



Indian Poultry Sector

For Prelims: [H5N1](#), [Livestock sector](#), [Avian Influenza \(bird flu\)](#), [Environmental pollution](#), [Greenhouse gas emissions](#), [20th Livestock Census](#), [Central Pollution Control Board \(CPCB\)](#)

For Mains: Issues in the Indian Poultry Sector

Source: [TH](#)

Why in News?

Recently, the [H5N1 outbreak](#) has highlighted **critical vulnerabilities** in the industrial [livestock sector](#), underlining the imperative for a **comprehensive reassessment** of animal welfare within India's environmental and legal frameworks.

- This outbreak reinforces the [One Health principle](#), which integrates public health, ecosystem health, and biodiversity conservation.

What are the Issues Faced by the Indian Poultry Industry?

- **Disease Outbreaks and Biosecurity:**
 - **Avian Influenza:** Regular outbreaks of [Avian Influenza \(bird flu\)](#) **disrupt production**, lead to the culling of birds, and create market panic, impacting consumption.
 - **Newcastle Disease (ND):** ND is another highly contagious viral disease that affects poultry health and productivity.
 - **Biosecurity Concerns:** Inadequate **biosecurity measures** in farms and live bird markets facilitate the spread of diseases.
 - **Other Concerns:** Chickens in industrial settings are often **confined in wired cages, known as 'battery cages,'** in high densities, leading to overcrowding and stress.
 - This practice leads to **poor air quality**, waste accumulation, and [greenhouse gas emissions](#), contributing to environmental pollution and degradation.
- **Market Fluctuations and Price Volatility:**
 - **Feed Price Fluctuations:** Volatile prices of **crucial poultry feed ingredients**, such as [corn](#) and [soybean meal](#), not only affect production costs but also exacerbate **import dependence** due to their significant reliance on imports.
 - **Consumer Demand Fluctuations:** Rumors and misinformation surrounding poultry products during disease outbreaks can drastically **reduce consumption**, affecting overall market stability.
- **Infrastructure and Supply Chain Challenges:**
 - **Limited Cold Chain Infrastructure:** It leads to spoilage and wastage, especially during peak production periods.
 - **Disorganised Supply Chain:** A fragmented supply chain with **multiple intermediaries** raises transaction costs and lowers farmer profits, while poor transportation infrastructure hampers product movement, affecting delivery times and freshness.
- **Policy and Regulatory Issues:**
 - **Fragmented Regulatory Framework:** Multiple overlapping regulations across different

- levels of government create **confusion and compliance challenges** for poultry farmers.
- **Limited Access to Credit:** Small and medium-scale poultry farmers often struggle to **access formal credit**, hindering growth and modernization.
- **Labour Challenges:** Finding and retaining skilled labour can be difficult for poultry farms, impacting operational efficiency.
- **Other Issues:**
 - **Environmental Concerns:** Poultry farming can contribute to **water pollution** and air quality issues if waste management practices are inadequate.
 - The rising demand for **protein has led to increased antibiotic** use in poultry farming, raising concerns about antibiotic resistance and public health risks.
 - **Animal Welfare Concerns:** Ensuring proper animal welfare standards across the industry remains a challenge.
 - **Difficult exit:** Poultry farmers often face challenges in exiting the industry due to **contract farming arrangements**, accumulated debts, and specialised skills required for the sector.

Issue of H5N1 Avian Influenza

- The outbreak of **H5N1 avian influenza** has brought to light the critical need to address **animal welfare**.
- **First spillover to humans:** The first instance of H5N1 infection spilling over to humans occurred in **1997 in Hong Kong**, directly from chickens.
- **Impact of H5N1 on India:** India reported its first H5N1 patient in Maharashtra in 2006. Subsequent outbreaks in December 2020 and early 2021 spread across 15 states, highlighting the widespread nature of the pathogen.
- **Global impact of H5N1:** H5N1 has demonstrated its ability to **cross species barriers**, causing mortality among **polar bears in the Arctic and seals and seagulls in Antarctica**, indicating its global impact.
- **Fatality rate of H5N1 in humans:** The **World Health Organization (WHO)** estimates the **fatality rate for H5N1 at 52%** based on recorded cases since 2003, highlighting its high risk to human health.

What are the Various Provisions Related to the Poultry Sector in India?

- **Status of Poultry Birds in India:**
 - According to the **20th Livestock Census**, there are 851.8 million poultry birds in India. About 30% of this is **'backyard poultry'** or small and marginal farmers.
 - Chickens, turkeys, ducks, geese, etc, are reared in poultry farms for meat and eggs.
 - Tamil Nadu, Andhra Pradesh, Telangana, West Bengal, Maharashtra, Karnataka, Assam and Kerala have the highest poultry populations.
- **Legal Status of Poultry Units in India:**
 - **Guidelines for Poultry Farmers, 2021:**
 - **New Definition of Poultry Farmer:**
 - **Small Farmers:** 5,000-25,000 birds
 - **Medium Farmers:** More than 25,000 and less than 1,00,000 birds
 - **Large Farmers:** More than 1,00,000 birds
 - A Certificate of Consent from the **State Pollution Control Board** or Committee under the **Water Act, 1974**, and the **Air Act, 1981**, is necessary for establishing and operating a medium-sized poultry farm, with permission granted for 15 years.
 - The **Animal Husbandry Department** will be responsible for implementing the guidelines at the state and district level.
 - **Other Provisions:**
 - The **Central Pollution Control Board (CPCB)** classifies poultry units with **more than 5,000 birds as polluting industries**, subject to compliance and regulatory consent.
 - The **Prevention of Cruelty to Animals (PCA) Act, 1960**, prohibits the intensive

confinement of animals, including chickens, recognising the importance of animal welfare.

- The **269th Law Commission of India Report** in 2017 **proposed draft rules** for the welfare of chickens in the meat and egg industries, emphasising improved animal welfare for safer food production.
 - Despite recommendations, the Draft Rules for the egg industry released by the **Ministry of Agriculture and Farmers' Welfare** in 2019 are considered inadequate.

▪ **Some Initiatives for the Poultry Industry:**

- **Poultry Venture Capital Fund (PVCF):** The **Department of Animal Husbandry and Dairying** is implementing it under “**Entrepreneurship Development and Employment Generation**” (EDEG) of the **National Livestock Mission**.
- **National Livestock Mission (NLM):** Different programmes under the NLM in which financial assistance is provided to States/Union Territories to implement **Rural Backyard Poultry Development (RBPDP)** and Innovative Poultry Productivity Project (IPPP).
- **Assistance to States for Control of Animal Diseases (ASCAD) Scheme:** ASCAD under “**Livestock Health and Disease Control**” (LH&DC) which covers the vaccination of economically important poultry diseases viz., Ranikhet Disease, Infectious Bursal Disease, Fowl Pox, etc., including control and containment of emergent and exotic diseases **like Avian Influenza**.

What are the Steps Needed to Support the Poultry Industry?

▪ **Biosecurity as a Global Priority:**

- **Compartmentalisation:** Leading poultry producers worldwide **segregate flocks by age and health status**, minimising disease transmission risk.
 - This practice can be adapted in India by **establishing compartmentalised poultry farming zones** or encouraging multi-age rearing within biosecure facilities.
- **Vaccination Programs:** Rigorous vaccination protocols against prevalent diseases like Avian Influenza and Newcastle Disease are standard practice globally.
 - India can benefit by strengthening its **national vaccination programs** and ensuring wider outreach to small-scale farmers.

