitude regarding the election:**
    - A news site investigation in the Philippines's 2016 presidential election discovered a machine of paid trolls, fallacious reasoning and propaganda techniques that had helped shift attitudes towards both candidates.
    - During US elections there was use of these platforms by Russian hackers and others to spread misinformation and skew elections.
  - Social media as the main channel of hoax dispersal in Indonesia. These findings reaffirm the powerful role of digital technology in manipulating political dynamics.

- **Social media has transformed into a platform where post-truth politics and computational propaganda overlap**
- Irresponsible utilization of social media as a political tool will further intensifies divisions between political groups, and even worse, **magnifies narrow-mindedness among society.**
- **Social effect:-**
  - **Rumours that confirm people's biases are now believed** and spread among millions of people
  - **People tend to only communicate with people that they agree with**
  - Online discussions quickly descend into **angry mobs**
  - Because of the speed and brevity of social media, people are forced to jump to conclusions and **write sharp opinions.**
  - The networks make information run so fast that it outruns fact-checkers ability to check it. **Misinformation spreads widely** before it can be downgraded in the algorithms.
  - The target group especially youth prefers spending an abundant amount of time on these social networking sites which **keeps them away from their own purpose of existence and interacting with their own natural surroundings.**
  - Their social gatherings are hampered because surfing these social networking sites keep them more involved for which they are bound to ignore other significant social events in their lives..
  - **Terrorist organizations** using social media platforms to propagate their ideas and radicalize youth.
  - **Cyber bullying, cyber stalking,** misusing social media platforms for extortion of money, misusing photos of women has been on rise showing that social media is polarizing the world.

#### Suggestions:

- The ability to filter vast amount of digital information should be a pre-requisite for all internet users in a world where social media is intertwined with electoral politics.
- Social media platforms need to come together and take action against fake news circulation and be accountable
- **Germany**, which witnessed a disturbing rise in racist, anti-immigrant hate speeches, enacted a law that would force social media companies to crack down on hate speech on their digital platforms.
  - The new German law aims at regulating social media platforms to ensure they remove hate speech within set periods of receiving complaints.
  - Fines of up to €50 million can be imposed on social media platforms that fail to comply
  - India must learn from and build on this model.

### Top 5 Fake Election Stories by Facebook Engagement (three months before election)

**"Pope Francis Shocks World, Endorses Donald Trump for President, Releases Statement"**  
(960,000, *Ending the Fed*)

**"WikiLeaks CONFIRMS Hillary Sold Weapons to ISIS... Then Drops Another BOMBSHELL! Breaking News"**  
(789,000, *The Political Insider*)

**"IT'S OVER: Hillary's ISIS Email Just Leaked & It's Worse Than Anyone Could Have Imagined"**  
(754,000, *Ending the Fed*)

**"Just Read the Law: Hillary Is Disqualified From Holding Any Federal Office"**  
(701,000, *Ending the Fed*)

**"FBI Agent Suspected in Hillary Email Leaks Found Dead in Apparent Murder-Suicide"** (567,000, *Denver Guardian*)

ENGAGEMENT REFERS TO THE TOTAL NUMBER OF SHARES, REACTIONS, AND COMMENTS FOR A PIECE OF CONTENT ON FACEBOOK SOURCE: FACEBOOK DATA VIA BUZZSUMO

**Topic: Various Security forces and agencies and their mandate**

Q1) Critically analyse how has India's acute dependence on imported arms and ammunition eroded combat readiness of its armed forces and its stature as net security provider in the region. (250 Words)

[The Indian Express](http://www.insightsonindia.com)

[www.insightsonindia.com](http://www.insightsonindia.com)



### Background :-

- India is facing a precarious situation of being a nuclear-weapons state with the world's fourth-largest armed forces, but having to support their operational needs through massive arms imports.

