

## 7 PM COMPILATION

**3<sup>rd</sup> and 4<sup>th</sup> Week Mar, 2024**

### Features of 7 PM compilation

- ❖ Comprehensive coverage of a given current topic
- ❖ Provide you all the information you need to frame a good answer
- ❖ Critical analysis, comparative analysis, legal/constitutional provisions, current issues and challenges and best practices around the world
- ❖ Written in lucid language and point format
- ❖ Wide use of charts, diagrams and info graphics
- ❖ Best-in class coverage, critically acclaimed by aspirants
- ❖ Out of the box thinking for value edition
- ❖ Best cost-benefit ratio according to successful aspirants

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## India's R&D Funding Status- Explained Pointwise

India's R&D Funding has received a major boost with the announcement of a **corpus of ₹1 lakh crore** in the interim Budget for 2024-25, to bolster the research and innovation ecosystem within the country.

The decision to rebrand the slogan, 'Jai Jawan Jai Kisan' (by Lal Bahadur Shastri) to 'Jai Jawan, Jai Kisan, Jai Vigyan' (A.B. Vajpayee) to now 'Jai Jawan, Jai Kisan, Jai Vigyan, Jai Anusandhan' (by the Prime Minister) is intended to reinforce the foundation of research and innovation for development. However, there is need to scale up India's R&D Funding to make India a developed economy by 2047.

India's R&D sector has demonstrated both positive and negative status in India.

## Comparison of research productivity and innovation metrics in selected countries (2021-22)

Country	Researchers per million inhabitants (2021) (FTE)	PhDs produced annually (2021) (Rank)	Publication output (2022) (Rank)	Top 1% most cited articles (% share)	Patents granted (2022) (Rank)
India	262	40,813 (3)	3,06,800 (3)	0.7	30,490 (6)
The U.S.	4,452	69,525 (1)	15,06,000 (1)	1.88	3,23,410 (2)
The U.K.	4,491	27,366 (5)	2,87,200 (4)	2.35	10,578 (15)
China	1,687	53,778 (2)	9,78,100 (2)	1.12	7,98,347 (1)
S. Korea	9,082	13,882 (11)	1,09,200 (16)	1.02	1,35,180 (4)
Japan	5,638	15,804 (10)	1,71,000 (9)	0.88	2,01,420 (3)

Source: Publications data has been extracted from OpenAlex on February 7, 2024.

Source- The Hindu

### What is the Positive status of India's R&D Funding?

**1. Significant Growth in R&D expenditure-** India's R&D is witnessing significant growth, with a notable increase in Gross Expenditure on Research and Development (GERD) from **₹6,01,968 million in 2010-11** to **₹12,73,810 million in 2020-21**.

**2. Powerhouse in producing academic talent-** India generates an impressive **40,813 PhDs** and is in **third place after the United States and China**. This achievement reflects India's commitment to fostering intellectual capital and contributing significantly to global research endeavours.

**3. Substantial research output as part of R&D investment-** India ranks **third position globally** in terms of scientific and research publication, with over **3,00,000 publications in 2022**.

**4. High number of Patent Grants-** India has also demonstrated commendable performance in patent grants compared to the R&D Funding. India has secured the **sixth position globally** with **30,490 patents granted in 2022**.

**5. Emphasis on Autonomous R&D Laboratories and Institutions-** These autonomous laboratories serve a **pivotal role in driving research and technology** development with strategic implications. According to the R&D statistics (2022-23) of the Department of Science and Technology, India's total investment in R&D reached **\$17.2 billion in 2020-21**. Within this sum, **54% (\$9.4 billion)** is allocated to the government sector and predominantly utilised by **four key scientific agencies** — the DRDO (30.7%), the DoS (18.4%), ICAR (12.4%), and DEA (11.4%). Rest 46% has been used by the autonomous R&D laboratories and Institutions.

#### What is the Negative status of India's R&D Funding?

**1. Low R&D investment as percentage of GDP-** India's R&D investment as percentage of GDP stands at **0.64%**. India falls behind major developed and emerging economies in R&D investment as % of GDP, such as **China (2.4%), Germany (3.1%), South Korea (4.8%)** and the **United States (3.5%)**.

**2. Less Contribution by Private Sector-** In India, the private sector industry contributes only **36.4%** of Gross Expenditure on Research and Development (**GERD**) during 2020–21. In India, **GERD is primarily driven by the government sector** (central government (43.7%), State governments (6.7%), Higher Education Institutions (HEIs) (8.8%), and the public sector industry (4.4%)). In leading innovative economies such as China, Japan, South Korea, and the U.S., **a significant portion (>70%) of R&D funding is from private industries**.

**3. Under-Utilisation of Allocated Funds-** In 2022-2023, the Department of Biotechnology (**DBT**), used only **72% of its estimated budget allocation** on Centrally Sponsored Schemes (CSSs)/Projects while the **DST used only 61% of its allocated budget**. This points to massive under-utilisation of allocated funds.

**4. Lack of Adequate Funding Support from state governments-** As per the RBI's report, **State Finances: A Study of Budgets of 2023-24**, the R&D expenditure of state governments was 0.09% of the GSDP on average.

#### What are the Other Challenges Facing R&D Sector in India?

**1. Lack of Skilled R&D Personnel-** The best talent of India in R&D migrates to foreign countries, resulting in **brain drain**.

**2. IPR violation-** Poor IPR compliance discourages foreign investment flow into the field of R&D in India.

**3. Outdated Curriculum and Pedagogy-** The curriculum in many **eminent universities** is still **focused on rote learning** and oriented to getting jobs. Many eminent universities are unable to duly utilise the research grant provided to them.

**4. Lack of focus on application-** Indian university system has been **focussing on basic research rather than application research**. That has limited its value to industry, and hence diminished the industry support.

#### What are the Government Initiatives to boost R&D in India?

<b>National Deep Tech Startup Policy (NDTSP)</b>	This Policy aims to <b>promote technological progress and innovation</b> , especially in private sector engagement.
<b>Anusandhan National Research Foundation (ANRF) Act</b>	This Act has been enacted to catalyse research and innovation, focusing on development. The Act is designed to bridge India's R&D investment gap and <b>nurture a robust research culture</b> within Higher Education Institutions (HEIs).
<b>Atal Innovation Mission</b>	It aims to promote innovation and entrepreneurship across the length and breadth of the country. AIM's objectives are to <b>create and promote an ecosystem of innovation and entrepreneurship</b> across the country at school, university, research institutions, MSME and industry levels.

#### What Should be the way Forward?

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**1. Encouraging Private Sector Collaboration in R&D-** Incentives for private investment, including **relaxation of foreign direct investments** (FDIs), **tax rebates**, and **clear regulatory roadmaps for products** will encourage private sector collaboration in R&D.

**2. Increasing R&D Expenditure as Percentage of GDP-** India must spend **3% of its GDP every year until 2047** on R&D for science to have a meaningful impact on development.

**3. Ensuring the Increased Role for HEIs in India-** Government should **promote Government-Industry-Academia partnership** to support the R&D Ecosystem in India. HEIs would play an integral role in the partnership.

**4. Strong IPR protection-** **National IPR policy of 2016** should be duly adhered in order to gain investor confidence and attract more investment in R&D.

**5. Mandating Proper Utilization of Allocated Funds-** The allocated funds and budgets to the research organisations must be properly utilized.

Read More- [The Hindu](#)

UPSC Syllabus- **GS 3** Indian science and technological development and Research

**GS 3 Indian Economy**

### **Open Book Exam – Significance and Challenges – Explained Pointwise**

The CBSE has decided to conduct a **pilot comprehensive study** to assess the viability of implementing **Open Book Exam (OBE)** for students from classes 9 to 12. The pilot will be held in select schools in November-December for subjects like **English, Mathematics** and **Science** for **Classes 9 and 10**, and **English, Mathematics** and **Biology** for **Classes 11 and 12**.





# Open Book Examination

The CBSE has decided to conduct a pilot comprehensive study to **assess the viability** of implementing **Open Book Exam (OBE)** for students from **classes 9 to 12**.

## Open Book Examination

This is an examination pattern where **students are allowed to refer to their books and notes** to answer questions.

## Types of Open Book Examination (OBE)

There are 2 types of open book examination.

- 1) **Restricted open book assessment**- Students are allowed to **refer only the study material** approved by the exam-conducting authority.
- 2) **Free type open book assessment**- Students are allowed to **bring any material** of their choice.

## Open Book Examination (OBE) not a new concept for Indian Students

1. **2014- CBSE introduced Open Text Based Assessment (OBTA)** which was implemented in **Class 9 (Hindi, English, Mathematics, Science, and Social Science)** and **Class 11 (Economics, Biology, and Geography)**. It was aimed to ease the burden of memorization and promote information processing skills.

However, **it was discontinued in the 2017-18** academic year due to its failure to develop critical thinking skills among students.

2. **2019- All India Council for Technical Education (AICTE)** permitted open book exams in **engineering colleges** following a recommendation from an advisory body.

3. **2020 and 2021 COVID-19 Lockdown**- Various Central Universities, like **Delhi University, Jamia Millia Islamia, Jawaharlal Nehru University, Aligarh Muslim University, IIT Delhi, IIT Indore, and IIT Bombay** have conducted open book tests to evaluate students.

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## What is Open Book Examination (OBE)? What is the History of OBE in India?

**Open Book Examination**- This is an examination pattern where **students are allowed to refer to their books and notes to answer questions** during the examination.