▪ **Enhancing Efficiency Through Technology:**

- **Precision Feeding:** Advanced feeding systems that adapt to individual bird needs and **optimise feed utilisation** are gaining traction worldwide.
 - Encouraging Indian poultry farms to adopt these technologies, even in scaled-down versions, can improve feed conversion efficiency and reduce costs.
- **Environmental Monitoring Systems:** Real-time monitoring of factors like temperature, humidity, and ammonia levels in poultry houses is crucial for optimal bird health.
 - Implementing such systems in Indian farms, even through low-cost sensors, can help maintain a healthy environment and prevent disease outbreaks.

▪ **Building a Sustainable Supply Chain:**

- **Contract Farming:** Contract farming arrangements between producers and processors ensure market access and fair pricing for farmers.
- **Cold Chain Infrastructure:** Investing in **robust cold chain infrastructure** to minimise spoilage during transportation and storage is a global best practice.
 - India can prioritise developing efficient cold chain networks, connecting remote production areas to major consumption centres.

Conclusion

- By adopting a **multi-faceted strategy** encompassing government support, industry collaboration, and farmer awareness, the Indian poultry sector can effectively implement global best practices.
- It will lead to sustainable growth, **heightened biosecurity**, increased efficiency, and **greater competitiveness in the worldwide market**, thereby bolstering India's food security and economic prosperity.

Q. Discuss the challenges and opportunities in the Indian poultry sector. How can policy interventions and industry initiatives address these issues to ensure the sector's contribution to food security and economic growth?

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. H1N1 virus is sometimes mentioned in the news with reference to which one of the following diseases? (2015)

- (a) AIDS
- (b) Bird flu
- (c) Dengue
- (d) Swine flu

Ans: (d)

Mains:

Q. Can overuse and free availability of antibiotics without a Doctor's prescription, be contributors to the emergence of drug-resistant diseases in India? What are the available mechanisms for monitoring and control? Critically discuss the various issues involved. (2014)

Redistribution of Private Property

For Prelims: Article 39, 31, Article 39(b), Supreme Court, Constitutional Bench of Supreme Court, [Directive Principles of State Policy](#), [Kesavananda Bharati case, 1973](#).

For Mains: Right to Private Property, DPSP Vs. Fundamental Rights, Supreme Court Landmark Decisions.

Source: IE

Why in News?

Recently, the [Supreme Court \(SC\)](#) of India has begun hearing on legal questions arising from various petitions about whether the government can acquire and redistribute privately owned properties.

- The question raised before the Court is whether **private properties** can be considered "**material resources of the community**" under [Article 39 \(b\)](#) of the Constitution, which is part of the [Directive Principles of State Policy \(DPSP\)](#).

What is the Case All About?

- The case before the SC arose out of a challenge to the 1986 amendment to the **Maharashtra Housing and Area Development Act (MHADA)**, 1976 by owners of 'cessed' properties in Mumbai.
- **MHADA, 1976**, was enacted to address the problem of old, dilapidated buildings housing (poor) tenants despite becoming increasingly unsafe.
 - MHADA imposed a cess on the buildings occupants, which would be paid to the Mumbai Building Repair and Reconstruction Board (MBRRB) to oversee repair and restoration projects.
 - The Act was amended in 1986 by invoking [Article 39\(b\)](#) which
 - It aims to execute plans for acquiring lands and buildings, in order to **transfer them to "needy persons"** and the "occupiers of such lands or buildings".
 - It contains provisions **allowing the state government to acquire cessed buildings** (and the land they are built on) **if 70% of the occupants make such a request.**
 - **Violation of Right to Equality:** The Property Owners' Association in Mumbai challenged the MHADA at the Bombay High Court claiming that the provisions violate the property owners' [Right to Equality](#) under [Article 14](#) of the Constitution.
 - **Immunity to DPSP:** The court held that laws enacted in furtherance of DPSP could not be challenged on the grounds that they violated the right to equality, as per Article 31C of the Constitution ("Saving of laws giving effect to certain directive principles").
 - **Interpreting Material Resources of the Community:** The Association appealed the decision in the Supreme Court in December 1992.
 - Thus, in the apex court, the central question became whether "material resources of the community" as per **Article 39(b)** includes privately owned resources which would include cessed buildings.

What is the Legal View on Private Property and its Distribution?

- **Constitutional View:**
 - **Articles 19(1)(f) and Article 31:** This article guaranteed the property as a fundamental right.
 - However, the 44th Amendment Act of 1978 removed this right from the list of fundamental rights and placed it **under Article 300A as a constitutional right.**
 - **Article 300A:** This article declares that no person shall be deprived of his property save by authority of law.
 - **9th Schedule:** It lists specific laws that cannot be challenged in courts on the grounds that they violate fundamental rights, including the (once) **Fundamental Right** to Property.
 - Laws included in this Schedule like Land reforms (abolition of zamindari system).
 - **Article 39:** It lists certain [Directive Principles of State Policy](#) (under **Part IV** of the [Constitution](#)), which are meant to be guiding principles for the enactment of laws, but are not directly enforceable in any court of law.
 - **DPSP** aims at ensuring socio-economic justice for the people and establishing India as a welfare state.
 - **Article 39(b)** places an obligation on the state to create policy towards securing "the ownership and control of the material resources of the community are so distributed as best to subserve the common good".
 - **Article 39(c)** ensures that wealth and the means of production are not "concentrated" to the "common detriment".
 - **Article 31C:**
 - **Article 31C** saves the laws giving effect to certain [directive principles.](#)
 - As per **Article 31C**, these particular directive principles (**Articles 39(b) and 39(c)**) cannot be challenged by invoking the right to equality ([Article 14](#)) or the rights under Article 19 (freedom of speech, right to assemble peacefully, etc).
 - In the [Kesavananda Bharati case, 1973](#), the Court upheld the validity of Article 31C but made it subject to [judicial review.](#)
- **Interpretations of Article 39(b) by Supreme Court:**
 - **State of Karnataka vs Shri Ranganatha Reddy Case, 1977:**
 - Court held that privately owned resources did not fall within the ambit of "material resources of the community".

- **Justice Krishna Iyer** held a **dissenting opinion** that privately owned resources must also be considered material resources of the community.
 - To exclude ownership of private resources from the coils of [Article 39\(b\)](#) is to cipherrise (make hidden) its very purpose of redistribution the socialist way.
- **Sanjeev Coke Manufacturing Company vs Bharat Coking Coal Case, 1983:**
 - Supreme **Court affirmed Justice Iyer's opinion** and upheld central legislation that **nationalised coal mines** and their respective coke oven plants.
 - It held that **privately owned resources must also be considered** material resources of the community.
- **Mafatlal Industries Ltd vs Union of India Case, 1996:**
 - Court felt the need for a 9-Judge [Constitutional Bench](#) to interpret Article 39(b).
 - Court relied on the interpretation of **Article 39(b)** offered by **Justice Iyer** and the Bench in **Sanjeev Coke Manufacturing Case**.
 - Court held "the words '**material resources**' occurring in Article 39 (b) will take in natural or physical resources and also movable or immovable property and it would **include all private and public** sources of meeting material needs, and not merely confined to public possessions."

What are Directive Principles of State Policy (DPSP)?