### How India's acute dependence on imported arms and ammunition eroded combat readiness of armed forces and cannot be a net security provider:

- India's acute dependence on imported arms and ammunition will constitute a grave handicap and **vulnerability in a conflict**. Other foreign suppliers may prove equally unreliable in wartime.
- The **Chinese army** constitutes the world's largest military organisation, with formidable capabilities in the conventional, nuclear, cyber, maritime and space domains. With China supplying arms to Pakistan India is at a critical situation and may cost India vis-a-vis future machinations of the China-Pak axis.
- There is **greater threat of cyber attacks** in the current world and India is already one of the vulnerable countries to be attacked.
- The **quality of imports has also been under question** due to delays in deals like Dassault Rafale fighter jet, Scorpene data leak etc.
- India's continuing dependence on foreign arms, coupled with a dysfunctional acquisition process has eroded the combat readiness of Indian armed forces. **Foreign arms purchases have also engendered a morally-corrosive system of corruption at many levels.**
- Studies show that soldiers still do not have modern arms and ammunition**
- India has tried to encourage private companies to make arms in India, both in partnerships to the government and independently, but few of these efforts have succeeded.
- Because of poor infrastructure, stultifying labour rules and difficulties acquiring real estate, making anything in India is hard. The country's manufacturing sector is declining .
- In spite of a vast military-industrial complex, with a large pool of DRDO scientists and a network of sophisticated laboratories, backed by advanced production facilities of the defence PSUs.
- Due to ineffective arms and ammunition the armed forces cannot be net security provider in the region. When is already spending on the imports how can it provide security in the region.

### Measures being taken :-

- Indian industry can suggest projects related to sub-systems for innovation and import substitution under the revised Make-II procedure in the Defence Procurement Procedure. This will greatly help small industries involve themselves in manufacturing defence equipment.
- The defence arm of the Tata Group has **signed an agreement** with **American** firm **Lockheed Martin** to produce and export new generation F-16 fighter jets.
- Reliance Defence Ammunition, a wholly owned subsidiary of Reliance Infrastructure, and Yugoimport, a Serbian state-owned company, have inked a strategic partnership to manufacture ammunition in India
- The potential for greater indigenisation and the large Indian market size, the economies of scale proffered by the partnership opened up new options for exports.
- The Joint venture between Reliance Defence and Thales is being set up to develop Indian capabilities to integrate and maintain radars and manufacture high-performance airborne electronics

### Way forward:-

- Shekatkar committee** had made recommendations on enhancing the combat potential of India's three armed forces, rationalising the defence budget, and improving the teeth-to-tail ratio.
- A number of committees on acquisition reforms, primarily the **Kelkar committee** in the past ,have talked about establishment of an enhanced procurement organization modelled on Direction Générale de l'Armement (DGA) of France.
- The Dhirendra Singh Committee is of the opinion that for the Indian industry to contribute meaningfully to 'Make in India', the procurement system needs to move towards indigenous design, development and production or 'Make' projects
  - The Committee is also of the firm opinion that for the local industry to grow, the current approach of the procurement system towards single vendor situations needs a relook.
  - To provide liberalised funding to MSME through the MoD's proposed Technology Development Fund (TDF).

Q1) Recently, a new sweeping two-tier security system for the Aadhaar programme was announced by the Unique Identification Authority of India (UIDAI). Discuss the features of new security system for Aadhaar. (150 Words)

[The Wire](#)

**Background:-**

- Security of Aadhaar has been a contentious issue in the recent years and after a wave of data breaches and leaks raised fresh privacy and security concerns UIDAI came up with the new security system to protect Aadhaar.

**New security system:-**

- Virtual ID is introduced for every Aadhaar holder. It is a temporary 16-digit number that will be mapped to a user's Aadhaar number that will allow the individual in question to avoid furnishing his or her Aadhaar number at the time of authentication.
- VID can be generated through the UIDAI's resident portal, an Aadhaar enrollment centre and the mAadhaar mobile application.
- Creation of a limited KYC (know your customer) service that will purportedly prevent agencies from storing Aadhaar numbers during the paperless KYC process.

**Benefits:-**

- With the introduction of virtual ID (VID), a fungible number mapped to the Aadhaar number, Aadhaar number holders will have an option not to share their Aadhaar number to improve privacy.
- It is not possible to derive the Aadhaar number from the VID.
- Limited KYC will allow agencies to do their own paperless KYC process without access to the Aadhaar number.
- UIDAI has also limited access to stored personal information and mandated the use of unique tokens through which authenticating agencies can access required data. It claims that the measures will strengthen privacy and also prevent combining of databases linked to Aadhaar.
- This is going to be one of the biggest innovations ever, people can change their virtual ID whenever they want or after every authentication or every 10 seconds.
- UIDAI will also provide "unique tokens" to each agency against an Aadhaar number to ensure that they are to establish the uniqueness of beneficiaries in their database such as for distributing government subsidies under cooking gas or scholarships.

