



PM-PRANAM

[Source: PIB](#)

The Union Minister of State for Chemicals and Fertilisers in reply to a question in the Lok Sabha provided information regarding the PM-PRANAM initiative of the government.

- **PM-PRANAM** stands for **PM Programme for Restoration, Awareness Generation, Nourishment, and Amelioration of Mother-Earth**.
 - It was announced in the [2023-24 Budget](#) by the Union government.
- **Aim:** To **complement state/UT** efforts to promote:
 - Sustainable and **balanced use of fertilisers**.
 - Encourage the **adoption of alternative fertilisers**.
 - Promote [organic](#) and [natural farming](#) practices.
- **Financial Mechanism:** **States and UTs that reduce their chemical fertiliser consumption compared to the past 3 years' average will receive 50% of the savings from the fertiliser subsidy.**
 - This grant can be used for the benefit of the local population, including farmers.
- **Fertiliser Types Covered:** Urea, [DAP \(Diammonium Phosphate\)](#), [NPK \(Nitrogen, Phosphorus, Potassium\)](#), and [MOP \(Muriate of Potash\)](#).
- **Scope:** All States and UTs in India.
- **Cabinet Committee on Economic Affairs (CCEA):**
 - It is chaired by the **Prime Minister**, and **sets priorities for public sector investments**.
 - It continuously **reviews economic trends** to develop an integrated economic policy framework and oversees policies and activities in the economic field, including foreign investment, requiring high-level decisions.

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PM-PRANAM

PM Programme for **Restoration, Awareness Generation, Nourishment** and **Amelioration** of Mother-Earth



Objective

To protect the health of “Mother Earth” by Incentivising the States/UTs with **reduced use of chemical fertilizers and promoting organic/ natural farming** and use of alternate fertilizers.

Methodology

Incentives to the states for **promoting alternate fertilizers and balanced chemical fertilizer** use to promote natural farming.



No separate financial support required

Read More: [PM-PRANAM Scheme and Increased FRP](#)

Perseid Meteor Shower

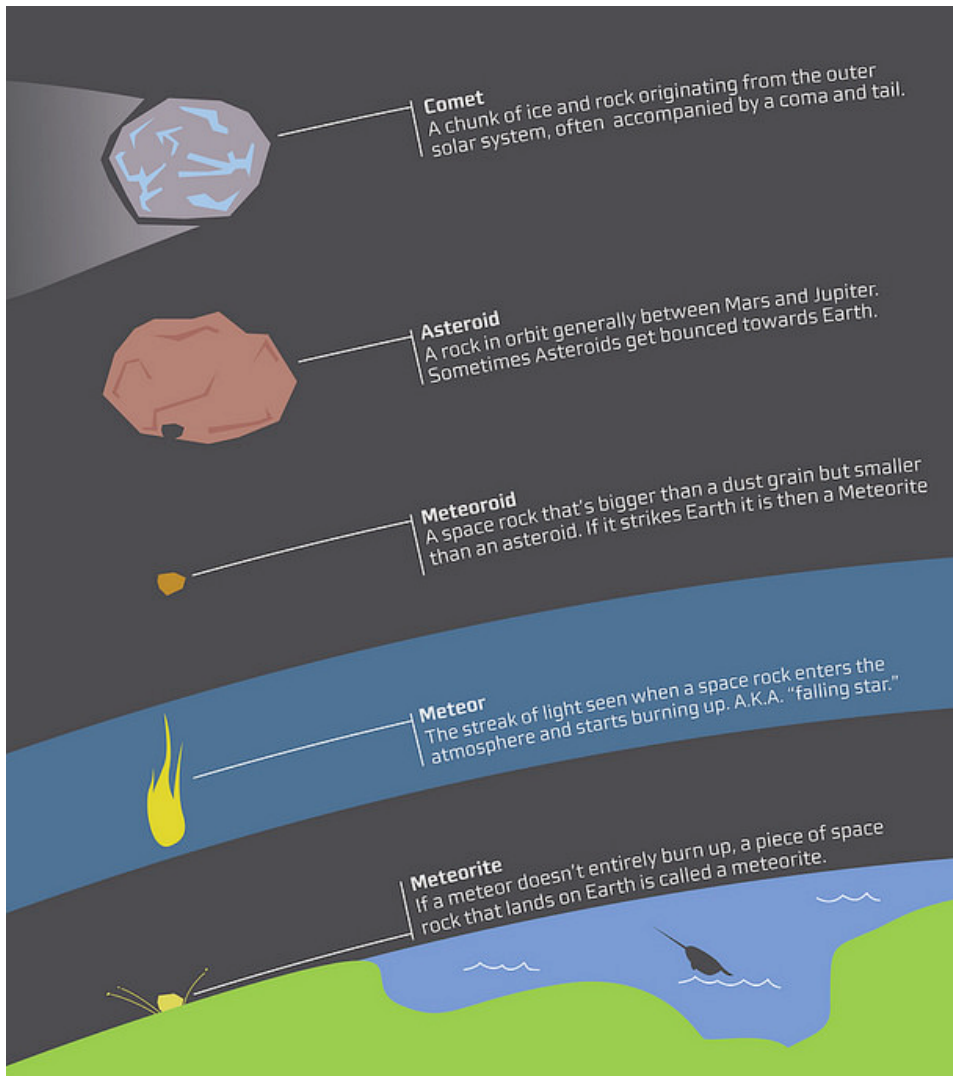
Source: [TH](#)

In 2024, the [Perseid meteor shower](#) began around July and will last until late August with peak activity occurring from 11th to 13th August, 2024. The meteor shower might be visible to the naked eye in many places between midnight and dawn, especially in the **northern hemisphere**.

- The Perseid meteors are debris left behind by the [comet Swift-Tuttle](#), which orbits the Sun in an **elliptical path** that takes 133 years to complete once.
 - The name Perseid is believed to be derived from the **Perseus constellation**.
 - Comets are **frozen leftovers** from the formation of the **solar system** composed of **dust, rock, and ices**.
- When the **earth** moves through the **cloud of debris** intersecting its path around the Sun, **Earth's**

gravity pulls the debris towards itself, producing the **meteor shower**.

- A meteor shower is a **raining-down of meteors (small pieces of rock in space)** over the earth from space at a particular time of year.
 - Most meteors **burn** up in the **atmosphere**.
 - Some that take a more **tangential path** through the air produce **small fireballs**.
- Meteors are better known as **"shooting stars"**. The light phenomenon in the **atmosphere** is called a **"meteor"**, while the **dust particle** is called a **"meteoroid"**.



Read More: [Sky Canvas: Artificial Meteor Showers](#)

Possible Decline in Coffee Production

[Source:TH](#)

Why in News?

