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YOUR PATHWAY TO UPSC SUCCESS

WEEKLY CURRENT AFFAIRS

16TH JUNE TO 21ST JUNE

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POLITY & GOVERNANCE

01 GLOBAL EDUCATION MONITORING REPORT

According to the Global Education Monitoring Team (GEM) report the global out-of-school population is now estimated to be 272 million, over 21 million more than the last estimate.

WHAT IS GLOBAL EDUCATION MONITORING REPORT?

- It is an annual publication produced by UNESCO (United Nations Educational, Scientific and Cultural Organization).
- It is an authoritative and evidence-based assessment of progress, challenges, and trends in education worldwide.
- The GEM Report was launched in 2002 as the Education for All Global Monitoring Report and transitioned to its current name in 2016.
- Its primary purpose is to monitor and analyse global education trends and provide policy recommendations to governments and stakeholders to improve education systems and outcomes.

HIGHLIGHTS OF THE REPORT

- It has pointed out that by 2025, countries will be off-track by 75 million relatives to their national targets.
- The out-of-school model estimates assume stable patterns of school-age population progression through the education system.
- The model used multiple data sources (administrative, survey and census) to generate internally consistent trends of regional and global averages.

INTERNATIONAL RELATIONS

01 PRIME MINISTER OF INDIA VISITED CYPRUS

Recently, the Prime Minister of India visited Cyprus, marking the first visit by an Indian PM to the country in over 20 years.

WHERE IS CYPRUS?

- It is an island in the eastern Mediterranean near Turkey and Syria, is a European Union member despite being geographically in Asia.
- **It gained independence from Britain in 1960, but tensions between its Greek and Turkish communities led to violence and the deployment of UN peacekeepers.**
- In 1974, a coup by Greek Cypriots to unite with Greece prompted a Turkish invasion.
- Although the government in Nicosia was restored, Turkish forces remained, and the island's northeast declared itself the Turkish Republic of Northern Cyprus, recognized only by Turkey.

KEY HIGHLIGHTS OF THE VISIT

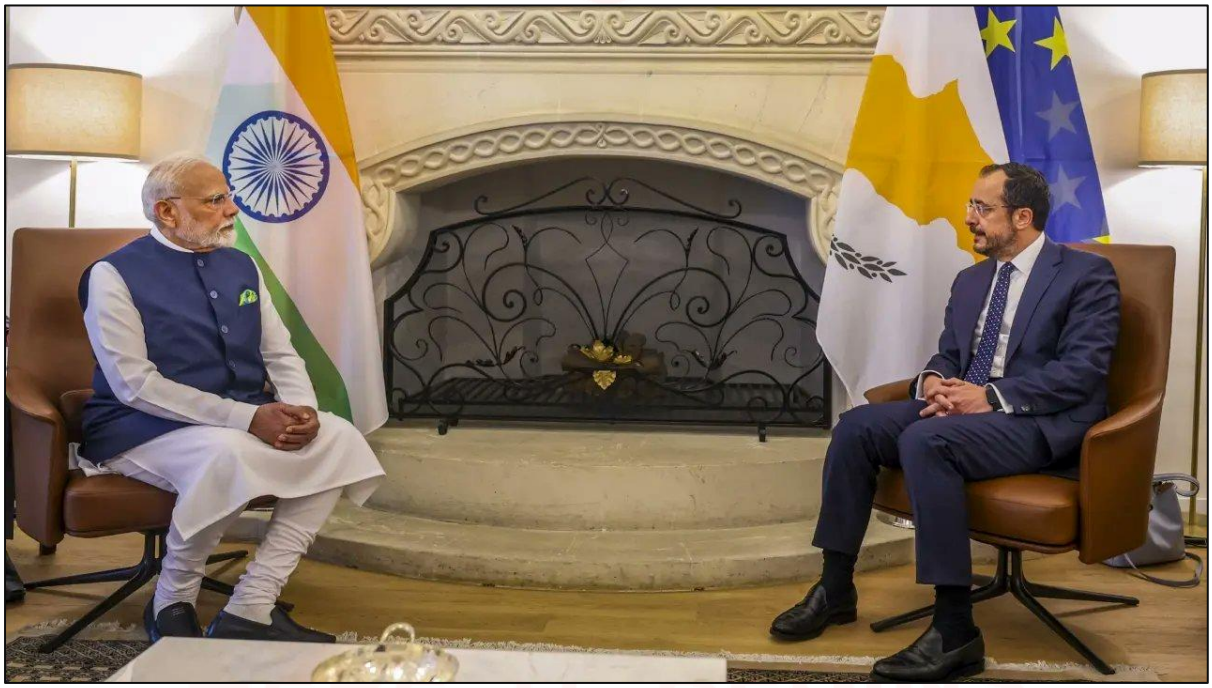
- **Strategic Roadmap:** A five-year strategic roadmap will be developed to steer bilateral cooperation.
    - Alignment between **Cyprus Vision 2035 and India's Viksit Bharat 2047** — both aiming for inclusive, tech-driven, sustainable development.
- **Economic & Trade Relations:** India-Cyprus-Greece Business & Investment Council launched earlier in 2025.
    - PM Modi emphasized India-EU Free Trade Agreement (FTA) — target: by end of 2025.
- **Grand Cross of the Order of Makarios III:** PM Modi was awarded **Cyprus' highest civilian honour.**
    - Named after **Cyprus' first President**, it is awarded to heads of state and leaders of merit.