**Concerns:-**

- Unless there is complete revocation, some database with Aadhaar numbers will still float around.
- There is no reason why some data controllers should be trusted, the tokenisation should be implemented for everyone.
- New category of so called Global AUAs are exempted from using the virtual IDs, so citizens are not protected almost anywhere that they need to use Aadhaar.

**Way forward:-**

- The widespread fear of misuse of demographic data is heightened by the fact that India still does not have a data protection legislation so the need for the data protection law is heightened.
- Privacy experts and activists were of the view that more needs to be done to ensure foolproof security for critical personal information.

Q2) Is it necessary for the state to access personal and biometric data to combat terrorism and crimes such as money-laundering? Critically examine. (250 Words)

[The Hindu](#)

**Background:-**

- Biometrics are fast becoming an integral part of online security.

- From the familiar fingerprint to cutting-edge retina scanning and facial recognition technology, it is increasingly the go-to mechanism for protecting and providing access to sensitive data including money and confidential account information.

#### Yes:

- Individual ought to have no objection if the state accessed his or her personal data to check if he was paying taxes. If personal information was used only for the limited purpose then citizen need not have any problem.
- Targeted surveillance which is a good thing, and essential for national security and public order
- **International examples:-**
  - Malaysian MyKad system has penetrated into the chip-enabled card being as the single point of identification and authentication in places like ATM kiosks, at toll booths on highways, electronic cash for micropayments and digital certificate as a public identifier.
  - The Monetary Authority of Macau is stepping up its KYC requirements by requiring measures to verify a customer's identity through facial recognition at ATMs. The ATM controls will ensure that banks are able to actually see, and verify, who is withdrawing the money.
- **The anonymity that cash provides, and the lack of an audit trail, makes it difficult to link cash to criminal activities.** A future in which biometric authentication replaces cash may be a breakthrough for those tackling money laundering,
- Aadhaar may also facilitate law enforcement agencies to take care of problem of terrorism to some extent and may also be helpful in checking crimes and also help investigating agencies in cracking the crimes.
- Due to the multiple methods of giving proofs of identity, **the problem of money-laundering arises which is being done to evade taxes under the garb of shell companies by the persons holding multiple bogus PAN numbers under different names. This can be removed by Aadhar.**

#### No:-

- Experts are concerned that there exists a centralized database of your fingerprints and iris scans that can be used by the government and third parties without your knowledge
- Western democracies have been vehemently opposed to centralised biometric databases and identity registries, precisely with regards to prevent the abuse of its citizens right to privacy.
  - The US Social security number was strictly meant for use by government agencies, but its abuse by the private sector has been identified as a crucial link for the rising number of identity thefts in America.
- The rapid development of 3D printing has also contributed to biometrics vulnerability
- Experts say that Aadhaar scheme is a violation of the fundamental right to privacy,
- **A citizen who had parted with his personal data and biometrics was in the dark about how the state was using them and whether or not these were safe at all**
- Biometrics allows for identification of citizens even when they don't want to be identified.
- **Lack of security would put the data at the risk of foreign government, criminals and terrorists using the breached biometric database to remotely, covertly and non-consensually identify Indians.**
- **With increased demands for Aadhaar authentication comes the risk of abuse.** Like the recent alleged Reliance Jio data hack, when a recent report on a website claimed that sensitive details, including mobile and Aadhaar numbers, of millions of subscribers were leaked online.

#### What needs to be done?

- **Open smart card standard:-**
  - Smart cards which require pins on the other hand require the citizens conscious cooperation during the identification process.
  - Smart cards based on open standards allow for decentralized authentication by multiple entities and therefore eliminates the need for a centralized transaction database.

Q3) Write a critical note on the nature and threats posed by cyberweapons, particularly those powered by Artificial Intelligence. (250 Words)

#### The Wire

##### Background:-

- Nations are developing and building weapons based on advanced technology. During the Cold War, the weapon of choice was nuclear missiles; today it's software.
- Cyberweapon is defined as ***an appliance, device or any set of computer instructions designed to offend the person through cyberspace.***

##### Nature:-

- The transitory nature of cyberweapons benefits great powers, changes the incentive structure for offensive cyber cooperation and induces a different funding structure for (military) cyber programs compared with conventional weapon programs
- Different from what leads to a conventional attack, **a cyber attack can be conducted in a silent way in times of peace** and this leads to having to consider the extremely insidious threat that requires a high level of alertness.
- The primary factors of success are the **efficiency and the reduced costs of these type of technologies**. The case of the Stuxnet virus, the real first example of a cyber weapon, has demonstrated the **impact that similar tools could have on critical infrastructures**.