Recently, [Coffee Board of India](#) hinted that India's coffee production for 2024-25 may see a significant drop due to plant and berry losses caused by high temperatures, heavy rainfall, and [landslides](#) in key growing regions.

What's the Status of Coffee Production in India?

- India is the **6th largest coffee producer** and **5th largest exporter** globally, accounting for 3.14% of global coffee output.
- **70% of India's coffee** produced is exported, **while 30% is consumed domestically**. India is renowned for its high-quality [coffee varieties](#).
 - India produced around 3.6 lakh metric tonnes of green coffee in 2023–24 [crop](#) year.
- **Coffee Varieties in India: Arabica and Robusta.**
 - **Characteristics of Arabica:** Grown at higher altitudes and it has higher market value due to its aroma.
 - **Characteristics of Robusta:** Known for its strength and used in various blends.
- **Causes of Declining Coffee Output:**
 - **Prolonged drought** and soaring temperatures during the April-May period led to scorching of blossom clusters and fruit burn at the pinhead stage.
 - **Heavy Rainfall** in July, caused severe issues like berry dropping, stalk rot, and wet foot conditions due to flooding.
 - **Landslides** in key coffee-growing areas like Sakleshpur and [Wayanad](#) resulted in significant plant and plantation losses. These combined factors have led to an estimated yield **loss of 15% to 20%** in the coffee belt, with the actual damage potentially being higher.

What are the Key Facts about Coffee Production?

- **History:**
 - Coffee was introduced to India during the late 17th century; the Dutch (who occupied much of India throughout the 17th century) helped spread the cultivation of coffee across the country, but it was with the **arrival of the British in the mid-19th century that commercial coffee farming fully flourished.**
- **About:**
 - Coffee in India is grown under a canopy of thick natural shade in ecologically sensitive regions of the [Western and Eastern Ghats](#).
 - This is one of the 25 [biodiversity hotspots](#) of the world.
 - Coffee contributes significantly to sustain the unique bio-diversity of the region and is also responsible for the socio-economic development in the remote, hilly areas.
 - Coffee offers protection against oxidative damage, reduces the risk of **type 2 diabetes, and lowers the risk of age-related diseases.**
- **Climatic Conditions Required:**
 - **Climate** - Hot and humid; **temperature** - ranging between **15°C and 28°C**; **rainfall** - 150 to 250 cm.
 - **Frost, snowfall, high temperature >30°C and strong sun shine** is not good for coffee crops and is generally grown under shady trees.
 - **Dry weather is necessary** at the time of ripening of the berries.
 - Stagnant water is harmful and the crop is grown on hill slopes at elevations from 600 to 1,600 metres above sea level.
 - **Well drained loam containing a good deal of humus** and minerals like **iron** and **calcium** is ideal for coffee cultivation.
- **Soil Type:**
 - Coffee can be grown on lots of [soils](#) but the ideal types are fertile **volcanic red earth or deep sandy loam.**
 - For coffee trees to grow, it is important that the soil is well drained which makes heavy clay or heavy sandy soils inadequate.
- **Major Areas:**
 - In India, coffee is traditionally grown in the Western Ghats spread over **Karnataka, Kerala and Tamil Nadu.**
 - **Karnataka is the largest producer** accounting for about 70% of the total coffee production, followed by Kerala at 23%
 - Coffee cultivation is also expanding rapidly in the nontraditional areas of Andhra Pradesh, Telangana and Odisha as well as in the North East states.

Note:

Coffee's Impact on Climate Change:

- **Coffee production contributes 40-80% of total GHG emissions of Coffee cycle**, mainly due to mechanisation and intensive irrigation from transitioning to sun-exposed fields. **Fertilisers emit nitrous oxide** and are produced using large quantities of natural gas.
- Heating and keeping water warm for coffee preparation impacts the carbon footprint, with greater emissions in regions using high-carbon electricity.
- Coffee capsules can reduce waste and emissions by optimising coffee and water use, but their manufacturing and disposal add to the carbon footprint if not recycled.

Coffee Board of India

- It is a **statutory organisation** that was constituted under Section (4) of the **Coffee Act, 1942**.
- It functions under the administrative control of the **Ministry of Commerce and Industry**.
- The Board comprises 33 Members including the Chairperson, who is the Chief Executive and it **functions from Bangalore**.
- The Board mainly focuses its activities in the areas of research, extension, development, market intelligence, external & internal promotion for coffee.

Read More: [India's Coffee](#), [Araku Coffee](#), [World Coffee Conference 2023](#)

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. Match List-I with List-II and select the correct answer using the code given below the Lists: (2008)

	List-I (Board)		List-II (Headquarters)
A.	Coffee Board	1.	Bengaluru
B.	Rubber Board	2.	Guntur
C.	Tea Board	3.	Kottayam
D.	Tobacco Board	4.	Kolkata

Code: A B C D

- (a) 2 4 3 1
(b) 1 3 4 2
(c) 2 3 4 1
(d) 1 4 3 2

Ans: (b)

Q.2 Though coffee and tea both are cultivated on hill slopes, there is some difference between them regarding their cultivation. In this context, consider the following statements: (2010)

1. Coffee plants require a hot and humid climate of tropical areas whereas tea can be cultivated in both tropical and subtropical areas.
2. Coffee is propagated by seeds but tea is propagated by stem cuttings only.

Which of the statements given above is/are correct?

- (a) 1 only
(b) 2 only
(c) Both 1 and 2

(d) Neither 1 nor 2

Ans: (a)

Nitrogen Use Efficiency and Biofortification

For Prelims: [Nitrogen](#), [Nitrogen Use Efficiency \(NUE\)](#), [High Yielding Varieties](#), [Nitrous Oxide \(N₂O\)](#), [Ammonia Pollution](#), [Ozone Depletion](#), [Climate Change](#), [Dead Zones](#), [Algal Bloom](#), [Ground Level Ozone](#), [Indian Council of Agricultural Research \(ICAR\)](#), [CR Dhan 416](#), [Durum Wheat Variety](#), [Biofortification](#), [Nutrient Density](#), [Biotechnology](#), [Copenhagen Consensus](#)

For Mains: Significance of Biofortified Foods in Meeting Nutritional Security in India and Associated Challenges.

[Source: TH](#)

Why in News?

Recently, [biotechnologists](#) have found significant variation in nitrogen-use efficiency among popular Indian rice varieties, enabling the development of [high-yielding](#), low-nitrogen varieties to cut fertiliser costs and reduce pollution. The most efficient varieties had a [nitrogen use efficiency \(NUE\)](#) that was five times higher than the least efficient ones.