**Types of Open Book Examination (OBE)**- There are 2 types of open book examination.

- 1) **Restricted open book assessment**- Students are allowed to refer **only the study material approved** by the **exam-conducting authority**.
- 2) **Free type open book assessment**- Students are allowed to **bring any material** of their choice.

**OBE not a new concept for Indian Students**- Open-book exams are not a new idea for India.

- 1. 2014-** CBSE introduced **Open Text Based Assessment (OBTA)** which was implemented in **Class 9 (Hindi, English, Mathematics, Science, and Social Science)** and **Class 11 (Economics, Biology, and Geography)**. It was aimed to ease the burden of memorization and promote information processing skills. However, it was **discontinued in the 2017-18** academic year due to its failure to develop critical thinking skills among students.
- 2. 2019-** **All India Council for Technical Education (AICTE)** permitted open book exams in engineering colleges following a recommendation from an advisory body.
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### **Why CBSE introduced Open Books Examination(OBE) in India?**

- 1. Transformation of Culture of assessment in line with NEP 2020-** The **National Education Policy 2020** has recommended implementing various modes of exams for the benefit of students. CBSE is exploring Open Book Examination (OBE) as an alternative for regular exams.
- 2. On the lines of National Curriculum Framework –** The CBSE has proposed this form of assessment based on the **National Curriculum Framework (NCF)** released last year. The National Curriculum Framework for School Education has highlighted the need to **reform the current assessment process**, which is **'focused on measuring rote learning'**.

### **What are the advantages of Open Book Examination (OBE) in India?**

- 1. Shift of Focus from 'rote learning' to 'conceptual understanding'-** Open Book Examination will help the students focus on **core concepts, high-order foundational skills, and self-peer assessments**.
- 2. Promotion of critical and creative thinking-** OBE helps to assessment of **learner readiness**, application of **course content to real-life scenarios, analysis of case studies** and connection of **content with real-world situations**.
- 3. Prevents the proliferation of coaching industry-** The examination system using an open book would **prevent the proliferation of board-exam based coaching industry**.
- 4. Encourages Resource Management Skills –** Through the use of Open Book method of examination, students learn to efficiently navigate and use reference materials. This leads to the development of a **valuable skill in quickly finding relevant information**, which is of **great help in academic and professional settings**.
- 5. Reduction in examination related stress of Students-** According to a **2021 study** involving medical students from **All India Institute of Medical Sciences (AIIMS) Bhubaneswar**, it was found that open book exams were less stressful. OBE will reduce the exam related cases of **student suicides in India**.

### **What are the Challenges/limitation with the system of OBE?**

- 1. Challenge for Indian Teachers-** There is **lack of creativity on part of Indian school teachers** to design innovative Open Book assessments. Questions in an open book exam, unlike a traditional exam, cannot be direct.
- 2. Reduction in student's motivation for studies-** Students often get complacent in an open book examination assessment system, by completely **ignoring the strong memorization or critical thinking skills**.
- 3. Challenges of Time Management-** Students may spend too much time searching for information in their materials leading to **incomplete or rushed answers**.

**4. Exacerbation of Inequality among students-** The availability of different resources can create inequality among students. **Students with better access to high-quality materials** may have an **advantage over their peers**.

**5. Logistical Challenges-** Organizing and administering OBEs can be logistically difficult for the teachers, with the students **trying to bring too many books** into the exam environment.

**6. Risk of plagiarism-** There are risks of plagiarism, with students being **tempted to copy answers** or use unauthorised materials.

### What Should be the way Forward?

**1. Implementation of Yash Pal Committee Report** – The Yash Pal Committee Report, '**Learning Without Burden**', had recommended reducing the burden of exams and introduction of measures like OBEs to **reduce the 'catch up' syndrome**. (Catch up syndrome is the popular belief that India needs to catch up with the explosion of knowledge had occurred in the West through strict curriculum and rigorous examinations)

**2. Development of spirit of critical pedagogy-** Teachers must **engage in a meaningful dialogue** with young students. They should remove their whole attention from "completing" the official syllabus in time.

**3. Training of students-** Students must be trained on **how to write an open book exam**, and **develop the necessary skills of analysing concepts** to get the benefits of Open Book Exam.

**4. Training of teachers-** Teachers must be **trained on formulating comprehensive, unique questions for an OBE** different from the **formulaic and archaic questions** in a regular exam.


**Read More-** [The Indian Express](#)

**UPSC Syllabus-** GS Paper 2 Social Justice – Issues relating to Education, Human Resources.

## India's Nuclear Deterrence and Agni-V- Explained Pointwise

The **successful test** of Agni-V ballistic missile dubbed as **Mission 'Divyastra'** is a **watershed moment** in the development of India's Nuclear Deterrence capabilities. Agni-V's impressive range of 5000 kms and enhanced potency due to **Multiple Independently Targetable Re-entry Vehicles (MIRVs)**, has bolstered India's nuclear Deterrence.





## Modernization and Missile Development Efforts for Nuclear Deterrence

Land Based Deterrence	
Agni Series	These <b>ballistic missiles</b> are among India's most prominent strategic weapons. The series includes <b>Agni-I</b> (700-1,250 km range), <b>Agni-II</b> (2,000-3,000 km range), <b>Agni-III</b> (3,000-5,000 km range), <b>Agni-IV</b> (4,000 km range), and <b>Agni-V</b> (5,000 range and Multiple Independent Re-entry Vehicles tech )
Prithvi Series	Prithvi series comprises <b>short-range ballistic missiles</b> which can carry both <b>conventional and nuclear warheads</b> .
Shaurya	Land-based <b>hypersonic missile</b> designed to deliver nuclear payloads with precision at hypersonic speeds within <b>range of around 700-1,000 km</b>
Sea Based Deterrence	
INS Arihant	India's <b>first indigenous Ballistic Missile Submarine (SSBN)</b> with firing capacity of submarine-launched ballistic missile (SLBM)
S-4	India's <b>third indigenous nuclear ballistic missile submarine (SSBN)</b> after INS Arihant and Arighat, with <b>more space for nuclear-tipped ballistic missiles</b>
Air Based Deterrence	
Rafale	Rafale aircraft has provided the Indian Air Force with a <b>sophisticated aircraft with nuclear-warhead-carrying capability</b>

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### What is Nuclear Deterrence? Where does it fit in India's Nuclear Policy?

**Nuclear Deterrence-** Nuclear deterrence is a **strategy employed by states possessing nuclear weapons** to **prevent adversaries from initiating a nuclear attack** by convincing them that the costs and consequences of such an attack would outweigh any potential benefits.

**Principle Behind Nuclear Deterrence-** Nuclear Deterrence operates on the principle of **Mutually Assured Destruction (MAD)**, where both sides possess sufficient nuclear capabilities to inflict unacceptable damage on each other, thereby deterring any hostile actions.

**India's Nuclear Policy and Nuclear Deterrence-** Maintenance of credible nuclear deterrence is one of the foremost priorities of India's Nuclear Policy.

**a. Credible Minimum Deterrence-** India would maintain a sufficient number of nuclear weapons to deter a

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nuclear attack, but it would not seek to match other countries' arsenals in size.

**b. Retaliation to a Nuclear Attack-** If India is subject to a nuclear attack, it would retaliate, causing massive damage to the aggressor.

### How has India's Nuclear Deterrence developed over the years?

#### Development of India's Nuclear Deterrence

1947	Post Independence, India pursued development of nuclear weapons capability, particularly in <b>light of regional tensions</b> and the <b>emergence of nuclear-armed neighbours</b> , namely <b>China</b> and <b>Pakistan</b> .
1974	India conducted its first nuclear test, codenamed ' <b>Smiling Buddha</b> '. This test demonstrated India's nuclear deterrence capabilities.
1974-1998	During this phase, <b>India maintained nuclear ambiguity, neither confirming nor denying the possession</b> of nuclear weapons. This ambiguity served as a form of deterrence, maintaining uncertainty about India's nuclear status.
1998	The <b>Pokhran Tests of 1998</b> , which comprised of five nuclear detonations, both fission and fusion, marked India's evolution as a nuclear weapons state.
After 1998 Tests	Following the 1998 tests, India outlined its Nuclear Doctrine. The key elements of India's nuclear doctrine include a <b>No First Use (NFU)</b> policy, <b>minimum credible deterrence</b> , and <b>retaliation</b> only in the event of a nuclear attack. India also established Strategic Forces Command (SFC) to oversee the management, deployment, and operational control of India's nuclear forces.

#### Modernization and Missile Development Efforts for Nuclear Deterrence

India has pursued an extensive missile development program as part of its nuclear deterrence strategy. These efforts have aimed to enhance its capability to deliver nuclear weapons effectively and establish a credible nuclear deterrence posture.

Land Based Deterrence	
<b>Agni Series</b>	The Agni <b>series of ballistic missiles</b> are among India's most prominent strategic weapons. The series includes <b>Agni-I (700-1,250 km range)</b> , <b>Agni-II (2,000-3,000 km range)</b> , <b>Agni-III (3,000-5,000 km range)</b> , <b>Agni-IV (4,000 km range)</b> , and <b>Agni-V (5,000 km range)</b> . Agni-V, intermediate-range ballistic missile (IRBM) with Multiple Independent Re-entry Vehicles, capable of reaching targets as far as Europe and China.
<b>Prithvi Series</b>	<b>Developed by DRDO</b> , the Prithvi series comprises short-range ballistic missiles designed for tactical use. These missiles, including <b>Prithvi I (150 km range)</b> and <b>Prithvi II (250-350 km range)</b> , <b>can carry both conventional and nuclear warheads</b> , providing India with a flexible deterrence option against regional threats.
<b>Shaurya</b>	Shaurya is a <b>land-based hypersonic missile</b> developed by India, designed to <b>deliver nuclear payloads with precision at hypersonic speeds</b> . Its <b>range is around 700-1,000 km</b> , enhancing India's deterrence capabilities by introducing a fast and maneuverable delivery system.
Sea Based Deterrence	
<b>INS Arihant</b>	India's <b>first indigenous Ballistic Missile Submarine (SSBN)</b> . There has been test-firing of nuclear-capable submarine-launched ballistic missile (SLBM) from the Arihant in October 2022. This has added to India's nuclear deterrence capabilities.