INDIA–CYPRUS RELATIONS: A HISTORICAL OVERVIEW

India and Cyprus share a warm and long-standing relationship rooted in shared democratic values, support for sovereignty, and cooperation in international forums. Despite geographical distance, both nations have maintained a deep political and diplomatic engagement since Cyprus's independence.

HISTORICAL BACKGROUND

ESTABLISHMENT OF DIPLOMATIC RELATIONS



- Cyprus gained independence from British colonial rule on **August 16, 1960**.
- India was among the **first countries to recognize the Republic of Cyprus**, establishing formal diplomatic ties in **February 1962**.
- India set up its **High Commission in Nicosia** the same year.

SUPPORT FOR CYPRIOT SOVEREIGNTY

- India has consistently supported Cyprus's **sovereignty, unity, territorial integrity, and independence**, especially during the **1974 Turkish invasion**, which divided the island.

- India supported **UN General Assembly and Security Council resolutions** for Cyprus's reunification based on a **bizonal, bicommunal federation**.

POLITICAL AND DIPLOMATIC ENGAGEMENT

HIGH-LEVEL VISITS

- Several **Presidents and Prime Ministers** have exchanged visits, strengthening bilateral ties:
    - **President of Cyprus Glafcos Clerides** visited India in 1994.
    - Indian **President K. R. Narayanan** visited Cyprus in 1998.
    - **President Ram Nath Kovind** visited Cyprus in **September 2018**, marking a new phase in bilateral ties.
    - Cypriot Foreign Minister **Ioannis Kasoulides** visited India multiple times to participate in international dialogues and strengthen ties.

SUPPORT IN INTERNATIONAL FORUMS

- Cyprus has supported **India's bid for a permanent seat** at the **UN Security Council** and other global bodies like the **Nuclear Suppliers Group (NSG)**.
- India supports Cyprus in its efforts for **reunification and peaceful resolution** of its internal conflict.

ECONOMIC AND TRADE RELATIONS

TRADE AND INVESTMENT

- Bilateral trade is modest but growing. In 2021–22, trade was valued at over **USD 114 million**.
- Cyprus is a significant source of **Foreign Direct Investment (FDI)** into India:
    - Between April 2000 and March 2023, Cyprus invested **USD 12.7 billion**, making it **9th largest investor** in India.

- This FDI is mostly routed through **holding companies** due to favorable tax treaties.

DOUBLE TAXATION AVOIDANCE AGREEMENT (DTAA)

- A revised **DTAA** between India and Cyprus came into effect in **2017**, addressing concerns over **tax evasion and round-tripping**.
- It brought Cyprus into India's **"white list"** of cooperating jurisdictions.

CULTURAL AND EDUCATIONAL COOPERATION

PEOPLE-TO-PEOPLE TIES

- Though the Indian diaspora in Cyprus is small (~8,000), it includes professionals in **IT, shipping, hospitality**, and **education sectors**.
- Several **Indian cultural events** and **International Day of Yoga** celebrations are held regularly by the **Indian High Commission** in Nicosia.

ACADEMIC LINKAGES

- Indian universities attract Cypriot students, while Cypriot institutions collaborate with Indian counterparts in **technology and cultural studies**.
- India offers **ICCR scholarships** and **ITEC training programs** to Cypriot students and professionals.