- In another development, the Prime Minister of India launched 109 high-yielding, climate-resilient, [biofortified](#) seed varieties developed by the [Indian Council of Agricultural Research \(ICAR\)](#) to boost farm productivity and farmers' incomes.

What is Nitrogen Use Efficiency (NUE)?

- **About:**
 - It is used to describe the efficiency of a plant in using **applied or fixed nitrogen** for biomass production.
 - It is further defined as the **ratio** between **crop yield** and the **amount of nitrogen absorbed** from the soil through roots or from the atmosphere through fixation by bacteria.
 - NUE in cereals, particularly rice, is a **critical factor** in agricultural sustainability.
- **Concerns:**
 - **Poor NUE** wastes Nitrogen fertilisers worth **Rs 1 lakh crore** a year in India and over **USD 170 billion per year** globally.
 - Nitrogen fertilisers are the main source of [nitrous oxide](#) and [ammonia pollution](#) of air and nitrate/ammonium pollution of water, affecting our health, biodiversity, and climate change.
 - **India** is the world's **second-largest** source of [nitrous oxide \(N₂O\)](#), a greenhouse gas that heats up the atmosphere far more than carbon dioxide.
 - In 2020, nearly **11%** of such global man made emissions were from **India**, next only to China (16%). The major source of these emissions is [fertiliser usage](#).

What is Nitrogen Pollution?

▪ **About:**

- Nitrogen pollution is caused when some **nitrogen compounds** like ammonia and nitrous oxide become too abundant in the environment posing health risks.
- In the past 150 years, human-driven flows of **reactive nitrogen** have increased **tenfold**, contributing to a dangerous **accumulation** of unused reactive nitrogen.
- The uptake by crops of nitrogen as fertiliser is limited. Each year, 200 million tonnes of **reactive nitrogen (80%)** is lost to the environment, **leaching** into soil, rivers and lakes and emitted to the air.
 - As a result, ecosystems are **over-enriched**, biodiversity lost and human health affected. In some forms, it contributes to **ozone depletion** and **climate change**.

▪ **Effects:**

◦ **Climate Change and the Ozone Layer:**

- Nitrous oxide is **300 times** more **potent** than methane and carbon dioxide as a **greenhouse gas**.
- It is also the biggest human-made threat to the **ozone layer**.

◦ **Biodiversity and Ecosystems:**

- Nitrogen pollution can **degrade soils**. Excessive application of synthetic fertilisers make soil acidic, damaging soil health and reducing the productivity of soils.
- It can cause the inadvertent **fertilisation** of trees and grasslands or nitrogen tolerant species to outcompete more sensitive wild plants and **fungi**.
- Nitrogen pollution can create "**dead zones**" in the ocean and cause toxic **algal blooms** to spread in **marine ecosystems**.

◦ **Air:**

- Nitrogen oxides generated from coal power plants, factory emissions and vehicle exhausts, can lead to **smog** and **ground-level ozone**.
- Agricultural ammonia emissions combined with pollution from vehicle exhausts create extremely dangerous **particulates** in the air, which can exacerbate **respiratory diseases**.

What are the Biofortified Seed Varieties Developed by ICAR?

- **About:** The biofortified seed varieties, launched recently by the PM, cover 61 crops, including 34 field crops and 27 horticultural varieties.

- **Crop Varieties:** Cereals, millets, forage crops, oilseeds, pulses, sugarcane, cotton, and fibre crops.
- **Horticulture:** Fruits, vegetables, plantation crops, tubers, spices, flowers, and medicinal plants.
- **Some Examples:**
 - **CR Dhan 416:** It is a rice variety ideal for **coastal saline areas**. It is moderately resistant to **brown spot, neck blast, sheath rot, rice tungro disease, and glume discoloration**, besides offering full resistance to **brown plant hopper, grasshopper and stem borer**.
 - **Durum Wheat Variety:** It is adapted for **irrigated conditions** and suitable for Maharashtra, Karnataka, and the plains of Tamil Nadu. It is tolerant to **terminal heat, resistant to stem and leaf rusts, and biofortified** with higher levels of zinc (41.1 ppm) and iron (38.5 ppm). It also contains 12% protein.

▪ **About Biofortification:**

- **Biofortification** is the process by which the **nutrient density** of food crops is increased through conventional plant breeding, improved **agronomic practices** and modern **biotechnology** without sacrificing any characteristic that is preferred by consumers.
- It is recognized as a **nutrition-sensitive-agriculture intervention** that can reduce vitamin and mineral deficiency.
- Examples of biofortification projects include:
 - **Iron-biofortification** of rice, beans, sweet potato, cassava and legumes;
 - **Zinc-biofortification** of wheat, rice, beans, sweet potato and maize;
 - **Provitamin A carotenoid-biofortification** of sweet potato, maize and cassava; and
 - **Amino acid and protein-biofortification** of sorghum and cassava.

▪ **Need of Biofortification:**

- **Malnutrition:** India has very high levels of malnutrition among women and children. According to [NFHS-5 2019-21](#), 57% of women in the age group 15-49 and 67% children between 6 and 59 months are anaemic. Iron, [Vitamin A](#), and Iodine deficiencies are the most prevalent ones.
 - Biofortification can help reduce the occurrence of malnutrition and hidden hunger by providing deficient nutrients.
- **Disease Resilient:** Biofortified crops are often more resilient to **pests, diseases, high temperatures**, and **drought**, while also offering high yields.
- **Sustainable:** Once biofortified seeds are developed, they can be replicated and distributed without losing their **micronutrient concentration**, making them cost-effective and sustainable.
- **No Behaviour Change Needed:** It seamlessly delivers nutrients without altering people's food habits or cultural practices, making it a socio-culturally acceptable approach.
- **Cost Effective:** Biofortification is cost-effective using the existing technology and delivery platforms. The [Copenhagen Consensus](#) estimates that every 1 Rupee spent on fortification results in 9 Rupees in benefits to the economy.

Drishti Mains Question

Q. How biotechnology can help in achieving food and nutritional security?

Q. What challenges are associated with edible products created using biotechnology which hinder its widespread adoption in India?

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. Consider the following: (2019)

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

Which of the above are released into the atmosphere due to the burning of crop/biomass residue?

(a) 1 and 2 only

(b) 2, 3 and 4 only

(c) 1 and 4 only

(d) 1, 2, 3 and 4

Ans: (d)

Q Consider the following statements: (2019)

1. Agricultural soils release nitrogen oxides into the environment.
2. Cattle release ammonia into the environment.
3. Poultry industry releases reactive nitrogen compounds into the environment.

Which of the statements given above is/are correct?