S-4	It is India's <b>third indigenous</b> nuclear ballistic missile submarine (SSBN) after <b>INS Arihant</b> and <b>Arighat</b> . The S-4 submarine is bigger than the INS Arihant and Arighat, with <b>more space</b> for <b>nuclear-tipped ballistic missiles</b> .
<b>Air Based Deterrence</b>	
<b>Rafale aircraft</b>	The induction of the Rafale aircraft has provided the Indian Air Force with a sophisticated aircraft with nuclear-warhead-carrying capability.

### What is the Significance of Agni V missile?

- 1) Enhanced nuclear deterrence against adversaries like China-** Agni-category missiles form the backbone of India's land-based nuclear deterrence. The missile is the core of the India's deterrence in the larger context of the **Sino-Indian power equation**. **For ex-** China's **Hong qi (HQ-19) ground-based ballistic missile interceptors**, cannot intercept MIRV Capable Agni-V carrying multiple nuclear warheads.
- 2) Enhanced Nuclear retaliation to first strike-** Agni-V helps us develop the **credible nuclear retaliation after the first strike**, as India's nuclear doctrine commits to "no first use". This retaliation with the help of MIRV capable Agni-V would **inflict maximum damage** to the other warring side.
- 3) Intercontinental Range Ballistic Missile (ICBM) Club-** Agni-V's range of **5,000km (about 3106.86 mi) can bring the farthest parts of China and even some of Europe** within India's strike radius. The development of this rocket has put India in the nations developing Intercontinental Range Ballistic Missile with increased ranges.
- 4) Boost to India's defence capabilities-**India's defence arsenal has received a significant boost with Agni-V induction.

Read More- [Agni-5 trial: A blast-off for superior deterrence](#)

### What are the Challenges to India's development of deterrence capabilities?

- 1) Inadequate nuclear testing facilities-** The lack of sufficient testing **undermines** the extent to which the **re-entry vehicles could be designed to carry the warheads**.
- 2) Opacity surrounding the warhead numbers-** There is opacity around the number of warheads Agni-V, can carry due to its classified nature. However, specialists suspect that it at present, **it can carry at most only three warheads**.
- 3) Low yield of the nuclear Warheads-** There are concerns that the **yield of the nuclear warheads will be limited** due to the small number of atomic tests conducted by India.
- 4) Problems with Sea based nuclear deterrence-** There are problems of **deep-sea communications with SSBN** because the very low-frequency systems in use on the submarine are prone to disruption at great depths.
- 5) Swift Expansion of Chinese Nuclear Arsenals-** Beijing has been making **brisk advancements** with its missile and missile defence programmes.

### What Should be the Way Forward?

- 1. Early testing of long-range Submarine Launched Ballistic Missile (SLBM)-** India must add punch to its nuclear arsenal by testing its **long-range Submarine Launched Ballistic Missile (SLBM)** which can be launched by its **nuclear submarines**.
- 2. Investment in Missile Defence Systems-** To counter the growing threat from China's modernizing nuclear arsenal, India should invest in developing and deploying advanced missile defence systems, like **expediting development of Agni VI**.



**3. Strengthening of Conventional Capabilities-** While maintaining a credible nuclear deterrent, India **should also focus on strengthening its conventional military capabilities**. This can help deter conventional conflicts that may escalate to the nuclear level.

**4. Cooperation with Allies-** India should continue to cooperate with its allies and partners, such as the **United States**, to deter potential aggressors. This could involve **sharing intelligence, conducting joint military exercises**, and **coordinating on defence strategies**.

**Read More-** [The Hindu](#)

**UPSC Syllabus- GS 3-** India's achievement in Science and Tech

**GS 2-** India and its neighbourhood relations

### Patent Rules 2024- Significance and Challenges- Explained Pointwise



Recently the **Patents Rules 2024** has been notified which marks a **significant milestone** in the patent regime of India. These rules introduce several provisions which aims to **simplify the process of obtaining and managing patents** to facilitate a conducive environment for inventors and creators. It also aims to accelerate economic development of the nation through science and technology to fulfil the **Sankalp of Viksit Bharat**. **Significance and Challenges Patent Rules 2024**





## Provisions of Patent Rules 2024

<b>Certificate of Inventorship</b>	A new ' <b>Certificate of Inventorship</b> ' has been introduced to acknowledge inventors' contributions to the patented invention
<b>Incorporation of Form 31</b>	The provision for <b>accessing Grace period benefits</b> under Section 31 has been streamlined through the introduction of new forms like Form 31
<b>Reduction in Time frame</b>	The time restriction for providing foreign application filing details in Form 8 has been modified from <b>six months from the date of filing</b> to <b>three months</b> from the date of issuing of the first examination report.
<b>Decreased Time Restriction for filing a request for inspection</b>	Given the rapid advancement of technology, the time restriction for filing a request for inspection has been <b>decreased from 48 months to 31 months</b> from the date of priority of application or the date of filing of application, whichever occurs first
<b>Reduction in Renewal Fees</b>	Renewal fees have been <b>reduced by 10%</b> if paid in advance via electronic method for at least four years
<b>Reduced Frequency of filing patents</b>	Patent statements in Form 27 are now <b>required every three fiscal years instead of annually</b> . Additionally, a provision allowing a three-month delay in filing upon request has been added.

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### What are the Notified Patent Rules 2024?

- 1. Introduction of Certificate of Inventorship-** A new '**Certificate of Inventorship**' has been introduced to acknowledge inventors' contributions to the patented invention.
- 2. Incorporation of Form 31-** The provision for **accessing Grace period benefits** under Section 31 has been **streamlined** through the introduction of new forms like **Form 31**.
- 3. Reduction in Time frame** – The time restriction for providing foreign application filing details in Form 8 has been **modified from six months from the date of filing** to **three months from the date of issuing of the first examination report**.

**4. Decreased Time Restriction-** Given the rapid advancement of technology, the time restriction for filing a request for inspection has been **decreased from 48 months to 31 months** from the date of priority of application or the date of filing of application, whichever occurs first.

**5. Extension in Time Limit** – The provision for extending the time limit and **forgiving filing delays has been streamlined** and **made more explicit** to make it easier to use. The period for performing any act or action may now be **extended up to six months** upon request in a regulated manner.

**6. Reduction in Renewal Fees** – Renewal fees have been **reduced by 10%** if paid in advance via electronic method for at least four years.

**7. Reduced Frequency of filing patents** – **Patent statements in Form 27** are now required **every three fiscal years instead of annually**. Additionally, a provision allowing a three-month delay in filing upon request has been added.

**8. Streamlining of Pre-Grant representation-** The procedure for filing and disposing of the Pre-grant representation by way of opposition under **section 25(1) has been further streamlined** and made more explicit by providing ways to dispose of the representation and establishing filing fees.

[Read More- Patent Rules 2024](#)

### What is Patent Regime in India?

**Patent-** A patent is a form of **intellectual property granted by the government** to inventors. It provides the owner with the legal right to prevent others from making, using, or selling an invention for a specific period.

**Patent Regime in India** – In India, patents are governed by the **Patents Act, 1970**.

Under the act, patents are granted if the invention fulfils the following criteria:

- (a) It should be novel;
- (b) It should have inventive step/s, or it must be non-obvious;
- (c) It should be capable of industrial application; and
- (d) It should not attract the provisions of section 3 (what cannot be qualified as patents) and section 4 (inventions related to atomic energy) of the Patents Act 1970.

**Indian Patent Act of 1970 was amended** to align with the **Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement of WTO**. The Amended Indian Patent Act of 2005, introduced patents for pharmaceutical products.

### What are the advantages of Strong Patent Regime with these Notified Patent Rules 2024?

- 1. Promotes a culture of research and grassroots innovation-** A robust patent regime is a basic requirement for creating a culture of research and designing innovative products suited to the local needs and demands. **For ex- Low cost menstrual pad manufacturing machine in India.**
- 2. Greater foreign investment-** These streamlined patent rules attract greater FDI inflows from the MNCs. **For ex- China's patent protection regime attracted manufacturing sector FDI.**
- 3. Promotes exports-** Strong patent regime helps in development of niche technologies which can be used to increase exports from India. **For ex- COVISHIELD and COVAXIN in vaccine technology.**
- 4. Social benefits-** Patents play a pivotal role in solving the contemporary social issues of climate change, poverty, hunger. **For ex- Patents in the Carbon Capture, Use and Storage technologies to solve global warming.**

5. **Fulfilment of India's obligations**- A strong and robust IPR regime fulfils India's obligations in implementing the international conventions of which it is a signatory, like **TRIPS, Berne convention** and **Budapest treaty** etc. It enhances India's global image.

### What are the prevalent challenges in Patent System in India?

1. **Low expenditure by the private sector in patent development**- India spends around 0.7% of its GDP on R&D, with most of the expenditure borne by the government. Other developed countries, spend more on the R&D for product development like US (2.8% of GDP), China (2.1% of GDP), with most of their expenditure coming from the private sector.