##### Benefits:-

- From a military perspective, it is easier to discover the building of a conventional weapon (e.g. missiles, drones, combat aircraft). **The development of a cyber weapon is hard to identify.**
- The use of cyber weapons is complementary to conventional military strikes. It could be possible to:
  - Support offensive operations destroying enemy defence infrastructures.
  - Probe the technological capabilities of the enemy by evaluating the ability of an agent to infect enemy system.
- The advantages make cyber warfare very attractive for those small states that, despite having reduced funds for military expenses, and are able to compete with the most important countries in the new domain.
- A fast, automated response capability could help ensure potential adversaries know a nation is ready and willing to launch, the key to mutual assured destruction's effectiveness as a deterrent.

##### Threats:-

- In case of an attack, the **AI could act more quickly and** without the potential hesitation or dissent of a human operator.
- **AI can also be used to control non-nuclear weapons** including unmanned vehicles like drones and cyberweapons.
- **AI systems can change targets and techniques faster** than humans can comprehend, much less analyse.
- Not only states but **AI attacks can be made by independent nationalist groups, militias, criminal organisations, terrorists etc** making countries even more vulnerable.
- Artificial intelligence **would not give value to human lives**
- **Electronic national defence systems:-**
  - Through Artificial intelligence hacking a defence system of a country is possible to control its conventional weapons, **for example there is the possibility to launch a missile against the state itself or other nations.**
- **Fully-automated transportation control systems and civil and military air traffic controls** will be increasingly vulnerable for cyber weapons as all those systems do not require conductors or drivers, or give a sensible aid to the conduction and control of transportation.
- **Banking systems and financial platforms :-**
  - Despite being unable to cause the direct loss of human lives, a cyber weapon attack could cause the financial collapse of a nation.
- **Hacking:-**
  - *Artificial intelligence, and machine learning, in particular, are perfect tools to be using on hackers end.*
  - *Artificial intelligence can be used to mine large amounts of public domain and social network data to extract personally identifiable information which can be used for hacking accounts.*

- *It can also be used to automatically monitor e-mails and text messages, and to create personalized phishing mails for social engineering attacks*
- **AI can be used for mutating malware and ransomware more easily**, and to search more intelligently and dig out and exploit vulnerabilities in a system.
- **Other technologies help:-**
  - *Also the availability of large amounts of social network and public data sets (Big Data) helps. Advanced machine learning and Deep Learning techniques and tools are easily available now on open source platforms.*
  - *This combined with the relatively cheap computational infrastructure effectively enables cyber attacks with higher sophistication.*

#### **Conclusion:-**

- The future will be characterized by an intensification of state-sponsored cyber operations. Cyberspace will change deeply, and with it the concept of cyber security. Governments, business and private business must be prepared for the challenge, not underestimating the risks.

#### **Topic: Security challenges and their management in border areas;**

**Q1)** In the light of frequent ceasefire violations witnessed by both India and Pakistan across their borders in Kashmir, which measures would you think help reduce these violations and build peace along the border? Examine. (250 Words)

#### The Hindu

#### **Background :-**

- With the rampant use of high calibre weapons such as mortars and even artillery in the borders in Jammu and Kashmir, civilian casualties and the destruction of their habitats have risen steadily.
- Pakistan has violated the ceasefire over 600 times so far this year, the highest in the last one decade.

#### **How to reduce it :-**

- To reduce the destruction of civilian habitats is to lower the calibre of the violations. The two sides could consider withdrawing heavy artillery to 50 km behind the zero line.
- The two Director-Generals of Military Operations, along with their delegations, could consider holding regular meetings every six months. Data show that every time the leaderships of the armed forces meet, ceasefire violations come down
- Establishing more flag meeting points between local commanders and responding quickly to meeting requests could lead to better communication and reduced misunderstandings resulting in fewer ceasefire violations.
- India could channel more effort into developing capabilities and strategies to exert non-violent pressure on Pakistan to prevent cross-border terrorism. It also comes with far lower risks of an escalating military conflict.
- India can bring pressure on Pakistan to reduce cease fire violations by getting support from international organisations like SAARC, SCO etc
- More avenues for people to people contact need to be encouraged.
- Advance technology like drones, thermal imaging etc can be used to monitor the activities in the border and track any violations beforehand.