(a) 1 and 3 only

(b) 2 and 3 only

(c) 2 only

(d) 1, 2 and 3

Ans: (d)

Q. Consider the following statements: (2017)

1. The nation-wide 'Soil Health Card Scheme' aims at expanding the cultivable area under irrigation.
2. enabling the banks to assess the quantum of loans to be granted to farmers on the basis of soil quality.
3. checking the overuse of fertilisers in farmlands.

Which of the above statements is/are correct?

(a) 1 and 2 only

(b) 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

Ans: (b)

Q. Why does the Government of India promote the use of 'Neem-coated Urea' in agriculture? (2016)

- (a) Release of Neem oil in the soil increases nitrogen fixation by the soil microorganisms.
- (b) Neem coating slows down the rate of dissolution of urea in the soil.
- (c) Nitrous oxide, which is a greenhouse gas, is not at all released into the atmosphere by crop fields.
- (d) It is a combination of a weedicide and a fertiliser for particular crops.

Ans: (b)

Mains

Q. What are the research and developmental achievements in applied biotechnology? How will these achievements help to uplift the poorer sections of the society? (2021)

Q. How can biotechnology help to improve the living standards of farmers? (2019)

Q. Why is there so much activity in the field of biotechnology in our country? How has this activity benefitted the field of biopharma? (2018)

Civil Registration System (CRS) Portal

[Source: TH](#)

The centralised [Civil Registration System \(CRS\) portal](#), responsible for registering births and deaths across India, has been facing significant technical issues, leading to widespread disruptions in the issuance of certificates.

- According to the [2023 Registration of Births and Deaths \(Amendment\) Act](#), all births and deaths in India from **1st October 2023** will be digitally registered through the CRS portal.
 - The digital birth certificates will serve as proof of date of birth for various services.
 - The centralised database will update the [National Population Register \(NPR\)](#), [ration cards](#), property registration and [electoral rolls](#).
 - The NPR, collected in 2010 and updated in 2015, has a database of 119 crore residents.
 - So far, 23 States and six union territories have migrated to the new portal. States such as **Tamil Nadu which have their own portals** send the data compulsorily to the Centre in a real-time basis as mandated by the 2023 amendment.
- States have flagged issues in the CRS portal, such as slow performance, frequent error messages, and data syncing problems. These issues have caused delays in issuing certificates.

Read more: [India's Civil Registration System Report](#)

No Legal Right on Child for Sperm/Egg Donors

[Source: TH](#)

Recently, The **Bombay High Court** ruled that a **sperm or egg donor** does not have **legal rights** over a child and cannot claim to be the biological parent.

- Surrogacy is an **arrangement in which a woman (the surrogate)** agrees to carry and give birth to a child on behalf of another person or couple (the intended parent/s).
 - A surrogate, **sometimes also called a gestational carrier**, is a woman who conceives, carries and gives birth to a child for another person or couple (intended parent/s).
- Under [the Surrogacy \(Regulation\) Act, 2021](#) a **widow or divorcee aged 35-45 or a legally married couple can avail of surrogacy** if they have a medical condition necessitating this option.
 - The intended **couple shall be legally married for at least 5 years**. Indian **man** aged **26-55 years** and a **woman** aged **25-50 years**, who have no previous biological, adopted, or surrogate child.
- It also bans commercial surrogacy, which is punishable with a **jail term of 10 years and a fine of up to Rs 10 lakhs**.
- The **law permits only altruistic surrogacy**, where no money is exchanged, and the **surrogate mother must be genetically related to the intended parents**.
- Upon birth, the **child is legally recognised as the biological child of the intended couple**.

Understanding Surrogacy and its Regulation

SURROGACY

- Having another woman bear a child for a couple (or single women or men) to raise.
- The surrogate offers to carry a baby through pregnancy and then return the baby to the intended parent(s) once it is born.
- Surrogacy is an option to fulfill the desire to have a child of a couple for whom it is physically or medically impossible or undesirable to carry a baby to term on their own.
- There are two types of surrogacy – traditional surrogacy and gestational surrogacy.
- In Traditional Surrogacy, a surrogate mother is artificially inseminated, either by the intended father or an anonymous donor. The surrogate mother provides the egg and is thus genetically related to the child.
- In Gestational Surrogacy, an embryo is created using an egg and sperm produced by the intended couple and is transferred into the surrogate's uterus. The surrogate has no genetic link to the child. Her eggs cannot be used to conceive the child.
- The Surrogacy (Regulation) Bill seeks to allow and regulate Gestational Surrogacy.
- Surrogacy can be altruistic or commercial. In altruistic surrogacy, the surrogate is not paid for her services, except for medical expenses and insurance. In commercial surrogacy, the surrogate is paid over and above these expenses.
- The Surrogacy (Regulation) Bill seeks to ban commercial surrogacy but protect the altruistic surrogate through enhanced, prescribed payments (for medical expenses, food and care, longer-duration insurance).

INDICATIONS FOR SURROGACY

- Opting for surrogacy is often a choice made when women are unable to carry children on their own.
- This can be for a number of reasons, including an abnormal uterus or a complete absence of a uterus either congenitally or post-hysterectomy.
- Women may have a hysterectomy due to complications in childbirth, medical diseases such as cervical cancer or endometrial cancer, or heart and renal conditions, etc

WHAT DO OTHER COUNTRIES DO?

- Russia, Georgia, Ukraine, Columbia, Iran, and some states of the US allow commercial surrogacy
- France, Finland, Italy, Japan, Spain, Sweden, Switzerland, Hungary, Ireland, etc. have banned all forms of surrogacy.
- India seeks a middle path between these extremes, by banning commercial surrogacy (including for foreigners) while allowing and regulating altruistic surrogacy for all persons of Indian origin.
- Australia, Canada, Israel, Netherlands, New Zealand, South Africa, UK, Vietnam, Thailand, Cambodia, Nepal, Mexico have similar surrogacy practices as India seeks to establish.