2. **Provisions of Compulsory licensing** – Compulsory Licensing is the grant of permission by the government to entities to use, manufacture, import or sell a patented invention without the patent-owner's consent. The fear of misuse of the provision of compulsory licensing has been a major deterrent in patent development in India. **For ex- Compulsory licence used by India in case of Naxavar, a crucial drug for kidney and liver cancer sold by Bayer.**

3. **Provisions against evergreening of patents**- Evergreening of patents is a corporate, legal, business, and technological strategy for extending / elongating the term of a granted patent in a jurisdiction that is about to expire, in order to retain royalties from them, by taking out new patents. **Section 3(d) of the Indian Patent Act 1970, does not allow evergreening of patents.** This issue has been a concern, especially for the pharma industry, which usually relies on such strategies. **For ex- Novartis vs. Union of India case where Novartis drug was prohibited from patent on account of evergreening.**

4. **Abolition of the Intellectual Property Appellate Board (IPAB)**- The IPAB was abolished in 2021 and its functions were assigned to the country's Commercial Courts and High Courts. This has made dispute resolution cumbersome and increased the pendency of cases in the commercial and HC.

5. **Poor implementation of patent laws & poor enforcement mechanisms for patent violation** – Recent **U.S. Trade Representative's Special 301** report has criticized India for having stricter patent laws along with poor implementation that discourages patent filing. India lacks strong enforcement mechanism for violation of the patents. **For ex- Pharma sector.**

6. **Infrastructure and Human resources issues** – Due to poor infrastructure and limited resources, Indian patent offices are working at suboptimal levels, leading to delays in filing and grant of patents. **For ex- India has far less number of patent officers than US.**

7. **Protection of generic medicines in India** – India has been **reluctant in giving patents to foreign pharma industries** to protect its generic pharma industries.

### What Should be the Way Forward?

1. **Post-facto analysis of patent quality** – India should carry out a post-facto analysis of patent quality, under the aegis of the **Office of Principal Scientific Adviser**. It could assess a patent's value by the volume of subsequent citations it receives.

2. **Robust Intellectual property regime** – India must focus on making its Intellectual Property Rights regime even more robust, which in turn will **incentivize more firms and research institutions** to file high-quality patents.

3. **Re-establishment of Intellectual Property Appellate Board (IPAB)**- There is a need to re-establish IPAB and empower it with more **structural autonomy, infrastructural, and administrative reforms** for early disposal of patent violation cases.



4. **Public awareness** – Public awareness should be created about the economic, social and cultural benefits of IPRs among all sections of society.

Read More- [PIB](#)

UPSC Syllabus- GS 3- Issues relating to Intellectual Property Rights

### PIB's Fact-Check Unit- Explained Pointwise

Government of India has notified the PIB's Fact-Check Unit (PIB-FCU) under the Ministry of Information and Broadcasting (MIB) as the fact check unit of the Central Government. Ministry of Electronics and Information Technology (MeitY) has notified the PIB's FCU as the fact check unit under the provisions of Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021.



## PIB's Fact-Check Unit (PIB-FCU)

Ministry of Electronics and Information Technology (MeitY) has notified the PIB's FCU as the fact check unit under the provisions of Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021.

**ESTABLISHMENT-** The Fact Check Unit was established under PIB in November 2019.

**OBJECTIVE-** Its objective is of acting as a deterrent to creators and disseminators of fake news and misinformation.

#### MANDATE

1. The PIB-FCU is mandated to counter misinformation on Government policies, initiatives and schemes either suo motu or under a reference via complaints.
2. The PIB-FCU actively monitors, detects, and counters disinformation campaigns, ensuring that false information about the Government is promptly exposed and corrected.

#### FACT CHECKING PROCEDURE

The PIB fact-check unit categorises any information received by it into three categories- fake, misleading, and true

**Fake News-** If a piece of information is completely false and can “deceive or manipulate the audience, with or without the intention to cause potential harm”, it is classified as ‘fake news’.

**Misleading-** If a content uploaded has “selective presentation of facts or figures or with distortion of facts or figures” and can mislead or deceive readers, it is classified as ‘misleading’ by the fact-check unit.

**True-** Content that the fact-check unit finds factual after review is classified as ‘true’.

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### What is PIB's Fact-Check Unit (PIB-FCU)?

**PIB's Fact-Check Unit (PIB-FCU)**- PIB's Fact-Check Unit was established in **November 2019** with a **stated objective of acting as a deterrent** to creators and disseminators of fake news and misinformation. It also provides people with an **easy avenue to report suspicious and questionable information** pertaining to the Government of India.

### Functions/Mandate of PIB-FCU

- a. The **PIB-FCU is mandated to counter misinformation** on Government policies, initiatives and schemes either suo motu or under a reference via complaints.
- b. The **PIB-FCU actively monitors, detects, and counters disinformation campaigns**, ensuring that false information about the Government is promptly exposed and corrected.
- c. When this unit flags a **piece of content as fake**, **social media platforms** will have to **take it down as part of their due diligence requirement** under the IT Rules. Also, the **internet and telecom service providers like Jio and Airtel** will have to block the web link of a particular fake news information.

### What is Govt's rationale for notifying PIB's Fact-Check Unit (PIB-FCU) as the Central Govt's Fact-check Unit?

1. **Addressing the issue of fake news**- This fact-checking body can help to **address the issue of fake news and misinformation on online platforms**, which can potentially cause harm to society.
2. **Improved accountability of Social Media Intermediaries**- The notification of PIB's Fact-Check Unit as the Govt's Fact-checking unit will **increase accountability** of social media intermediaries like **Facebook, Twitter** etc., which will now be required to remove false and misleading content.
3. **Enhancement of Cybersecurity**- PIB's Fact-Check Unit can improve the cybersecurity by preventing the misuse of online platforms for illegal or harmful activities. **For ex- Regulation of Sharing of Deepfakes.**
4. **Prevention of Hate Speech and Violence**- The Fact-Check unit seeks to ensure compliance with Indian laws like IT Act and laws related to national security. This **helps to prevent the misuse of social media platforms** and other digital media outlets **to incite violence or spread hate speech.**

Read More- [Controlling Fake News in India and associated challenges](#)

### What are the Concerns with notification of fact-check Unit by the Government of India?

1. **'Chilling effect' on freedom of speech and expression**- There are concerns that PIB's fact-check unit and its power to censor content could have a **chilling effect on free speech and expression provided under Art 19(1)(a)**. There are concerns that people may be hesitant to express their opinions online for fear of being censored or facing legal consequences.
2. **Potential for Misuse by the Govt**- The fact-check unit's power **could be misused by the government to silence dissenting voices or criticism** of government actions. This could have serious implications for democracy and human rights.
3. **Conflict of interest**- The role played by the fact-checking unit has a significant conflict of interest as it plays the **role of judge, jury and executioner.**
4. **Lack of clarity on what constitutes "fake or false or misleading" information**- There is lack of a clear definition of **what types of information qualify as 'fake or false or misleading'**. This lack of clarity **creates ambiguity** and can **lead to arbitrary censorship** by the government.

**5. Short-circuiting established legal procedures-** The notification of a **fact-checking unit with powers to issue directions to take down content**, short-circuit the procedures, safeguards and conditions laid out in **Shreya Singhal v. Union of India** and **Section 69A of the IT Act**. The judgement extends the right to free speech into the online space.

#### What Should be the Way Forward?

**1. Early Judgement of the Bombay High Court-** The **Kunal Kamra v. Union of India (2023)** case challenging the notification of fact-check unit of the Central Government, must be decided by the Bombay High Court at the earliest which will establish its constitutionality.

**2. Building consensus among political parties-** With Opposition political parties **criticising the notification of PIB's fact-check unit** as the Govt's official fact check body, the government must build consensus by assuring them of 'credible' functioning of the body.

**3. Develop a more transparent and participatory process-** The government should work with **civil society, media organizations**, and **other stakeholders** to develop a more transparent and participatory process for **determining what content should be considered fake or misleading**.

**4. Need an independent and non-partisan fact-checking body-** The government should ensure that **anybody tasked with fact-checking is independent and non-partisan**, with clear guidelines for how decisions are made.

**5. Ensure functioning according to judicial and legal guidelines-** The government should ensure that any takedown requests are made in accordance with the procedures and safeguards laid out in **Shreya Singhal v. Union of India** or **under Section 69A of the IT Act**. These define and restrict the conditions under which government can take down online content.

**Read More-** [The Indian Express](#)

**UPSC Syllabus-**

**GS 3 Security Issues** – The role of media and social networking sites in internal security challenges

**GS 2-** Government Interventions for regulation of the sector

### Status of Inequality In India- Explained Pointwise

The recent working paper by World Inequality Lab titled '**Income and Wealth Inequality in India, 1922-2023: The Rise of the Billionaire Raj**' has put the spotlight on the status of inequality in India. According to the estimates of the paper, **post-independence till the early 1980s**, inequality declined in India. After 1980 inequality began rising and inequality has skyrocketed since the early 2000s.

The report combines data from **national income accounts, wealth aggregates, tax tabulations, rich lists**, and **surveys on income, consumption**, and **wealth** to arrive at the results.