- **About:**
 - The [Directive Principles of State Policy \(DPSP\)](#) aims at ensuring socio-economic justice for the people and establishing India as a welfare state.
- **Constitutional Provisions:**
 - [Part IV](#) of the Constitution of India (Article 36-51) contains the DPSP.
 - **Article 37** of the Indian Constitution States about the application of the Directive Principles.
- **Background:**
 - The directive principles contained in the Indian constitution are taken from the **Irish Constitution**.
 - The idea of such policies can be traced to the Declaration of Rights of Man and the Declarations of Independence by the American colonies as well as the [Gandhian concept of Sarvodaya](#).
- **Objectives:**
 - **Checks & Balance:** DPSP aims at socio-economic justice which according to the framers of the constitution Indian State should strive for.
 - They lay down a code of conduct for the legislatures, executives and administrators of India to discharge their responsibilities in tune with these ideas.
 - **Legal Actions & Government Policies:** They embody the aspirations of people objectives and ideals that the Union and the State governments must bear in mind while making laws and formulating policies.
 - **Philosophy of Social Justice:** They represent the philosophy of social justice incorporated in the constitution of India although directive principles are not legally binding by any court however, they are fundamental in the governance of the country.
- **Classification:**

Classification of Directive Principles of State Policy

- The Directive Principles are classified on the basis of their ideological source and objectives. These are Directives based on:
 - **Socialist Principles: Article 38, 39, 41, 42, 43, 43A, 47**
 - **Gandhian Principles: Article 40, 43, 43B, 46, 47, 48**
 - **Liberal and Intellectual Principles: Article 44, 45, 48A, 49, 50, 51**

Famous Rulings for DPSP By Judiciary:

- **Champakam Dorairajan case (1951):** FR would prevail over the DPSP in case of conflict between the two. However, legislature can amend FR to give effect to DPSP
- **Golaknath case (1967):** FR are **sacrosanct** in nature and cannot be amended for implementation of DPSP
- **Minerva Mills case (1980)** Constitution is founded on the **bedrock of balance** between FR and DPSP

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What are the Arguments Related to Redistribution of Wealth?

▪ Arguments in Favour:

- **Social Justice:** This goes with the **principles of Preamble of the Constitution** which strives to ensure social justice.
 - Unrestricted property rights can exacerbate wealth inequality.
 - The wealthy can accumulate vast amounts of property, leaving less for others. This can lead to social unrest and hinder economic mobility.
 - Eg: The Naxalbari uprising and subsequent **Naxal movement** originated primarily **due to economic and social inequality** in rural areas of India.
- **Poverty Alleviation:** Redistribution programs can help alleviate **poverty** by providing financial assistance, access to education, healthcare, and other essential services to those in need.
- **Address Social Issues:** As property is scarce resource, wise redistribution of wealth enables the government to address social issues like **poverty**, homelessness, or environmental degradation.
- **Enhanced Social Cohesion:** Reducing economic disparities can foster greater **social cohesion and solidarity** by bridging the gap between different socio-economic groups.

▪ Arguments Against:

- **Disincentivizes Work:**
 - Redistribution discourages people from working hard and taking risks if they believe the **government will simply provide for them.**
 - It may disincentivize wealth creation and **entrepreneurship**, leading to slower economic growth and reduced prosperity for all.
- **Market Efficiency:** Redistribution can interfere with market mechanisms and distort resource allocation, leading to inefficiencies and decreased overall welfare.
- **Individual Freedom:** It can infringe upon individual freedom and property rights by forcibly taking wealth from one group of individuals and transferring it to another.
- **Administrative Costs:** Implementing and managing redistribution programs can be costly and inefficient, with significant administrative overhead and potential for bureaucratic abuse and corruption.
- **Earlier Failed Attempts for Redistribution:**
 - Property ownership has cultural and historical significance in many societies. It reflects notions of identity, heritage, and family legacy.
 - Also, previous redistribution efforts like **land reforms failed in most states except in Kerala and West Bengal.**

Way Forward

- **Conditional Property Rights:** There should be a system where property rights are conditional on responsible use.
 - The government could regulate how property is used to ensure it doesn't harm the environment or infringe on the rights of others.
- **Focus on Social Justice:** Rather than absolute property rights, there should be efforts for prioritising social justice and ensuring everyone has access to basic necessities like housing and land.
 - This might involve wealth redistribution or regulations on property ownership.

Drishiti Mains Question:

Examine the challenges and constraints faced in the realisation of the objectives of Article 39(b) and suggest potential strategies to overcome them.

UPSC Civil Services Examination Previous Year's Questions (PYQs)

Prelims

Q1. Which part of the Constitution of India declares the ideal of Welfare State? (2020)

- (a) Directive Principles of State Policy
- (b) Fundamental Rights
- (c) Preamble
- (d) Seventh Schedule

Ans: (a)

Q2. Other than the Fundamental Rights, which of the following parts of the Constitution of India reflect/ reflects the principles and provisions of the Universal Declaration of Human Rights (1948)? (2020)

1. Preamble
2. Directive Principles of State Policy
3. Fundamental Duties

Select the correct answer using the code given below:

- (a) 1 and 2 only

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

Ans: (d)

Mains

Q. 'Constitutional Morality' is rooted in the Constitution itself and is founded on its essential facets. Explain the doctrine of 'Constitutional Morality' with the help of relevant judicial decisions. (2021)

Paradox of Savings

For Prelims: Paradox of Savings, Paradox of Thrift, [Savings Rates](#), [John Maynard Keynes](#), [Microfinance](#), [Reserve Bank of India](#), [Sagarmala](#), [Bharatmala](#)

For Mains: Application of Paradox of Savings in Context of India

[Source: TH](#)

Why in News?

Recently, the **paradox of savings**, or the **paradox of thrift**, has been a topic of interest in economic discussions due to its implications on how personal savings behaviors might negatively affect broader **economic growth**.

- This counterintuitive economic concept has resurfaced in news and analyses, particularly in times of **economic downturns**, where the balance between saving and spending becomes crucial to policy debates on how best to **stimulate recovery** and sustain **economic stability**.

What is the Concept of the Paradox of Savings?

- **About:**
 - The paradox of savings, also known as the paradox of thrift, suggests that while **individual savings** are ostensibly good, an increase in overall **savings rates** across an economy may lead to a decrease in total economic savings.
 - This theory contrasts with the intuitive belief that **higher personal savings** directly contribute to **increased economic savings**.
- **Origins and Development of the Theory:**
 - **Key Historical Insights:** The idea was notably popularised by [John Maynard Keynes](#) in his influential 1936 book, **The General Theory of Employment, Interest, and Money**.
 - **Keynesian Perspective:** [Keynesian economists](#) argue that an **increase in savings reduces consumer spending** on final goods and services, which in turn decreases overall savings and investment.
 - They contend that **consumer spending drives economic growth** and that **savings are channelized** into investments aimed at producing goods for consumer markets.
 - **Insufficient consumer spending** can lead to a reduction in these investments, thus **harming economic growth**.