Read more: [Assisted Reproductive Technology](#)

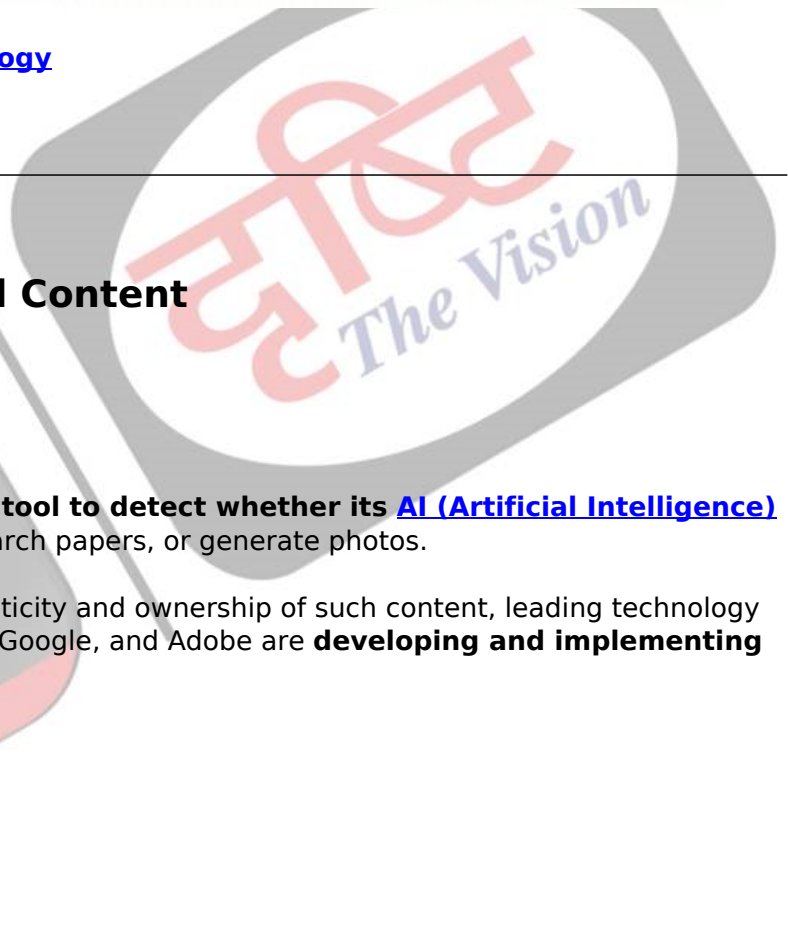
Watermarking on AI Generated Content

Source: [ToI](#)

Why in News?

Recently, ChatGPT-maker OpenAI **developed a tool to detect whether its [AI \(Artificial Intelligence\) chatbot has been used](#)** to write essays, research papers, or generate photos.

- To address issues concerning the authenticity and ownership of such content, leading technology companies like OpenAI, Meta, Microsoft, Google, and Adobe are **developing and implementing watermarking techniques**.



Artificial Intelligence(AI)

AI is the simulation of human intelligence in machines programmed to think and learn like humans, capable of problem-solving, reasoning, and adapting to new information.

AI Timeline - Major Milestones

- 1950s** Turing Test Proposed; First AI Programs Developed
- 1956** Dartmouth Conference Coins "Artificial Intelligence"
- 1960s** Eliza Chatbot Created; Early Neural Networks Emerge
- 1996** Deep Blue - a Chess-Playing Program
- 2012** Deep Learning Breakthrough in Image Recognition
- 2014** Generative Adversarial Networks (GANs) Introduced
- 2020** GPT-3 Demonstrates Advanced Language Generation
- 2022** Chatgpt Launches, Bringing Conversational AI to Masses
- 2023** Generative AI Boom; Major Tech Companies Release AI Models



Applications of AI

- ↳ **Healthcare:** Personalised medicine
- ↳ **Finance:** Algorithmic trading
- ↳ **Transportation:** Autonomous vehicles
- ↳ **Marketing & Customer Service:** Targeted advertising, chatbots
- ↳ **Education:** Adaptive learning systems, personalised tutoring
- ↳ **Agriculture:** Crop monitoring
- ↳ **Cybersecurity:** Threat detection
- ↳ **Energy:** Smart grid management, consumption forecasting

Concerns

- ↳ Deepfakes & misinformation
- ↳ Algorithmic bias
- ↳ Automation & job displacement
- ↳ Privacy issues
- ↳ Data ownership & liability issue
- ↳ Ethical decision-making complexes

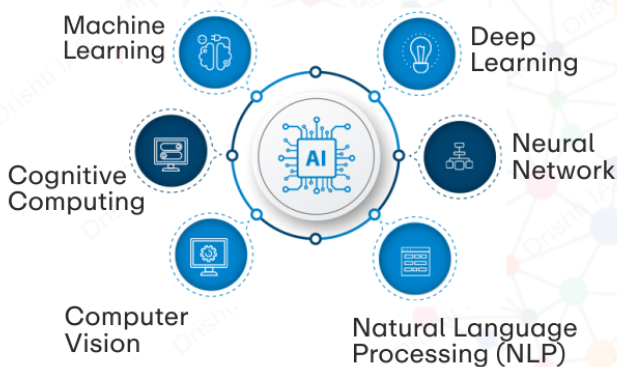
Regulating AI

- ↳ **Global Partnership on AI (GPAI)** launched in 2020
- ↳ **Bletchley Declaration (2023):** Enhance Global Collaboration on AI
- ↳ **G20 New Delhi Leaders' Declaration (2023):** Harnessing AI responsibly for good and for all
- ↳ **Hiroshima AI Process (2023)** by G7

India and AI

- ↳ **National Strategy For AI 2018**
- ↳ **AI For All:** Self-learning online program
- ↳ **GPAI Summit 2023** hosted by India
- ↳ **IndiaAI Mission 2024**
- ↳ **US India Artificial Intelligence (USIAI) Initiative:** AI cooperation in critical areas
- ↳ **AIRAWAT** (AI Research, Analytics and Knowledge Assimilation Platform): Supercomputer

KEY COMPONENTS OF AI



What is Watermarking on AI Generated Content?

▪ About:

- The AI watermarking technique is **used to identify what's AI-generated and what is**

an original work.

- It is a **digital signature that serves as a unique identifier**, akin to a fingerprint, allowing for the tracing of the AI model used to create the content back to its origin.

▪ **Need of Watermarking:**

- **Authentication and Validation:** It provides a reliable method for verifying the authenticity of digital files, crucial in combating **deepfake** videos, manipulated images, and deceptive media in a digitally-driven world.
- **Tamper-Evident Records:** Integrating AI watermarking with **blockchain** and **public key infrastructure** ensures that any attempts to alter or manipulate content are detectable, preserving the integrity of digital records.
- **Trust and Confidence:** By assuring the authenticity of media, AI watermarking helps content creators, distributors, and consumers combat **misinformation** and counterfeiting, bolstering trust and understanding of content provenance.