## Income and Wealth Inequality in India, 1922-2023: The Rise of the Billionaire Raj

- 1. Growth in average incomes-** India's average income grew at **2.6% per year in real terms** between 1960 and 2022.
- 2. Emergence of very high net worth individuals-** The number of high net worth individuals has increased from **1 to 52 to 162 in 1991, 2011 and 2022 respectively**.
- 3. Rise in the percentage of income taxpayers-** The share of adult population filing an income tax return has increased from **1% till the 1990s to 5% in 2011 to 9% between 2017-2020**.
- 4. Extreme levels of inequality in India-** In 2022-23, **India's top 1% own 22.6% of India's national income and 40.1% of the country's wealth**. The 'Billionaire Raj' headed by India's modern bourgeoisie is now **more unequal than the British Raj** headed by the colonialist forces.
- 5. Extreme wealth concentration at the very top-** Between 1961 and 2023, the **top 1% wealth share has increased threefold**, from 13% to 39%.
- 6. International comparison of income and wealth inequality-** India's **top 1% income share and wealth share is among the very highest in the world**, behind only perhaps Peru, Yemen and a couple of other small countries.
- 7. Policy solution to reduce inequality-** Implementing a **super tax on Indian billionaires and multimillionaires**, **restructuring the tax schedule** to include both income and wealth, and **finance major investments** in education, health

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### What are the main takeaways of the report?

- 1. Growth in average incomes-** India's average income grew at **2.6% per year** in real terms between 1960 and 2022.
- 2. Emergence of very high net worth individuals-** The period between 1990 to 2022 witnessed a rise in national wealth and the emergence of very high net worth individuals (**those with net wealth exceeding \$1 billion at market exchange rate**). The number of high net worth individuals has increased from **1 to 52 to 162 in 1991, 2011 and 2022 respectively**.
- 3. Rise in the percentage of income taxpayers-** The share of adult population filing an income tax return has increased from **1% till the 1990s to 5% in 2011 to 9% between 2017-2020**.

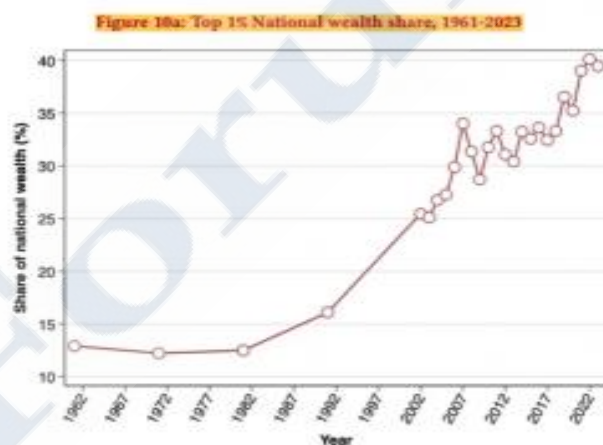
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**4. Extreme levels of inequality in India-** In 2022-23, India's top 1% own 22.6% of India's national income and 40.1% of the country's wealth. The 'Billionaire Raj' headed by India's modern bourgeoisie is now more unequal than the British Raj headed by the colonialist forces.



Source- Indian Express

**5. Extreme wealth concentration at the very top-** Between 1961 and 2023, the top 1% wealth share has increased threefold, from 13% to 39%.



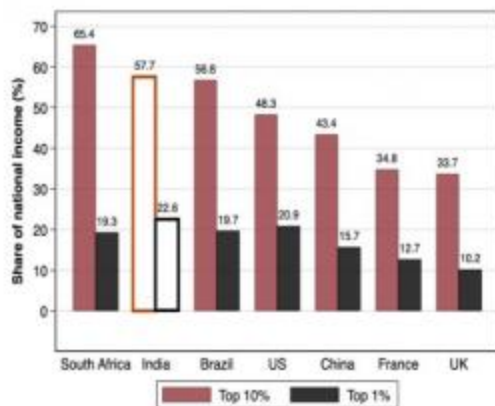
Note: The figure presents the distribution of per-adult national wealth.

Source- Indian Express

**6. International comparison of income and wealth inequality-** India's top 1% income share and wealth share is among the very highest in the world, behind only perhaps Peru, Yemen and a couple of other small countries. India has one of the highest wealth and income inequality in the world.



Figure 15a: Top income shares in global perspective, 2022-23



Note: The figure compares India's top 10% and top 1% income shares with a handful of countries that include some of the most unequal ones. In 2022-23, India's top 1% income was not only the highest among these countries but among the very highest anywhere in the world.

Figure 1. Source- Indian Express

situations like **Pandemic, Disasters** etc.

**2. Hampers progress of Future Generations-** Lack of access to income and wealth hampers the ability of the poor to **access the levers, like education**, that enable upward mobility. Children born in poor families remain perpetually trapped in poverty.

**3. Undermines Dignity-** People with less resources have to work day and night without any day off, **unlike the affluent section**. They starve for food, clothing and other basic things, which undermines their right to a dignified life under Article 21.

**4. High Crime Rates-** Inequitable distribution of wealth leads to **lower social trust** and **higher crime rates**.

**What are the challenges in addressing inequality?**

**1. Low Female Labour Force Participation Rate-** **Lack of Education, Early Marriage, household responsibilities** etc. force women to opt out of jobs which reduces their income and increases income inequalities.

**2. Poor Coverage of Schemes-** There is poor coverage of health and education schemes, which **increases the out-of-Pocket expenditure of poor people** and exacerbates income and wealth inequalities.

**3. Global Uncertainties-** The **continuation of COVID-19** and **Russia-Ukraine conflict** have pushed the inflation levels in the country, thereby increasing income and wealth inequality in India.

**4. High level of in-formalisation of economy-** A significant portion of India's workforce is **engaged in the informal sector**, which typically lacks job security, social protections, and access to formal financial services. Workers in the informal sector often **face exploitative working conditions and lower wages** compared to their counterparts in the formal sector.

**5. Skewed Economic Growth Patterns-** High growth rates have **primarily benefited certain sectors and regions**, leading to a concentration of wealth and opportunities among a relatively small portion of the population.

**What steps have been taken by the government to reduce inequality in India?**

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**7. Poor Economic data-** **Quality of economic data in India is notably poor**, and it has seen a decline recently, leading to likely underestimation of level of inequality.

**8. Policy solution to reduce inequality-** **Implementing a super tax** on Indian billionaires and multimillionaires, **restructuring the tax schedule** to include both income and wealth, and **finance major investments in education, health** and other public infrastructure, could be effective measures to reduce inequality in India.

**What are the implications of rising inequality in India?**

**1. Higher Vulnerabilities to Extreme Events-** Poor people have little to no savings or wealth which makes it very difficult for them to survive in extreme

<b>JAM Trinity</b>	It focuses on mobile numbers, Aadhaar Card and post office accounts as <b>alternative financial delivery mechanisms</b> to ensure that benefits reach the poor households seamlessly.
<b>Ayushman Bharat</b>	It focuses on providing care through <b>Health Wellness Centres (AB-HWC)</b> covering child and maternal health services, non-communicable diseases, and free drugs and diagnostic services.
<b>Samagra Shiksha Abhiyan</b>	It is an Integrated Scheme for School Education. This programme subsumes the three erstwhile Centrally Sponsored Schemes of <b>Sarva Shiksha Abhiyan (SSA)</b> , <b>Rashtriya Madhyamik Shiksha Abhiyan (RMSA)</b> and <b>Teacher Education (TE)</b> .
<b>MGNREGA</b>	It <b>guarantees 100 days of work a year</b> to every rural household with an aim to enhance the livelihood security of people.

### What Should be the Way Forward?

- 1. Super Tax or Wealth Tax-** The government should levy wealth tax and super tax on Indian billionaires and multimillionaires. This will reduce levels of income inequality in India.
- 2. Raising minimum wage rate-** The government should raise the minimum wage rate especially in **the unorganized sector** wherein people get very less social security benefits like gig workers and gig economy.
- 3. Higher investment in Education and Health-** The government of India must **invest 6% of GDP in Education** and **2.5% of GDP in Health** to ensure equitable development and reduce inequalities in the country.
- 4. Reduce exclusion error in schemes-** There should be **greater focus on digitization** and **JAM usage** in order to reduce inclusion and exclusion errors in schemes.

Read More- [The Indian Express](#)

UPSC Syllabus- GS 3- Inclusive Growth In India

### [Yojana March 2024 Summary] Folk Art Reimagined Using Modern Techniques- Explained Pointwise

**Contemporary Digitisation** has been revolutionising every aspect of Human lives. The realm of **contemporary Indian folk art** is also facing **increasing pressure** to adapt to modern technological advancements like **digitisation** and **virtual representation**. However, there is also a challenge to preserve the intrinsic essence of these traditions amidst evolving technological Changes.



Source- Yojana

### What is Folk Art? What is the importance of Folk art?

Folk art covers **all forms of visual art made** in the context of folk culture. These art forms are expressed through music, dance, and visual representations. They are deeply rooted in the cultural specifics of communities.

#### Importance of Folk Art

- a. Folk art serves as a **medium for preserving unique customs** and contributes to fostering of communal cohesion.
- b. Folk art serves as a **means for articulating collective consciousness** and their historical legacy.
- c. Folk art **facilitates sustainable community engagement**.

In the modern era, **folk art and music** are shifting to the digital realm for their presentation. This provides an opportunity for these folk art to preserve their cultural heritage, so that they can reach a broader audience, **particularly among younger generations**.

#### What are the advantages of folk art presentation using modern techniques?

**1. Transcending geographical and cultural boundaries-** Smart virtual technologies offer an opportunity for folk art forms to evolve and reach broader audiences through **digital dissemination** by transcending geographical and cultural boundaries.

**2. Facilitate Cross-cultural influence-** Modern techniques like digitisation and virtual medium, facilitates **globalisation of Indian folk art**.



**3. Relevance of contemporary audiences-** Infusion of modern elements **revitalises these folk practices**, making them relevant to contemporary audiences.