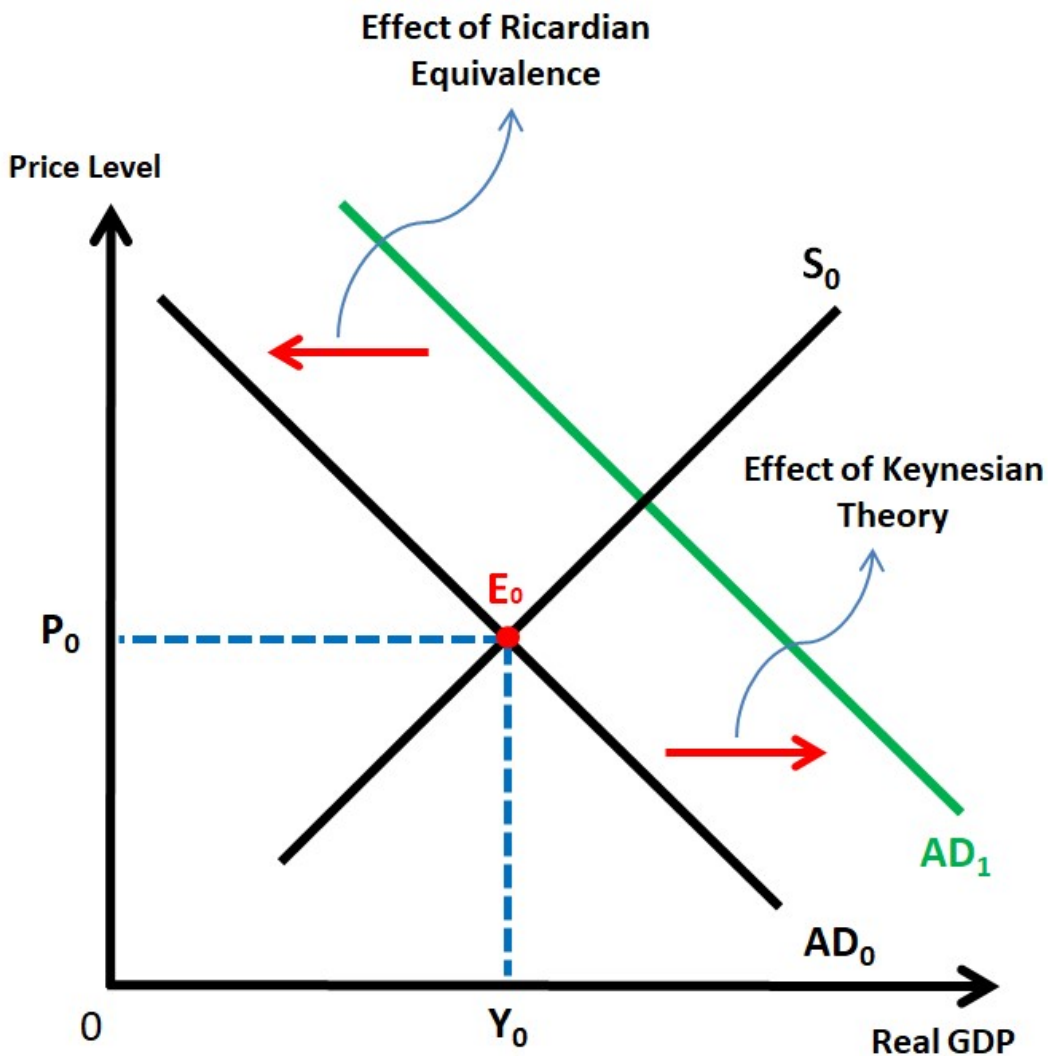
- **Governmental Role:**
 - Keynesians advocate for **active governmental intervention**, particularly in times of economic downturns.
 - Measures could include **increasing government spending** to boost consumer purchasing power and stimulate demand.
- **Counter Arguments:**
 - Critics of the paradox argue that **savings contribute to a pool of capital** that can be used for investment, potentially **leading to economic growth** even in the context of reduced consumer spending.
 - A decrease in consumer demand **shifts investment from short-term**, consumer-driven production **to long-term projects**, potentially making previously unviable projects viable.

How the Paradox of Thrift Plays Out in Indian Context?

- **The Indian Context:**
 - **Indian's high savings rate, beneficial for long-term security**, may hinder economic growth in slowdowns.
 - A sizable informal sector with limited savings complicates matters; policies promoting **formalisation can boost savings and enhance credit access**.
 - Low demand may deter businesses from investing in new projects, shrinking the overall investment pool, a critical concern for India's infrastructure and job creation needs.
- **Mitigating Factors:**
 - An **efficient banking system** can channel savings into productive investments.
 - During economic downturns, the **government can increase spending on** infrastructure and social programs, stimulating demand and creating jobs.
 - Principles from **behavioral economics** can be used to encourage consumption during economic downturns.

How Does the Ricardian Equivalence Proposition Plays Out in India?

- **The Crowding-Out Effect:** The economic survey (2021) discusses the **crowding-out effect**, where increased government spending potentially reduces private investment by causing **higher interest rates**.
- This effect is linked to the **Ricardian Equivalence Proposition (REP)**, which assumes **perfect capital markets** and suggests that consumers save in anticipation of **future taxes**, thus neutralising government spending's impact.
 - However, the strict assumptions of REP may not hold true in **complex and developing economies** like India.
- **India's Economic Landscape:** Unlike the fixed savings supply assumed in the crowding-out theory, **India, as an emerging economy, sees an expanding savings** supply with income growth.
- Government spending can boost demand and employment, leading to increased savings and stimulating private investment.
- **Public expenditures** that support the **private sector's saving** and investment capacities can actually foster private investment, especially when directed towards infrastructure and development.
- **Economic Survey Insights:** The **Economic Survey of India (2020-21)** acknowledges potential **short-term crowding-out effects** but emphasises the long-term benefits where public investments stimulate private investments.
- It highlights the growth in **credit to the MSME sector** and increased capital expenditure by the government as vital economic growth drivers.
- The survey suggests that in India, **public spending complements private investment**, aiding the country's overall economic progress.



Conclusion

- The paradox of savings presents a **significant theoretical challenge** to conventional economic wisdom that favours savings unequivocally.
- While **Keynesian economists** highlight **potential negative impacts** of increased savings rates on economic activity, **critics offer a different perspective** that sees savings as a flexible tool for adjusting economic production and investment across time, potentially **leading to more sustainable long-term growth**.

Drishti Mains Questions:

Q. Discuss the relevance of the paradox of thrift in the context of the Indian economy. How does individual saving behaviour impact overall economic growth and aggregate demand?

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. In India, the interest rate on savings accounts in all the nationalized commercial banks is fixed by (2010)

- (a) Union Ministry of Finance
- (b) Union Finance Commission
- (c) Indian Banks' Association
- (d) None of the above

Ans: (d)

Q. If the interest rate is decreased in an economy, it will (2014)

- (a) decrease the consumption expenditure in the economy
- (b) increase the tax collection of the Government
- (c) increase the investment expenditure in the economy
- (d) increase the total savings in the economy

Ans: (c)

Mains:

Q. Among several factors for India's potential growth, savings rate is the most effective one. Do you agree? What are the other factors available for growth potential?

UN Panel on Critical Energy Transition Minerals

For Prelims: [Critical Minerals](#), [Mining Sector](#), [Rare Earth Metals](#), [Electric vehicles](#), [Renewable energy](#), [United Nations Framework Agreement on Climate Change](#), [Paris Agreement](#)

For Mains: Key Critical Minerals and Their Applications, Significance of Critical Minerals for India.

Source: [UN](#)

Why in News?

Recently, the [United Nations \(UN\)](#) Secretary-General appointed a **panel on Critical Energy Transition Minerals** to develop **global common and voluntary principles** for the **minerals value chain** to safeguard environmental and social standards and embed justice in the energy transition.