▪ **Steps to Ensure AI Authenticity:**

- **Coalition for Content Provenance and Authenticity (C2PA):** A collaboration between Adobe, Intel, Microsoft, Sony, and other leading firms to establish standards for verifying the authenticity of audio-visual content.
- **Use of Blockchain Technology:** **Blockchain technology** ensures transparency by providing an immutable, publicly accessible record of digital asset ownership and provenance.
- **Ethereum Improvement Proposal:** This project proposes adding C2PA consent data, including content consent for AI and ML (Machine Learning) data mining, to on-chain metadata, leveraging blockchain technology **to enhance security and transparency**.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. With the present state of development, Artificial Intelligence can effectively do which of the following? (2020)

1. Bring down electricity consumption in industrial units
2. Create meaningful short stories and songs
3. Disease diagnosis
4. Text-to-Speech Conversion
5. Wireless transmission of electrical energy

Select the correct answer using the code given below:

- (a) 1, 2, 3 and 5 only
(b) 1, 3 and 4 only
(c) 2, 4 and 5 only
(d) 1, 2, 3, 4 and 5

Ans: (b)

Dalit Business Owners Face Income Disparity

For Prelims: Dalit, [Scheduled Tribes](#), [Other Backward Classes](#), [Jyotiba Phule](#), [Dayanand Saraswati](#), Bhakti Movement, Neo-Vedantic Movements, [Dr. B.R. Ambedkar](#), [Article 17](#)

[Source: TH](#)

Why in News?

A study from the Indian Institute of Management Bangalore reveals that **Dalit business owners in India face a notable income gap** compared to other **marginalised groups** despite similar levels of education and social capital.

- The study underscores the impact of institutional stigma on economic outcomes for Dalits, highlighting the persistent disparities in their business income.

What are the Key Highlights of the Study?

- **Methodology:** The study utilises data from the **India Human Development Survey (IHDS) of 2011**, covering over 42,000 households across 373 districts in India to analyse income disparities among business-owning households.
- **Impact of Institutional Stigma**
 - The study highlights the unique stigma-related disadvantages faced by Dalit business owners, which are **not comparable to other identity-based challenges like gender, race, or ethnicity**.
 - The study defines institutional stigma as the prejudice and negative perceptions ascribed to **individuals based on their demographic group membership**, which perpetuates through interconnected social mechanisms.
 - Dalit business owners **face lower income levels due to their historically marginalised status**, which restricts their access to resources, opportunities, and individual dignity, hindering their economic advancement.
- **Income Disparities: Dalit business owners face a significant income gap, earning approximately 16% less compared to other marginalised communities, such as Other Backward Classes (OBCs), Scheduled Tribes (STs), and religious minorities like Muslims.**
 - This income gap persists even when controlling for factors such as **education, land ownership, urban setting, and social environment**.
- **Social Capital: Social capital refers to the networks of relationships among people that enable a society or community to function effectively.**
 - Social capital generally benefits business owners by providing access to networks and resources; however, Dalits benefit significantly less from these networks compared to other disadvantaged groups.
 - A standard deviation increase in **social capital results in a 17.3% increase in business income** for non-stigmatized communities, **but only a 6% increase for Dalit households**.
- **Human Capital:** Human capital refers to the personal attributes, including knowledge, skills, education, health, and other valued factors, that contribute to the production process.
 - The study highlights that **although education benefits Dalits, it is insufficient to overcome the income disadvantage** resulting from stigma.
- **Limitations of the Study:**
 - The study's measure of social capital is somewhat limited, capturing connections but not the number or strength of these ties.

- The study uses 2011 data, which may not fully capture current economic dynamics and changes in caste-based income disparities. The findings may need re-evaluation with more recent data to assess the present-day relevance of the results.

What are the Implications of this Income Disparities?

- **Challenging Conventional Views:** The study challenges the conventional view that **caste identity is just one of many factors contributing to income disparity**, instead highlighting the unique stigma-related disadvantages faced by Dalits.
- **Need for Fair Economic Systems:** The findings underscore the need for economic systems that are **fair and do not determine success based on one's born identity**.
 - The study calls for a deeper understanding of the underlying processes of discrimination faced by Dalit communities.
- **Targeted Interventions:** The study suggests that policy interventions should focus on addressing the **specific stigma-related challenges faced by Dalits**, rather than **relying on universal strategies** that may not effectively mitigate the income gap.
 - The findings open avenues for further research into the impact of stigma on economic outcomes that can better support marginalised communities in India.

Who are Dalits?

- **About: Dalits, historically referred to as "untouchables," are a marginalised group in India positioned at the bottom of the traditional caste hierarchy. This group has faced systemic discrimination, social exclusion, and economic deprivation for centuries.**
 - Dalits constitute approximately **16.6% of India's population**. They are primarily concentrated in states such as **Uttar Pradesh, Punjab, Bihar, Tamil Nadu, Andhra Pradesh, Rajasthan, Orissa, and Maharashtra**.
- **Historical Evolution of the Term "Dalit":**
 - The term "**Dalit**" derives from the Sanskrit word "**Dal**," which means "**ground**," "**suppressed**," or "**crushed**." It was first used by [Jyotiba Phule](#), a 19th-century social reformer, to describe those oppressed by the caste system.
 - Throughout history, Dalits have been known by various terms, including **Antyajas, Pariahs, and Chandalas**.
 - **Mahatma Gandhi** used the term "Harijan" (children of God) to describe Dalits. While intended to be more respectful, **many, including Dalit leaders, found it patronising and insufficiently empowering**.
 - **Scheduled Castes: The British administration officially recognised these groups as "Scheduled Castes" in 1935, formalising their status within the legal framework.**
 - Currently, legally Dalits are known as **Scheduled Castes in India**, and the Constitution mandates a list of these castes for compensatory programs. As of now, there are approximately **166.6 million Dalits in India**.
 - However, the list **excludes Dalit converts to Christianity and Islam**, although it includes those who converted to Sikhism.
 - The [Constitution \(Scheduled Castes\) Order, 1950](#), states that **only persons professing Hinduism, Sikhism, or Buddhism are deemed to be members of a Scheduled Caste**.
- **Dalit Oppression:**
 - **Caste System:** The roots of Dalit oppression trace back to the **origins of the caste system, as described in the Manusmriti**, a sacred Hindu text from the 2nd century BCE. Dalits were historically confined to menial tasks.
 - In the traditional **Varna system, untouchables were classified as Panchama Varna**, occupying the lowest rung in society. They were relegated to menial and polluting occupations and faced severe discrimination.
 - **Key Dalit Movement in Pre-Independence India:**
 - **Bhakti Movement: The 15th-century Bhakti Movement promoted social equality and challenged orthodox Hinduism. It included Saguna (God with form) and Nirguna (formless God) traditions.**