**4. Enhances Community Engagement-** The use of modern techniques for folk art dissemination enhances community engagement as it connects different communities across the globe.

**5. Identity and change-** Digital dissemination of folk art forms, helps them in **adapting and flourishing** while retaining their intrinsic cultural significance.

#### **What are the challenges in disseminating folk art using modern techniques?**

**1. Threats of Mutation and Dilution-** Some experts have expressed apprehensive concerns regarding the potential dilution of the subtle, abstract, and intuitive elements inherent in traditional folk art forms.

**2. Failure to convey nuanced expressions-** There is growing concern among traditional masters about whether performance through virtual mediums can **adequately convey the nuanced expressions that are expected to be felt physically**.

**3. Algorithmic bias and mass standardisation-** There are dangers of algorithmic bias and mass standardisation for these unique art forms, which can **inadvertently erase the locality-specific nuances** of folk traditions.

**4. Risks of Homogenisation-** There are risks of homogenisation, commodification and reduction to superficial representations devoid of their original depth and meaning.

**5. Balance between innovation and preservation-** We must maintain the integrity of these folk elements by maintaining a delicate balance between innovation and preservation.

Read More- [Folk artists as record-keepers of the pandemic](#)

#### **What should be the way forward?**

**1. Collaboration between technologists and artists-** Collaborative efforts between modern technologists and artists, who have an in-depth understanding of tradition, can be endeavoured to ensure that **digital adaptations retain the genuineness and richness of their traditional counterparts**.

**2. Finding methodology to preserve authenticity-** A well-thought-out practical solution must be devised wherein these folk art forms, while retaining their intrinsic cultural significance, can adapt and flourish amidst the rapid pace of change.

**3. Sensitivity and respect for diversity-** It is essential to approach the digitisation of folk art with sensitivity and respect for its diversity and its connection to our rich heritage.

**4. Balance between innovation and preservation-** We must strike a well-thought-out balance between innovation and preservation, to ensure that folk art forms thrive in the digital age without sacrificing their essence.

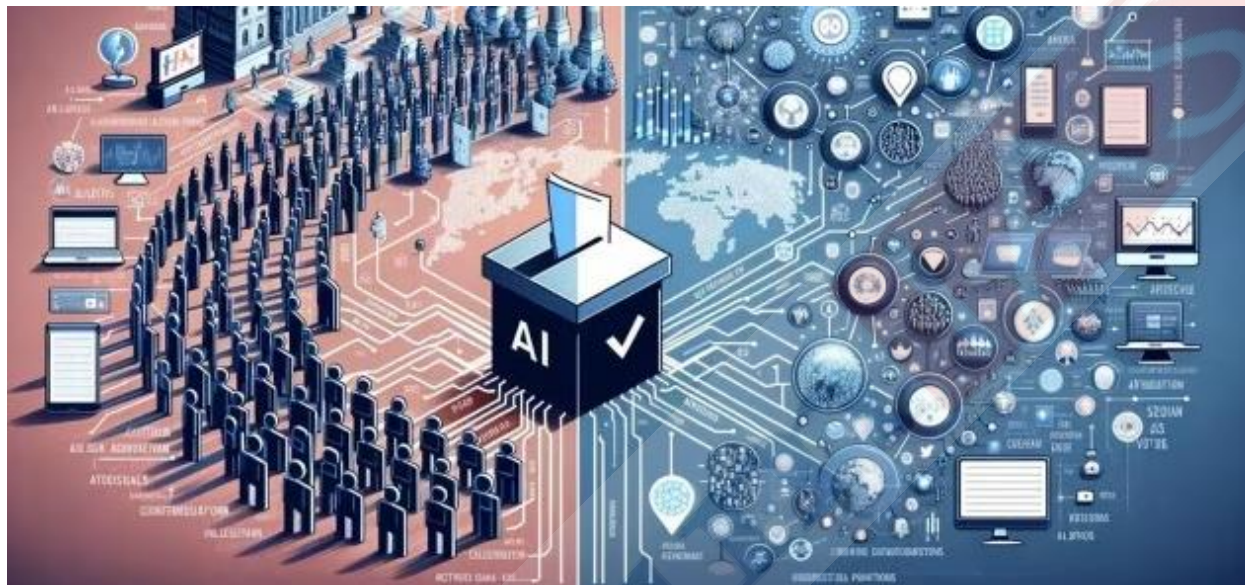
Read More- [Indian Art Ideas](#)

UPSC Syllabus- **GS 1** – Indian art and culture (Contemporary times)



## Social and Political Impacts of AI- Explained Pointwise

Artificial intelligence (AI) is **transforming our world**, with **wide-ranging social and political impacts**. However, Its rapid **development and integration into social and political life** raises critical questions about privacy, employment, ethics and governance. As AI advances, understanding and managing its social and political impacts become increasingly important for a balanced and inclusive future.



Source- Indian Express

### What is artificial Intelligence?

**Artificial Intelligence-** Artificial intelligence is **intelligence demonstrated by machines**. AI is a **discipline** which **focuses on formulating theories** and **methodologies** for constructing machines that emulate human thought processes and behaviours.

Generative AI is a subset of Artificial intelligence which is being increasingly used with wide ranging social and political impacts.

**Generative AI-** Generative AI is a type of **artificial intelligence technology** that can produce various types of **content, including text, imagery and audio**. The term 'Generative' refers to the ability of the models to create new data based on certain input parameters. **For ex-** A generative model is used to generate facial images by providing a set of parameters such as the eyes, hair, or skin colour etc.

Read More- [Generative AI Explained Pointwise](#)

### What are the positive and negative political impacts of artificial Intelligence?

#### Positive impacts

- 1. Innovative Policy Development-** AI is being increasingly used in innovative policy development. **For ex-** **AI-drafted bills in the US Congress** is an example of AI's use in legislative drafting.
- 2. Enhanced Political Messaging-** AI is being used to **craft resonant political messages** through advanced analytics, which is revolutionizing campaign strategies.

**3. New Political Platforms-** AI is being used as a platform for political engagement and political ideological development. **For ex- Denmark's Synthetic Party using AI Chatbox** to shape its political ideology.

**4. Economic Contributions-** **AI-driven fundraising and business ventures** marks a significant shift in political finance dynamics.

**5. Campaign Strategies-** Generative AI is being used extensively in electoral campaigns, such as **live translation of election speeches into multiple languages**.

### Negative Impacts

**1. Promotion of 'Liar's Dividend' through Deepfakes-** Liar's Dividend refers to the situation when an undesirable truth is dismissed as deepfake or fake news. Political leaders have been weaponising deepfakes generated through AI, to replace an actual piece of media and truth. **For Ex- Donald Trump's deepfake videos blur the line between reality and fake**. People start dismissing reality as fake.

**2. Erosion of trust in democratic processes like elections-** Doctored content, most likely in the form of a realistic fake video, is presented as fact to alter public perception and create democratic deficit. **For Ex- Capitol Hill violence, 2021 was incited by using deep fake media**.

**3. Manipulation Risks-** There are concerns about AI swaying elections and public opinion through the **spread of false political narratives**.

**4. Ethical and Legal Challenges-** The acceptance of **AI-generated political contributions or parties** raises complex ethical and legal questions about AI's role in democratic processes.

### What are the positive and negative Social impacts of AI?

#### Positive Impacts

**1. Improving Healthcare System-** AI has the potential to revolutionize the healthcare sector by improving the accuracy of diagnosis. **For ex- Conversion of X-ray or any CT scan images to real images** can improve the accuracy of diagnosis.

**2. Boost to Agriculture-** AI **enables precision agriculture**, improving crop productivity by providing accurate agronomic and weather data. This is crucial for meeting the needs of a growing population.

**3. Creating empathy for people of War torn regions-** Projects like the **Deep empathy project of MIT and UNICEF** has been increasing empathy for victims of a disaster region by creating AI-images of war-torn regions like **Syria, Yemen**.

**4. Voice restoration-** The technology is being used to restore the voices of patients suffering from amyotrophic lateral sclerosis. **For ex- Launch of various 'Voice cloning initiatives'**.

**5. Use in the field of creative art and Entertainment-** The deepfake technology can be used to **improve the dubbing of foreign language, films and resurrect dead actors**. **For ex- Samsung artificial intelligence lab in Moscow bringing Monalisa to life by using deep fake technology**.

#### Negative Impacts

**1. Crime against women-** The deepfakes generated through AI are being used as a weapon to attack women dignity and chastity. According to AI company Deeptrace report, **over 90% of the deepfake videos are pornographic** in nature.

**2. Fuelling Radicalisation and violence-** The **non-state actors like ISIS and Al-Qaeda**, use fake videos to stir anti-state sentiments among people. **For Ex-** Fake videos showing armed forces committing ‘crimes in conflict areas’.

**3. Threat of Job Losses-** There are fears of job losses due to the use of AI technology, which can prove to be more **cost-efficient and productive** to firms as compared to human capital. **For ex-** **Customer service jobs are under threat from the AI chatboxes** (Zomato’s Zia).

**4. Data Privacy Concerns-** AI’s **ability to analyze vast amounts of data** raises **significant concerns** over **data protection, cybersecurity, and privacy**.

**5. Environmental Concerns-** AI systems require a lot of computing power, which have grave implications for the environment. **For ex-** **According to analysts, training a transformer model just once with 213 million parameters can emit carbon emissions equivalent to 125 flights between New York and Beijing.**

### What is the status of regulation of AI in India and across the globe?

#### India

**a. Digital India Framework-** India is developing a comprehensive Digital India Framework that will include provisions for regulating AI. The framework aims to protect digital citizens and ensure the safe and trusted use of AI.