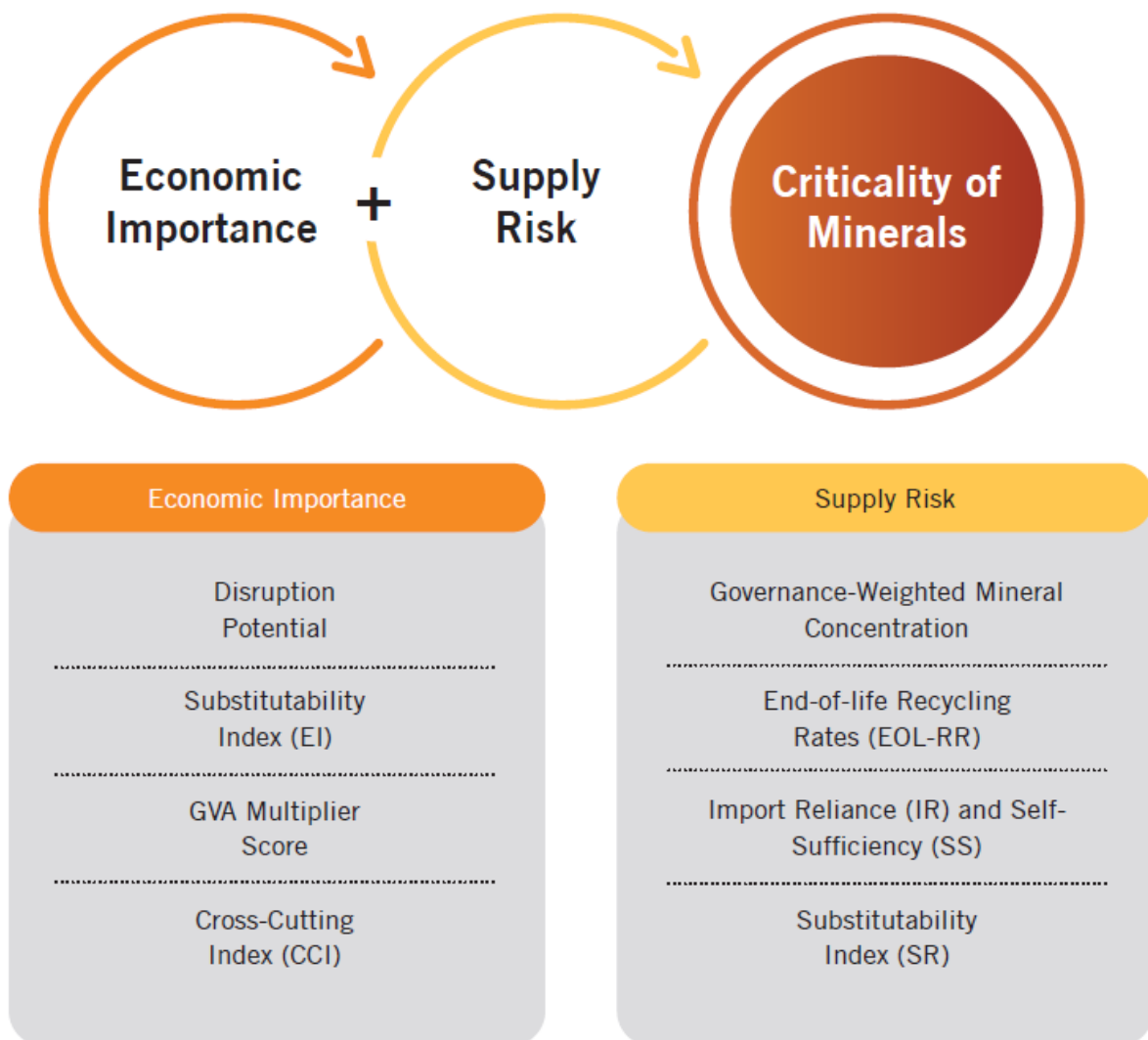
What are the Key Facts About the Panel on Critical Energy Transition Minerals?

- The panel will address issues relating to **equity, transparency, investment, sustainability, and human rights** in the context of critical minerals for renewable energy technologies.
 - Developing countries see [critical minerals as an opportunity](#) to create jobs, diversify economies, and boost revenues, but proper management is essential to avoid trampling over the poor.

- The **panel's objective** is aligned with the **2030 Agenda for Sustainable Development**, the **United Nations Framework Agreement on Climate Change**, and its **Paris Agreement** to harness the potential of critical minerals for shared prosperity and leaving no one behind.
- The panel **utilises past UN efforts**, especially the Working Group on Sustainable Extractive Industries and its 'Harnessing Critical Energy Transition Minerals for Sustainable Development' initiative.
 - It will help to **develop principles to ensure a fair and transparent approach** globally and for local communities in the **entire value chain** — upholding the highest sustainability and human development standards.
- The goal of combating climate change and **limiting global warming to 1.5°C** hinges on a **secure and accessible supply of critical energy transition minerals**.
 - These minerals, such as copper, lithium, nickel, cobalt, and rare earth elements, are **essential components of clean energy technologies** like wind turbines, solar panels, electric vehicles, and battery storage, **which are crucial for powering a sustainable future**.

What are Critical Minerals?

- **Critical Minerals:**
 - These are those minerals that are **essential for economic development and national security**, the lack of availability of these minerals or concentration of extraction or processing in a few geographical locations may lead to supply chain vulnerabilities and even disruption of supplies.



▪ Declaration of Critical Minerals:

- It is a **dynamic process**, and it can evolve over time as new technologies, market dynamics, and geopolitical considerations emerge.
- **Different countries** may have their **own unique lists** of critical minerals based on their specific circumstances and priorities.
 - The **US has declared 50 minerals** critical in light of their role in national security or economic development.
 - **Japan** has identified a set of **31 minerals** as critical for its economy.
 - The UK considers **18 minerals** critical, **EU (34)** and **Canada (31)**.

▪ Critical Minerals for India:

- Expert Committee under Ministry of Mines has identified a set of **30 critical minerals** for India.
- These are Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, **Rare Earth Elements (REEs)**, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium and Cadmium.
- The creation of **Centre of Excellence for Critical Minerals (CECM)** in the **Ministry of Mines** is also recommended by the Committee.
 - CECM will **periodically update the list of critical minerals** for India and notify the critical mineral strategy from time to time.

What are the Key Critical Minerals and Their Applications?

▪ Lithium, Cobalt, and Nickel:

- These minerals are indispensable components of **lithium-ion batteries**, widely utilized in **electric vehicles, portable electronic devices, and energy storage systems**.

▪ Rare Earth Elements (REEs):

- Consisting of **17 elements**, **REEs** play pivotal roles in manufacturing high-strength magnets, electronics, wind turbines, and military equipment.
- Notably, **neodymium and dysprosium** are crucial for the production of **permanent magnets** used in motors.

▪ Copper:

- It holds significant importance in **electrical wiring, renewable energy infrastructure, and electric vehicle components**, owing to its remarkable electrical conductivity.

▪ Titanium:

- In the **aerospace industry**, titanium finds extensive use due to its **exceptional strength-to-weight ratio, resistance to corrosion**, and ability to withstand high temperatures.

▪ Platinum Group Metals (PGMs):

- PGMs are indispensable in the **fabrication of catalytic converters for vehicles**, fuel cells, and various electronic devices.

▪ Graphite:

- It is a **critical material** for the **anodes of lithium-ion batteries** and is valued for its lubricating properties in diverse industrial applications.

What is the Significance of Critical Minerals for India?

▪ Economic Self-Reliance:

- **High-Tech Electronics:** Critical minerals like **lithium** are used in **lithium-ion batteries, powering laptops, smartphones**, and other devices. India's growing electronics industry heavily relies on a steady supply.
- **Telecommunications:** **Rare earth elements** are essential for **fiber optic cables** and advanced telecommunication equipment, driving faster internet speeds and network capacity.
- **Electric Vehicles:** **Lithium, cobalt, and nickel** are crucial for **electric vehicle batteries**. As India pushes for cleaner transportation, access to these minerals is vital for domestic EV production.

- **Technological Innovation:**
 - **Defense Aircraft:** Rare earth elements and titanium are used in high-performance jet engines and airframes, enabling [advanced fighter jets](#) and military aircraft.
 - **Nuclear Energy: Vanadium and zirconium** are crucial for nuclear reactors, ensuring safe and reliable nuclear power generation.
 - **Space Exploration: Lithium and beryllium** are used in **lightweight and high-strength materials** for rockets and satellites, critical for India's space program ambitions.
- **Environmental Sustainability:**
 - **Solar Panels: Silicon** is a key component of [solar photovoltaic cells](#), enabling the conversion of sunlight into clean electricity.
 - **Wind Turbines: Neodymium and dysprosium** are used in high-strength magnets for wind turbine generators, promoting [renewable energy generation](#).
 - **Battery Storage: Lithium-ion batteries**, containing lithium and cobalt, are essential for storing energy from renewable sources like solar and wind, enabling a shift from fossil fuels.