- Saints like **Ravidas and Kabir**, who inspired Dalits by advocating for social equality and spiritual salvation.
- **Neo-Vedantic Movements:** Initiated by reformers like [Dayanand Saraswati](#), these movements aimed to address untouchability within the caste system.
 - **Arya Samaj** founded by **Dayanand Saraswati** in 1875, aimed to reform Hinduism by **rejecting the caste system and promoting social equality**.
 - **Satyashodhak Samaj** established by **Jyotiba Phule** in 1873, this movement sought to **liberate non-Brahmins from Brahminical dominance**.
 - It focused on educational and social reforms to uplift the lower castes and challenged the existing caste hierarchies.
 - **Sanskritization Movement:** M.N. Srinivas defined Sanskritization as **low-caste groups adopting high-caste customs** to elevate their status.
 - Dalit leaders mimicked Brahmanic practices (e.g., **vegetarianism**) as a form of social assertion and elevation.
 - **Gandhi's Contributions:** He criticised **untouchability and founded the Harijan Sevak Sangh in 1932** to work towards the upliftment of Dalits.
 - **Mahatma Gandhi** viewed untouchability as a social evil and aimed to integrate Dalits into mainstream society.
 - **Dr. B.R. Ambedkar's Contributions:** He led various movements and legal battles for **Dalit rights, including the Mahad Satyagrah (1927) and Kalaram Temple Satyagrah (1930)**.
 - **Dr. B.R. Ambedkar** founded the **Bahiskrit Bharat and Samaj Samta Sangh**, and established the **Scheduled Castes Federation** to promote political representation and social equality.

What are the Challenges Faced by Dalits in Contemporary India?

- **Social Discrimination and Exclusion:** Dalits are often segregated in villages and urban areas, excluded from public spaces, and subjected to untouchability practices.
 - Discrimination persists even during crises, such as the 2004 Tsunami, where Dalits in Tamil Nadu faced severe exclusion from relief efforts.
- **Economic Exploitation:** Many Dalits work as [bonded labourers](#) due to debt, despite the practice being outlawed in 1976. They often receive minimal or no wages, with resistance met by violence.
 - About **80% of Dalits live in rural areas, primarily as landless labourers** or marginal farmers, exacerbating their economic vulnerability.
 - Despite legal prohibitions, [manual scavenging](#) remains a prevalent and degrading occupation for many Dalits.
 - According to the "**Income and Wealth Inequality in India**" report, the **top 1% of Indians received 22.6% of the national income in 2022**, up from 11.5% in 1951, while the **income share for the bottom 50% dropped from 20.6% to 15%**, and the middle 40% saw their share decline from 42.8% to 27.3% over the same period.
 - These figures underscore a **growing income gap** that has adversely affected **all disadvantaged communities, including Dalits**.
- **Political Marginalisation:** Despite reservations in political representation, Dalit issues are often sidelined by mainstream political parties.
 - Although there has been political mobilisation in recent years and the rise of Dalit leaders, the tangible benefits for the majority of Dalits have been limited.
- **Ineffective Laws:** Laws like the Protection of **Civil Rights Act, 1955** remain poorly implemented due to a lack of political will and institutional support.
- **Judicial Injustice:** Dalit women face severe discrimination due to a combination of **caste, class, and gender biases**. They are often subjected to **sexual exploitation** and violence,

with **conviction rates for these crimes being significantly lower** compared to other women in India.

- In certain regions, young Dalit girls are coerced into **prostitution under the pretense of religious or cultural practices**.
- **Migration and Urban Challenges: Many Dalit families migrate to cities, where they often end up in [urban slums](#), doing the lowest-paying jobs with minimal security.**
- However, there is a growing Dalit middle class in cities, gaining access to education and secure employment in public service, banking, and private industries.

What are the Initiatives and Schemes for Dalits in India?

- **Article 17 of the Constitution of India abolishes untouchability** and forbids its practice in any form. Enforcing any disability arising from untouchability is a punishable offence under the law.
- **Legislative Efforts:**
 - **[Scheduled Castes and Scheduled Tribes \(Prevention of Atrocities\) Act \(SC/ST Act\), 1989.](#)**
 - **Protection of Civil Rights Act, 1955: Aims to abolish the practice of untouchability in India.**
 - **Reservation Policies:** India implements **reservations for SC, ST, and OBC** in education and government jobs, aiming to provide opportunities for historically marginalised communities.
 - **[National Commission for Scheduled Castes \(NCSC\).](#)**
 - **[Mahatma Gandhi National Rural Employment Guarantee Act/scheme \(MNREGA/S\).](#)**
 - **[Stand Up India Initiative.](#)**

Way Forward

- **Black Capitalism in the US:** The experience of **black entrepreneurship in the US**, supported by targeted inclusion in supply chains, offers a model for how similar measures could benefit Dalit businesses in India.
 - While some Indian corporations have shown positive signs in supporting Dalit businesses, broader and more systemic changes are needed.
- **Enhancing Access to Networks:** Develop initiatives to **integrate Dalit entrepreneurs into broader business networks**, including both formal and informal sectors.
 - Encourage larger corporations to actively include Dalit businesses in their supply chains and procurement processes.
- **Improving Financial Support:** Ensure that the **Stand Up India initiative** is effectively implemented with better oversight.
 - Explore alternative funding mechanisms and provide risk capital to overcome barriers faced by Dalit entrepreneurs.
- **Addressing Social Discrimination:** Implement policies and programs that address **caste-based discrimination within market systems** and promote equitable treatment of Dalit entrepreneurs.
- **Policy Integration:** Align economic empowerment initiatives with **broader social justice goals** to ensure that advancements in the market also contribute to **addressing social inequalities**.

Drishti Mains Question:

Q. Examine the impact of institutional stigma on the economic outcomes with specific reference to Dalit entrepreneurs. How can policy interventions address these challenges?

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. With reference to 'Stand Up India Scheme', which of the following statements is/are correct? (2016)

1. Its purpose is to promote entrepreneurship among SC/ST and women entrepreneurs.
2. It provides for refinance through SIDBI.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (c)

Mains

Q1. Has caste lost its relevance in understanding the multi-cultural Indian Society? Elaborate your answer with illustrations. **(2020)**

Q2. "Caste system is assuming new identities and associational forms. Hence caste system cannot be eradicated in India." Comment. **(2018)**

Q3. Debate the issue of whether and how contemporary movements for assertion of Dalit identity work towards annihilation of caste. **(2015)**

Q4. Mahatma Gandhi and Dr. B.R. Ambedkar, despite having divergent approaches and strategies, had a common goal of amelioration of the downtrodden. Elucidate. **(2015)**

Uniform Civil Code

For Prelims: [Uniform Civil Code \(UCC\)](#), [Directive Principles of State Policy](#), [Hindu laws](#), [Law Commission](#)

For Mains: Significance of Directive Principles of State Policy in Indian Polity, Challenges and significance of Uniform Civil Code (UCC).