**b. National AI programme-** India has established a National AI Programme to promote the efficient and responsible use of AI.

**c. National Data Governance Framework Policy-** India has implemented a National Data Governance Framework Policy to govern the collection, storage, and usage of data, including data used in AI systems. This policy will help ensure the ethical and responsible handling of data in the AI ecosystem.

**d. Draft Digital India Act-** The Ministry of Information Technology and Electronics (MeitY) is working on framing the draft Digital India Act, which will replace the existing IT Act. The new act will have a specific chapter dedicated to emerging technologies, particularly AI, and how to regulate them to protect users from harm.

#### Rest of the World

**a. European Union-** The European Union is working on the draft Artificial Intelligence Act (AI Act) to regulate AI from the top down.

**b. United States-** The White House Office of Science and Technology Policy has published a non-binding Blueprint for the Development, Use, and Deployment of Automated Systems (Blueprint for an AI Bill of Rights), listing principles to minimize potential harm from AI.

**c. Japan-** Japan’s approach to regulating AI is guided by the Society 5.0 project, aiming to address social problems with innovation.

**d. China-** China has established the “Next Generation Artificial Intelligence Development Plan” and published ethical guidelines for AI. It has also introduced specific laws related to AI applications, such as the management of algorithmic recommendations.

### What Should be the Way Forward?

**1. De-biasing while training the AI-** We must ensure fairness of the information which is being fed into the system, to **ensure that AI doesn’t perpetuate or amplify social biases**, like **gender and racial biases**.



**2. Transparency of information-** Users should have transparent information about the **limitation and risks of AI**.

**3. Privacy protection-** The user data and confidentiality must be protected to ensure user privacy. **For ex-Strict implementation of data protection laws.**

**4. Ethical use of AI-** We must ensure that AI is used only for beneficial purposes. The push must be made towards **universal adoption of the Bletchley Declaration** by all the countries.

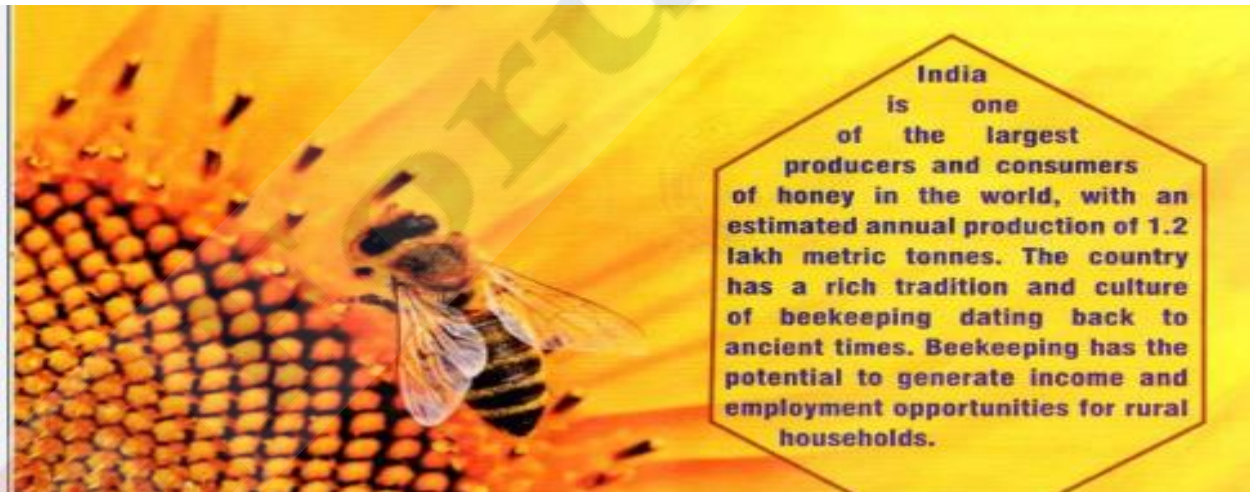
AI has the potential to give society intelligent guidance on how to approach some of the biggest problems, like climate change and pandemics. In the coming times, AI will contribute to longer, healthier, and more fulfilling lives worldwide if used responsibly.

**Read More-** [The Indian Express](#)

**UPSC Syllabus- GS 3-** Development in the field of IT

### **[Kurukshetra March 2024 Summary] Apiculture- Scope and Opportunities- Explained Pointwise**

Apiculture is a **widespread and global activity**, with millions of beekeepers **depending on bees for their livelihoods and well-being**. Together with wild pollinators, **bees play a major role in maintaining biodiversity**, ensuring the survival and reproduction of many plants, supporting forest promoting sustainability and adaptation to climate change, and improving the quantity and quality of agricultural productions.



Source-Kurukshetra

#### **What is apiculture?**

Apiculture is the **science and culture of honeybees and their management**. Beekeeping is the practice of intentional maintenance of honey bee colonies, commonly in hives, by humans.

**Apiary-** A beekeeper may keep bees in order to collect honey and beeswax, or for the purpose of pollinating crops, or to produce bees for sale to other beekeeper. A location where bees are kept is called an apiary.



**Beekeeping-** Beekeeping (or apiculture, from Latin: Apis ‘bee’) is the maintenance of honey bee colonies, commonly in hives, by humans. In India, beekeeping has been mainly forest-based. Several natural plant species provide nectar and pollen to honey bees.

### What is the history of beekeeping in India?

Globally, there are more than 20,000 species of wild bees, many of which are solitary or which rear their young in burrows and small colonies, like mason bees. In India, beekeeping is commercially done in Himachal Pradesh where locals collect honey on hills and in forests.

Beekeeping, or apiculture, is concerned with the practical management of the social species of honey bees which live in large colonies of up to 100,000 individuals.

### Different types of honey bee species in India

Sl. No.	Common name	Scientific name	Honey yield per year per hive (kg)
1	Indian bee	<i>Apis cerena</i>	8-10
2	European bee	<i>Apis mellifera</i>	25-30
3	Rock bee	<i>Apis dorsata</i>	30-35
4	Little bee	<i>Apis florea</i>	<1
5	Himalayan bee	<i>Apis laboriosa</i>	40-45

Source: AICRP on Honey Bee, 2018

Figure 2. Source- Kurukshetra

### What are the advantages of apiculture in India?

**1. Source of Important forest based Outputs-** Apiculture is important because it directly contributes to the outputs produced, such as **honey, beeswax, queen, and bee colonies**, and other products such as pollen, royal jelly, bee venom, and propolis in cosmetics and medicine.

**2. Maintenance of ecological sanctity-** Apiculture plays a role in providing **nutrition, economic, and ecological security**, as bees are valuable pollinators of both

agricultural crops and natural ecosystems.

**3. Less capital requirement-** Apiculture business is less capital intensive as it requires **less land and less initial capital**.

**4. Source of employment opportunities-** Apiculture is a **major source of employment opportunities for people of all age groups**.

### What are the challenges in the development of apiculture in India?

**1. Lack of Awareness and Training-** Many potential beekeepers lack adequate knowledge about **beekeeping practices**, including **hive management, disease prevention, and honey extraction techniques**.

**2. Limited Access to apiculture Resources-** Access to beekeeping equipment, such as **hives, protective gear, and bee colonies**, is limited in certain regions of India. This lack of resources hampers the expansion of beekeeping activities, particularly in rural areas.

**3. Climate Variability-** Erratic weather patterns, such as unseasonal rains or prolonged droughts, have been affecting the **honeybees foraging behavior, disrupting flowering patterns**, and ultimately impacting honey production.

**4. Pests and Diseases-** Bee colonies are susceptible to various pests and diseases, such as Varroa mites, nosema, and foulbrood.

**5. Chemical Use in Agriculture-** Pesticides and other agricultural chemicals pose a **threat to bee populations by contaminating their food sources** and weakening their immune systems.

**6. Market Challenges-** **Price fluctuations, competition from imported honey, and lack of market infrastructure** have been hindering the profitability of beekeeping ventures.

#### What are the Government Initiatives for Beekeeping Development in India?

<b>National Beekeeping and Honey Mission (NBHM)</b>	Launched in 2017 under the National Horticulture Mission, NBHM aims to promote scientific beekeeping practices, enhance honey production, and improve the livelihoods of beekeepers.
<b>'Sweet Revolution' as part of Aatmanirbhar Bharat Abhiyaan</b>	NBHM aims for the overall promotion and development of scientific beekeeping in the country to achieve the goal of 'Sweet Revolution', which is being implemented through the National Bee Board (NBB).
<b>National Bee Board (NBB)</b>	The National Bee Board, established in 2000 under the Ministry of Agriculture & Farmers Welfare, serves as the apex body for the promotion and development of beekeeping in India.
<b>Rashtriya Krishi Vikas Yojana (RKVY)</b>	RKVY supports various agricultural and allied sector development activities, including beekeeping.

#### What Should be the Way Forward?

**1. Proper Training-** Proper training and awareness programs are essential to equip beekeepers with the necessary skills.

**2. Adequate Pest Management-** Proper pest management and disease management must be readily available to all beekeepers.

**3. Sustainable farming practices-** Encouraging sustainable farming practices that minimize chemical use is essential for the health of bee colonies.

**4. Preservation of natural habitats-** Preserving natural habitats and promoting agroforestry practices can help mitigate the effects of land use change and provide additional forage for bee colonies.