What are the Challenges for India Related to Critical Minerals?

- **Supply Chain Disruptions:**
 - The ongoing **conflict between Russia and Ukraine**, both significant producers of critical minerals, disrupts established supply chains, threatening reliable access for India.
- **Limited Domestic Reserves:**
 - India **lacks sufficient reserves** of critical minerals like **lithium, cobalt, and rare earth elements**, crucial for clean energy technologies and [electric vehicles](#).
- **Heavy Reliance on Imports:**
 - The lack of domestic reserves forces India to rely heavily on imports, making it vulnerable to:
 - **Price Fluctuations:** Global market fluctuations can significantly impact the cost of critical minerals.
 - **Geopolitical Factors:** Strained relations with supplier countries can restrict access to critical minerals.
 - **Supply Disruptions:** Events like wars or natural disasters can disrupt critical mineral supply chains.
- **Growing Demand:**
 - India's **ambitious clean energy and electric vehicle** goals require ever-increasing quantities of critical minerals.
 - India's has set the target of ["Panchamrit"](#) regarding its climate action plan. These include:
 - Achieving a **non-fossil energy capacity of 500 GW by 2030**.
 - **Sourcing 50%** of its total energy needs from **renewable energy** sources by 2030.
 - This rising demand, coupled with limited domestic reserves, intensifies India's dependence on foreign suppliers.

Conclusion

With a focus on equity, sustainability, and international cooperation, this UN initiative underscores the importance of critical minerals in driving economic development, ensuring national security, and advancing environmental sustainability, particularly in the context of renewable energy technologies. As India pursues its ambitious renewable energy goals, international cooperation on critical minerals becomes increasingly vital, highlighting the need for a comprehensive and inclusive approach towards economic and environmental sustainable future.

Drishiti Mains Question:

Q. Discuss about key critical minerals and their applications. What is the significance of critical minerals for India.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. Recently, there has been a concern over the short supply of a group of elements called 'rare earth metals'. Why? (2012)

1. China, which is the largest producer of these elements, has imposed some restrictions on their export.
2. Other than China, Australia, Canada and Chile, these elements are not found in any country.
3. Rare earth metals are essential for the manufacture of various kinds of electronic items and there is a growing demand for these elements.

Which of the statements given above is/are correct?

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

Ans: (c)

Mains

Q. Despite India being one of the countries of Gondwanaland, its mining industry contributes much less to its Gross Domestic Product (GDP) in percentage. Discuss. (2021)

Q. "In spite of adverse environmental impact, coal mining is still inevitable for development". Discuss. (2017)

Occultation in Astronomy

[Source: TH](#)

Why in News?

Recently, the [Indian Institute of Astrophysics \(IIA\)](#) has released a video capturing the occultation of the moon passing in front of the **bright red star Antares (Jyeshtha)**.

Note:

- Since the moon is relatively close to the Earth, such **occultations will be visible only from some locations on the globe**, similar to why a [solar eclipse](#) is seen only from a particular part of the globe.

What is an Occultation in Astronomy?

▪ **About:**

- An occultation in astronomy occurs when **one celestial body passes in front of another, obscuring it from view.**
 - Occultations can also be artificially produced to take a look at certain phenomena in detail. Perhaps the **best-known use is blocking the light of the sun or a star to see what is nearby.**
- In the case of lunar occultations, the Moon appears to move in front of other objects in the sky, such as stars, planets, or asteroids.

▪ **Lunar Occultations of Stars:**

- The Moon regularly occults bright stars as it moves along its apparent path in the sky.
- Approximately 850 naked-eye stars, including prominent ones like **Aldebaran** (reddish giant star in the constellation Taurus), **Regulus** (constellation Leo), Spica (constellation of Virgo), **and Antares**, may be occulted by the Moon in a year.
- During a lunar occultation of a star, the star appears to abruptly disappear as the Moon moves in front of it, demonstrating the lack of atmosphere on the Moon.

▪ **Lunar Occultations of Planets:**

- Occultations of planets, such as **Venus, Jupiter, Mars, and Saturn**, by the Moon are notable astronomical events.
- During a lunar occultation, observers can witness phases on both the planet and the Moon, offering unique viewing opportunities.

▪ **Asteroid Occultations:**

- Asteroids are small, rocky bodies that orbit the Sun. Sometimes, they pass in front of distant stars, causing an occultation.

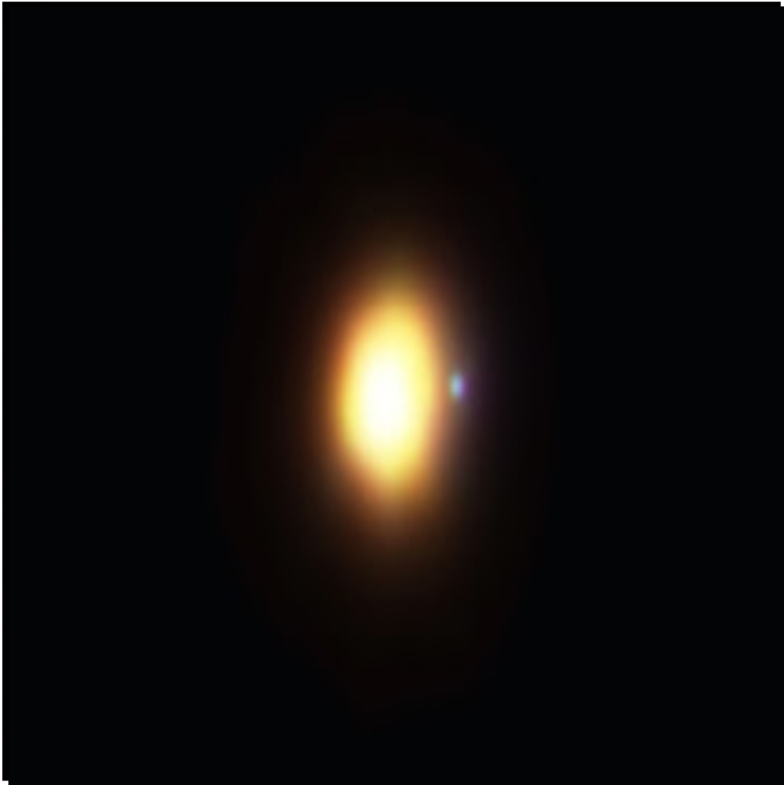
▪ **Planetary Occultations:**

- Planetary occultations are rare and intriguing events where one planet passes in front of another from our perspective on Earth, temporarily hiding it from view.
 - These events are similar to asteroid occultations but involve planets instead.
- Historically, **mutual planetary occultations have been extremely rare.** The most recent one occurred on January 3, 1818, when Venus passed in front of Jupiter.

Antares

- It is the **brightest star in the constellation Scorpio.** The star is a red supergiant about **12 times the mass of the sun, 750 times the diameter of the sun.**
- Antares is part of a **binary star system.** The fainter secondary star is **called Antares B, a main-sequence star with a blue-white hue.**
 - These two stars are projected to be more than 220 Astronomical Units (AU) away from each other.

The Antares Star



Color: Red (M-type)

Spectral type: M1.5Iab-Ib

Apparent magnitude: 0.6–1.6

Mass: \approx 12 solar masses

Radius: \approx 680 solar radii

Luminosity: 10,000 Suns

Temperature: 3,660 K

Constellation: Scorpius

Distance: \approx 550 light-years from Earth



Indian Institute of Astrophysics (IIA)

- The IIA is a premier institute devoted to research in astronomy, astrophysics and related physics. It originated from an observatory set up in 1786 in Madras, which later moved to Kodaikanal in 1899.
- In 1971, it became the Indian Institute of Astrophysics and shifted its **headquarters to Bengaluru in 1975.**
 - The institute's main observing facilities are located at Kodaikanal, Kavalur, Gauribidanur, and Hanle.
- It conducts research in physical sciences, engineering sciences, astronomy, and space sciences under the **Department of Science & Technology (DST).**

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. Recently, scientists observed the merger of giant 'blackholes' billions of light-years away

from the Earth. What is the significance of this observation? (2019)

- (a) 'Higgs boson particles' were detected.
- (b) 'Gravitational waves' were detected.
- (c) Possibility of inter-galactic space travel through 'wormhole' was confirmed.
- (d) It enabled the scientists to understand 'singularity'.