Source: [IE](#)

Why in News?

In his speech on the occasion of 78th Independence Day, the Prime Minister called for a [uniform civil code \(UCC\)](#), framing it as a **secular civil code**.

What is the Uniform Civil Code?

▪ About:

- **The Uniform Civil Code (UCC)** is outlined in **Article 44** of the Constitution as part of the **Directive Principles of State Policy**, which states that the government should **strive to establish a uniform civil code for all citizens across India**.
 - However, its implementation is left to the discretion of the government.
- **Goa** is the only state in India where a UCC is in place, following the **Portuguese Civil Code of 1867**.

▪ Historical Context:

- While the **British established uniform criminal laws in India**, they avoided standardising family laws due to their sensitive nature.
- During the debates the **Constituent Assembly** discussed the UCC and Muslim members raised concerns about its impact on community personal laws, proposing safeguards for religious practices.
- On other hand supporters like **K.M. Munshi, Alladi Krishnaswami, and B.R. Ambedkar** argued for the UCC to promote equality.

▪ Supreme Court of India's Stance on UCC:

- **Mohd. Ahmed Khan vs Shah Bano Begum Case, 1985**: The Court noted with regret that "**Article 44 has remained a dead letter**" and advocated for its implementation.
- **Sarla Mudgal v. Union of India, 1995** and **John Vallamattom v. Union of India, 2003**: The Court reiterated the need for implementing the UCC.
- **Shayara Bano v. Union of India, 2017**: The Supreme Court ruled that the practice of **triple talaq was unconstitutional** and violated the dignity and equality of Muslim women.
 - It also suggested that Parliament should pass legislation to regulate Muslim marriages and divorces.
- **Jose Paulo Coutinho v. Maria Luiza Valentina Pereira Case, 2019**: The Court praised Goa as a "shining example" where "the uniform civil code is applicable to all, regardless of religion except while protecting certain limited rights" and called for its implementation across India.

▪ Law Commission's Stance:

- In 2018, the **21st Law Commission**, led by former Supreme Court judge Justice Balbir Singh Chauhan, released a consultation paper on "Reforms of family law," stating that the "**formulation of a Uniform Civil Code is neither necessary nor desirable at this stage.**"

What are the Significances of the UCC?

▪ National Integration and Secularism:

- **Promotes Unity**: The UCC would foster **national integration** and **secularism** by creating a shared identity and sense of belonging among all citizens.
- **Reduces Conflicts**: It would decrease **communal and sectarian conflicts** arising from different personal laws.
- **Upholds Constitutional Values**: The UCC would reinforce the principles of equality, fraternity, and dignity for all individuals.

▪ Gender Justice and Equality:

- **Ensures Equality**: The UCC would address **gender discrimination and oppression** by providing equal rights and status to women in marriage, divorce, inheritance, adoption, and maintenance.
 - It would **empower women** to challenge patriarchal and regressive practices that violate their fundamental rights.

▪ Simplification and Rationalisation of the Legal System:

- **Simplifies Laws**: The UCC would streamline and rationalise the legal system by **eliminating the complexities and contradictions** of multiple personal laws.
- **Harmonizes Legal Frameworks**: It would reconcile **civil and criminal laws** by addressing anomalies and loopholes arising from diverse personal laws.
- **Enhances Accessibility**: The UCC would make the legal system more accessible and understandable for the general public.

- **Modernisation and Reform of Outdated Practices:**
 - **Updates Practices:** The UCC would modernise and **reform outdated and regressive practices** in some personal laws.
 - **Eliminates Harmful Practices:** It would remove **practices contrary to human rights and constitutional values**, such as triple talaq, polygamy, and child marriage.

What are Challenges in Implementing the UCC?

- **Diverse Personal Laws:** India's numerous communities follow distinct personal laws for **marriage, divorce, inheritance, and succession**. Harmonising these diverse practices into a single code poses a significant challenge.
- **Religious Sensitivities:** Different religious communities have deeply rooted traditions and laws.
 - They also argue that the **UCC** would infringe upon their constitutional rights under **Article 25**, which guarantees freedom of conscience and the right to freely profess, practice, and propagate religion.
- **Political and Social Opposition:** The UCC is often seen through a political lens. Parties and leaders may resist or support the **UCC based on electoral considerations, leading to inconsistent policies and delays**.
- **Social Concerns:** There is a fear that the UCC could disrupt traditional practices and create social unrest.
- **Legislative and Legal Hurdles:** Crafting a comprehensive UCC requires **extensive legislative work** and **detailed legal drafting** along with **administrative capacities** to address the nuances of various personal laws.

Way Forward

- **Unity and Uniformity:** **The UCC should acknowledge India's multiculturalism and maintain its diversity, emphasising that unity is more crucial than uniformity.**
 - The Indian Constitution supports both **integrationist and multicultural approaches** to address cultural differences.
- **Discussion and Deliberations with Stakeholders:** It is essential to engage a wide range of stakeholders, including **religious leaders, legal experts, and community representatives**, in the development and implementation of the UCC.
 - This engagement ensures that the UCC reflects diverse perspectives and is perceived as fair and legitimate by all citizens.
- **Striking a Balance:** The lawmakers should focus on removing practices that conflict with **constitutional standards** while ensuring cultural practices align with principles of **substantive equality and gender justice**.
 - Integrating **culturally sensitive practices** into a uniform system without alienating communities is a delicate balancing act.
- **Constitutional Perspective:** **The Indian Constitution supports cultural autonomy and aims for cultural accommodation, with Article 29(1) protecting the unique cultures of all citizens.**
 - Communities should assess whether practices such as **polygamy and unilateral divorce** align with their cultural values. The goal should be to create a just code that promotes equality and justice.
- **Education and Awareness:** Ensuring that all citizens are aware of and understand the UCC is crucial for effective implementation, requiring **extensive outreach and education** efforts.

Drishti Mains Question:

Discuss the major challenges in implementing the Uniform Civil Code across India. How can these challenges be addressed effectively?

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. Consider the following provisions under the Directive Principles of State Policy as enshrined in the Constitution of India: (2012)

1. Securing for citizens of India a uniform civil code
2. Organising village Panchayats
3. Promoting cottage industries in rural areas
4. Securing for all the workers reasonable leisure and cultural opportunities

Which of the above are the Gandhian Principles that are reflected in the Directive Principles of State Policy?

- (a) 1, 2 and 4 only
- (b) 2 and 3 only
- (c) 1, 3 and 4 only
- (d) 1, 2, 3 and 4

Ans: (b)

Mains:

Q. Discuss the possible factors that inhibit India from enacting for its citizen a uniform civil code as provided for in the Directive Principles of State Policy. (2015)