Read More- [Indian Express](#)

UPSC Syllabus- GS 3- Agriculture and allied sectors

## [Yojana March 2024 Summary] From the 'Art with intelligence' TO 'Artificial intelligence'- Explained Pointwise

We have been **evolving** from **art with remarkable intelligence** to **artificial intelligence in the creation of new art forms**. Art and intelligence have always been bound to each other since ancient times. However, the rise of digital technology has given birth to new art forms, such as **digital painting, graphic design, animation, and interactive media**.



Source- Yojana

### What is the history of art with remarkable intelligence?

Early humans developed significant art with their intelligence. **For ex-** Art made of stone and ivory, pottery, metallurgy, textile manufacture, bead-making, wood-carving, cart-making, cave painting.

During the **first urbanisation in India**, which took place between **2600-1900 BCE**, Harappan civilisation emerged as a civilisation famous for its art with remarkable intelligence. **For ex-** **Invention of wheel, intercropping, lost wax technique, alloying technique to make figurines.**

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During the **second urbanisation in India**, which took place in the Ganga valley also displayed remarkable intelligence. For ex- **Delhi Iron Pillar**, which is 1500 years old, consists of six tonnes of wrought iron and uses phosphorous in the iron, is an excellent example of art with intelligence. **This iron pillar is famous for its rust-resistant properties.**

### How is Artificial intelligence being used to enhance Art features?

The combination of art and digital technology has led to the creation of a new, revitalised form of art known as '**digital art**'. The rise of digital technology has given birth to new art forms, such as **digital painting, graphic design, animation, and interactive media.**

Artists use digital tools like **tablets, software programs, and digital cameras** to create stunning visual artworks that were previously impossible to achieve with traditional methods.

### Use of Digital Technologies in the following art forms in Modern Times

<b>Visual Art</b>	There has been <b>new digital innovation in the field of Visual art</b> , especially in cinema. New technologies are being used to create a <b>visual imagination of our cultural places, cultural attire.</b>
<b>Painting</b>	Digitisation is being used to <b>create abstract painting</b>
<b>Sculpture</b>	<b>3D techniques</b> are being used to make digital sculptures using <b>laser technology</b> , and digital impression of sculpture using <b>projection technology.</b>
<b>Architecture</b>	<b>Remote sensing to Aerial exploration</b> is used to gather calculative data required to make an architecture.
<b>Dance</b>	<b>Laser lighting</b> is used to create a persona where a person is dancing, using laser lights.
<b>Music</b>	Instruments are now <b>being digitally</b> played to synchronise the voices of artists.
<b>Cinematography</b>	<b>VFX technology</b> and <b>Voice in cinema</b> is being used in cinematography.

### What are the advantages of use of artificial intelligence in art?

- 1. Development of Digital space for art institutions-** The use of artificial intelligence has marked a significant turning point in the development of the digital space for art institutions like **virtual art museums, exhibitions, virtual conservatories, theatres.**
- 2. Expanding audience Reach-** Websites, social media platforms, online galleries, and digital art marketplaces allow artists to reach a wider audience and **connect with fellow creators.**
- 3. Increase in sales-** Digital technologies have led to increase in sales of digital artworks by helping them to **sell their artwork directly to collectors.**
- 4. Digital preservation-** Digital preservation techniques, such as **digitisation, metadata management, and digital archiving** are essential for ensuring the long-term preservation and accessibility of digital artworks for future generation.
- 5. Increasing accessibility-** Digital era has helped to create new art and cultural expression forms, making them accessible worldwide.

### What are the challenges in the digital era of art?

- 1. Lack of training and resources-** Many artists lack training and resources in digital art creation, which requires **proficiency in digital tools and software.**



**2. Concerns about quality and authenticity of artworks-** The proliferation of digital art online makes it difficult to discern the quality and authenticity of artworks, **leading to trust and credibility issues.**

**3. Digital manipulation-** Digital technologies are used inappropriately, like **fake or defaced videos.** The distinction between original artworks and digital forgeries or replicas have become more challenging.

**4. Data Privacy concerns-** Collection and storage of personal information, conduction of financial transactions, and sharing creative content online carry **inherent data breach risks** that require robust cybersecurity measures and data protection protocols.

#### **What Should be the way Forward?**

**1. Copyright laws and Digital rights mechanisms-** Copyright laws and digital rights mechanisms must be streamlined to look out for the interests of artists and consumers.

**2. Digital technology-** We must restrict ourselves and create boundaries for how much we use digital technology.

**3. Measures against Digital manipulation-** Safe and responsible use of AI in accordance with **Bletchley Declaration** principles to guard against digital manipulation.

Read More- [Indian Express](#)

UPSC Syllabus- GS 1- Art and architecture in modern times

### **[Kurukshestra March 2024 Summary] Vertical Farming and Hydroponics- Explained Pointwise**

Adoption of Advanced farming methods like **Vertical Farming** and **Hydroponics** is necessary for **sustainable and efficient food production systems** to meet the demands of growing population. In India, hydroponics and vertical farming are gaining importance considering the increasing demand for leafy, green vegetables and fruits like strawberries and blueberries.



Fig. 1- Vertical farming technology at ICAR-IARI, New Delhi

Source- Kurukshetra

### What is Vertical Farming and Hydroponics?

**Vertical Farming-** It is an **indoor urban technique** involving large-scale food production within multi-storey buildings. It adopts a unique approach to **maximise space and efficiency** by **cultivating plants in vertically stacked layers** or **inclined surfaces**, often within controlled environments like greenhouses or warehouses. It frequently utilises **controlled-environment agriculture (CEA) techniques** to optimize factors such as light, temperature, humidity, and nutrients.

**Nutrient Providing Method-** Various shapes and sizes of vertical farms worldwide employ one of three nutrient-providing methods- Hydroponics, Aeroponics and Aquaponics.

<p><b>Hydroponics</b></p>	<p>This prevalent technique involves <b>growing plants on soil-free substances continuously irrigated with nutrients</b>. Plant roots are submerged in a nutrient solution, and the system <b>uses 60-70% less water than traditional agriculture</b>, making it widely utilised in numerous vertical farms worldwide.</p>
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<b>Aeroponics</b>	Aeroponics cultivates plants in a <b>soil-free mist environment with roots hanging down in a closed-air container</b> . This method <b>uses 90% less water than hydroponics</b> , making it a highly efficient system of food production. Plants grown aeroponically absorb more nutrients, resulting in healthier and more nutritious produce.
<b>Aquaponics</b>	Aquaponics <b>integrates fish production into plant cultivation</b> . The system <b>utilises fish-produced nutrient rich waste as a feed resource for plants</b> , and plants, in turn, purify and recycle wastewater for fish ponds.

### Crops suitability

<b>Leafy greens and vegetables</b>	Lettuce, spinach, kale (karam Saag), pak choi, arugula, coriander, chard, collard green tomatoes, pepper, broccoli, cucumber, beans
<b>Herbs</b>	Chives, basil, mint, oregano, fennel and parsley
<b>Fruits</b>	Strawberries, blueberries

Figure 3. Source- Kurukshetra

### What is the need for Vertical Farming and Hydroponics in India?

**1. Diminishing Farmlands and increasing urbanisation-** According to UN report, **53% of Indian Population is expected to live in cities by 2050**. Vertical and hydroponic farming, can ease pressure on agricultural lands for a healthier and more sustainable future.

**2. Potential for Economic Growth-** According to IMARC

Group's latest research report, the India vertical farming market is expected to demonstrate **a CAGR of 25.4% during the period 2023-2028**, which will propel economic growth.

**3. Address the diminishing production due to climate change-** It is a contemporary practice of cultivating crops in stacked layers within protected indoor environments, can help in addressing diminishing agricultural resources due to changing climate.

**4. Enhancing food production-** It has the potential to enhance food production, maintain quality and **contribute to sustainable urban farming**.

**Read More-** [Methods of Farming](#)

### What are the associated advantages?

**1. Less land requirement-** Hydroponics in conjunction with vertical farming **utilises 99% less land** compared to traditional farming due to the concentrated root system.

**2. Year-round cultivation of seasonal crops-** It enables the creation of a **controlled microclimate**, allowing year-round indoor cultivation of regional or seasonal crops.

**3. Reduced need of pesticides-** It **protects crops from soil-borne pests and diseases**, and adverse weather conditions, thereby reducing the need for pesticides and fertilisers.

**4. Flexibility of installation-** It is flexible to set up locations of vertical farming anywhere. Hence, it reduces transportation and warehouse costs, streamlining the supply chain.

### What are the associated Challenges?

**1. Shortage of Skilled labour Force-** There is **shortage of expert labour force** which can execute vertical farming, leading to elevated labour costs.

**2. Increased cost of production-** Vertical Farming is **highly energy-intensive having artificial lighting, temperature, and humidity requirements**, which increases the cost of production.

**3. Absence of natural pollinators-** There is **absence of natural pollinators in controlled conditions**. This can result in poor fruit sets and the production of small, misshapen fruits.

**4. Confined range of crop production-** The range of crops cultivated commercially is usually **confined to leafy vegetables and microgreens**.

**5. Regular maintenance requirement-** It requires continuous attention and care, with components like pumps and nutrient delivery systems needing regular maintenance.

#### **What should be the way Forward?**

**1. Increasing affordability-** Vertical farming's affordability can be enhanced by **utilising cheap and available shipping containers** and abandoned warehouses.

**2. Collaborative research-** Collaborative research must be **undertaken in the field of vertical farming** to enhance technological practices for increased sustainability.

**3. Supportive policies-** Supportive policies and incentives, like **grants and tax benefits**, can encourage investment and promote urban agriculture through agri-startups.

**Read More- [Indian Express](#)**

**UPSC Syllabus- GS 3- Modern agricultural techniques**