Ans: (b)

INCOIS Study on Indian Ocean Floor Mapping

Source: TH

Why in News?

Recently, scientists at the [Indian National Centre for Ocean Information Services \(INCOIS\)](#) conducted a study on the mapping of the [Indian Ocean floor](#) to delve deeper into [ocean currents](#) and dynamics.

Note:

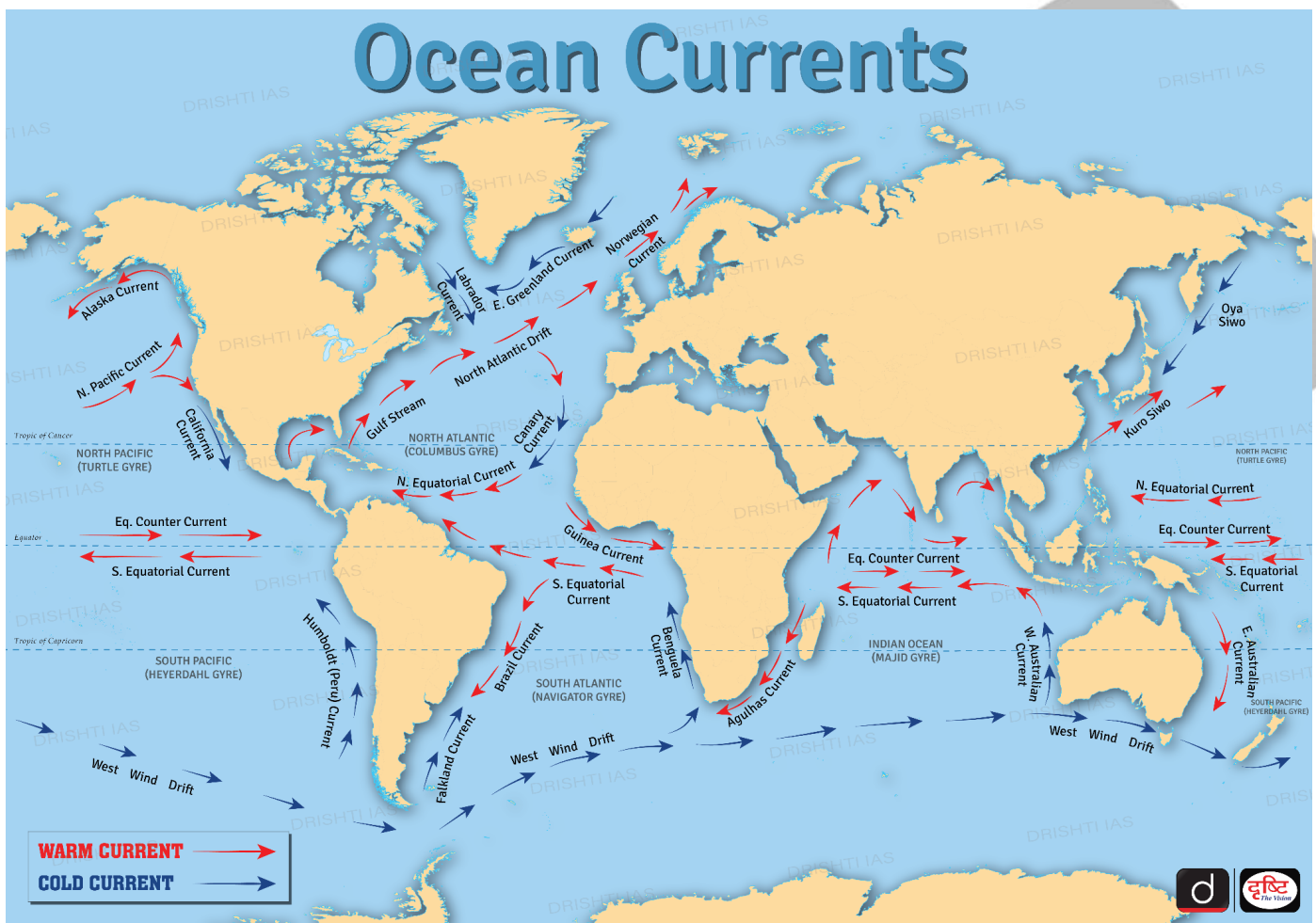
- ESSO-INCOIS was established as an **autonomous body in 1999 under the Ministry of Earth Sciences (MoES)** and is a unit of the Earth System Science Organisation (ESSO). It is located in Hyderabad.
- ESSO- INCOIS is mandated to provide the best possible ocean information and advisory services to society, industry, government agencies and the scientific community through sustained ocean observations and constant improvements through systematic and focused research.

What are the Key Highlights of the Study?

- **Influence of Islands on Currents:**
 - The study reveals that the [Andaman and Nicobar Islands](#), along with the [Maldives](#), significantly influence the direction and speed of Indian Ocean currents, creating **deep-swirling patterns opposite to surface currents**.
- **Improved Modelling with Accurate Bathymetry:**
 - Previous ocean modelling systems underestimated observed coastal currents around India.
 - Incorporating accurate **bathymetry** data led to:
 - Better predictions of upper ocean salinity, temperature, and currents near the coast.
 - More realistic estimation of the **East India Coastal Current (EICC)** flow at deeper depths (1,000 and 2,000 metres), which flows opposite to the surface currents.
 - The EICC is the western boundary current of the [Bay of Bengal](#). It's a powerful current that **reverses its direction twice a year**, playing a crucial role in the ocean circulation of the region.
 - The surface flow of the EICC from February to September, it flows **northeastward along the Indian coast**. From October to January, the flow reverses **southward along both the Indian and Sri Lankan coasts**.
 - Identification of a boundary current along the Andaman and Nicobar Islands coast

at a depth of 2,000 metres.

- Understanding the Maldives Islands' influence on the **Equatorial Under Current (EUC)**.
 - EUC is a permanent **eastward-flowing current in the Atlantic and Pacific Oceans** and is present in the Indian Ocean during the northeast monsoon in spring and winter.
 - The presence of the Maldives Islands affects the westward extent of the EUC, with variations in depth and definition between seasons.
- **Importance for Forecasting:**
 - Accurate oceanographic forecasting is essential for the maritime industry and has significant economic benefits.
 - Accurate ocean forecasts vital for weather, climate, and maritime industry. Improved observations and models are key for precision predictions.
- **Advancing Ocean Dynamics Understanding:**
 - The study highlights the importance of incorporating accurate bathymetry data into ocean circulation models. Aids in forecasting for Indian subcontinent and nearby regions.



What is Bathymetry?

- Bathymetry is the study and **mapping of the underwater topography of water bodies, such as oceans, rivers, lakes, and streams.**
 - It involves measuring the depth of the water and is similar to mapping the topography of land.
 - Bathymetric maps **use contour lines to show the shape and elevation** of underwater terrain.
- Bathymetry is the foundation of the science of **hydrography**, which measures the physical features of a water body.
 - **Hydrography includes** not only bathymetry, but also the shape and features of the

shoreline; the characteristics of tides, currents, and waves; and the physical and chemical properties of the water itself.

Read more: [Ocean currents](#)

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. The most important fishing grounds of the world are found in the regions where: (2013)

- (a) warm and cold atmospheric currents meet
- (b) rivers drain out large amounts of fresh water into the sea
- (c) warm and cold oceanic currents meet
- (d) continental shelf is undulating

Ans: (c)

Q. Consider the following factors:

1. Rotation of the Earth
2. Air pressure and wind
3. Density of ocean water
4. Revolution of the Earth

Which of the above factors influence the ocean currents? (2012)

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

Ans: (b)

65th Foundation Day of CSIR-Indian Institute of Petroleum (IIP)

Source: PIB

Recently, the [Council of Scientific & Industrial Research - Indian Institute of Petroleum \(CSIR-IIP\)](#) celebrated its **65th Foundation Day**, established on **14th April, 1960**.

- During the event, scientists were encouraged to undertake challenging research in [e-Methanol](#) and [Green Hydrogen](#), [Carbon neutrality](#).
- The **Director of CSIR-IIP** presented the institute's roadmap for **2024-2030**, aiming to

achieve [Vikasit Bharat](#) and highlighted achievements of institute such as **Numaligarh Wax Plant**, [Sustainable Aviation Fuel](#), **US Grade Gasoline**, [Medical Oxygen Units](#), **Sweetening Catalyst**, **PNG Burner**, and **Improved Gur Bhatti**.

- CSIR is **one of the largest research and development (R&D) organisations**, established in 1942.
 - It is funded by the **Ministry of Science and Technology** and it operates as an autonomous body through the [Societies Registration Act, 1860](#).
- **CSIR** covers a broad range of fields from [radio and space physics](#), [oceanography](#), and [geophysics](#) to [biotechnology](#), [nanotechnology](#), [mining](#), [aeronautics](#), **environmental engineering**, and [information technology](#).

Read More: [Council of Scientific and Industrial Research](#)

Microsoft Unveils Phi-3-Mini

Source: [IE](#)

Recently, Microsoft unveiled **Phi-3-Mini** as part of its family of [open AI models](#), designed to be capable and cost-effective [Small Language Models \(SLMs\)](#).

- **SLMs** are **AI systems** trained on existing data to solve language-related tasks such as **text classification**, **question answering**, **text generation**, etc.
- Phi-3-Mini reportedly outperforms models of similar size and even larger ones in key areas like **language**, **reasoning**, **coding**, and **math**.
- Phi-3-mini is the first model in its class to support a context window of up to **128K tokens**, with little impact on quality.
 - The amount of conversation that an AI can read and write at any given time is called the **context window**, and is measured in something called tokens.
- Microsoft collaborates with Imperial Tobacco Company (ITC) utilising Phi-3- Mini for their ongoing partnership in developing **Krishi Mitra**, a farmer-focused app benefiting over a million farmers.

Read More: [Microsoft's Phi-2: Small Model, Big Impact](#)

CPGRAMS

Source: [PIB](#)

Recently, the **Centralised Public Grievance Redressal and Monitoring System (CPGRAMS)** of India was recognised as a **state-of-the-art** grievance redressal system and a best practice of smart government by **the Commonwealth Secretariat**.

- Other country's monitoring systems are the Civil Registration and Vital Statistics System (CVRS) and identity management systems **of Namibia**, Human Resource Management and E-Citizen models **of Kenya**.

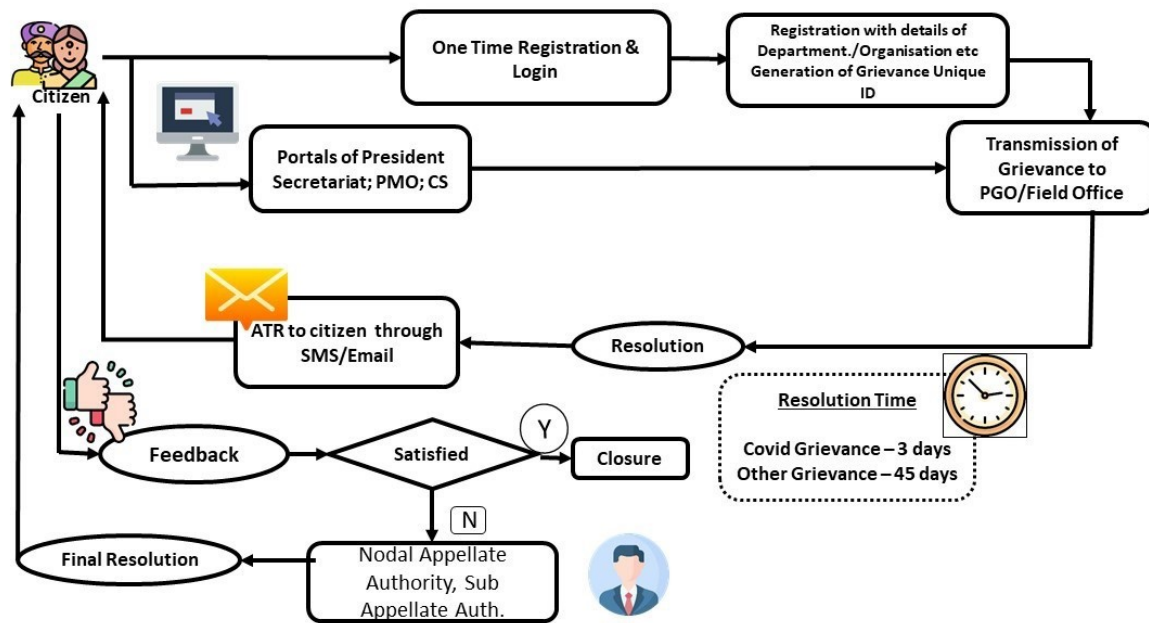
CPGRAMS:

- It is an **online web-enabled system** developed by the **National Informatics Centre, (MeitY)**,

in association with the **Ministry of Personnel, Public Grievances & Pensions.**

- It aims to **receive, redress and monitor** the grievances of the public.
- It acts as a **single portal** connecting all Ministries/Departments of the Government of India and States.
- Citizens can access CPGRAMS through a standalone **mobile application** via the **UMANG integrated mobile application.**
- While registering, citizens receive a **unique registration ID** to track the status of their grievances.
- It also offers an **appeal mechanism** for citizens unsatisfied with the resolution.

CPGRAMS PROCESS FLOW



Read more: [Santusht Portal](#)

6th Conference of the ICDRI

Source: [PIB](#)

Recently, the Prime Minister of India addressed the 6th [International Conference on Disaster Resilient Infrastructure \(ICDRI\)](#) 2024.

- ICDRI is the **annual international conference** of the [Coalition for Disaster Resilient Infrastructure \(CDRI\)](#) in partnership with member countries, organisations and institutions
 - It aims to increase the resilience of infrastructure systems to climate and disaster risks, thereby ensuring [sustainable development](#).
- CDRI was **launched in 2019, at the United Nations Climate Action Summit in New York**. It is India's second major global initiative after the [International Solar Alliance \(ISA\)](#).
 - The **CDRI Secretariat** is based in **New Delhi, India**.
- **CDRI's initiatives:**
 - **Infrastructure for Resilient Island States (IRIS):** India launched this initiative and it focuses on building capacity, having pilot projects in [Small Island Developing States or](#)

SIDS.

- **Infrastructure Resilience Accelerator Fund:** It is a fund supported by both the [United Nations Development Programme \(UNDP\)](#) and [United Nations Office for Disaster Risk Reduction \(UNDRR\)](#).
- Few other **CDRI programs** are the **resilient housing in Dominica, resilient transport networks in Papua New Guinea**, and enhanced early warning systems in the Dominican Republic and Fiji.

Read more: [India Approves Ratification of HQ Agreement with CDRI](#)

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