SCIENCE, TECHNOLOGY & OTHER COOPERATION

AGREEMENTS AND MOUS

- Both countries have signed various agreements in areas like:
  - **Merchant Shipping (1997)**
  - **Air Services**
  - **Tourism**
  - **Education and Cultural Exchange**
- Discussions have been held to promote cooperation in **IT, renewable energy**, and **pharmaceuticals**.

CLIMATE CHANGE AND ENVIRONMENT

- India and Cyprus both emphasize the importance of **sustainable development and climate action**.
- They cooperate under **international climate platforms** and are aligned on **environmental concerns**.

STRATEGIC & MULTILATERAL COOPERATION

SHARED GLOBAL VISION

- Both countries believe in **multilateralism, peace, and dialogue-based conflict resolution**.
- Cyprus supports India's efforts in the **Indian Ocean Region** for **maritime security and stability**.
- They collaborate under platforms like:
  - **Commonwealth of Nations**
  - **United Nations**
  - **Non-Aligned Movement**

02 VIETNAM OFFICIALLY JOINS BRICS AS 'PARTNER COUNTRY'

Vietnam has now become the 10th BRICS partner. The partner country category was created at the 2024 BRICS Summit in Kazan, Russia. The current list of partners includes Vietnam, Belarus, Bolivia, Kazakhstan, Cuba, Malaysia, Nigeria, Thailand, Uganda, and Uzbekistan.

WHAT IS BRICS?

BRICS is an acronym for a group of major emerging economies: **Brazil, Russia, India, China, and South Africa**.

Originally formed as **BRIC** in 2006, the group became **BRICS** in 2010 with the inclusion of South Africa.

In **2023**, BRICS entered a new phase of global influence by expanding its membership, signaling a challenge to Western-dominated institutions like the IMF and World Bank.

BRICS represents a **multipolar global order**, promoting cooperation in economic, political, technological, and cultural domains.

CURRENT MEMBERS OF BRICS (AS OF 2025)

Brazil	Russia	India	China
South Africa	Egypt (joined in 2024)	Iran (joined in 2024)	United Arab Emirates (UAE) (joined in 2024)
	Ethiopia (joined in 2024)	Saudi Arabia (joined in 2024)	

These six new members were officially inducted during the **15th BRICS Summit in Johannesburg** in August 2023.

ORIGIN AND EVOLUTION

- The term **BRIC** was coined in 2001 by **Jim O'Neill**, a British economist at Goldman Sachs, to describe fast-growing economies likely to dominate global growth.
- **2006**: Formal diplomatic cooperation began between BRIC nations.
- **2009**: First official BRIC summit held in **Yekaterinburg, Russia**.
- **2010**: **South Africa** joined, turning BRIC into **BRICS**.
- **2023**: BRICS announced **historic expansion**, marking a shift toward a larger coalition of the Global South.

KEY FACTS AND GLOBAL INFLUENCE

- **BRICS nations** account for:
  - Over **42%** of the world's population.
  - Around **30% of global GDP** (PPP basis).
  - Over **25% of world trade**.

    - Significant control over global energy resources—especially with Saudi Arabia, Iran, and Russia as top oil producers.

- **New Development Bank (NDB)**, established in 2015, funds sustainable development and infrastructure projects.
- BRICS is a **major alternative voice** to Western-led blocs like G7 and NATO, advocating for a **multipolar world order**.

CORE OBJECTIVES

- **Reform global financial and political institutions** like the UN, IMF, and World Bank to reflect today's global realities.
- Promote **inclusive economic growth and development**.
- Enhance **South–South cooperation**.
- Strengthen **multilateralism and diplomacy** based on mutual respect.
- Promote **peace and security**, especially in the Global South.

INSTITUTIONAL MECHANISMS

ANNUAL BRICS SUMMIT

- Held since 2009, hosted on a rotational basis by member countries.
- Discusses economic issues, global governance, technology, health, and more.

NEW DEVELOPMENT BANK (NDB)

- Headquartered in **Shanghai**.
- Provides funding for **sustainable infrastructure** and development in BRICS and other developing countries.
- As of 2024, NDB includes **non-BRICS members** like Bangladesh, UAE, Egypt, and Uruguay.

CONTINGENT RESERVE ARRANGEMENT (CRA)

- A financial safety net of **$100 billion** created in 2014 to help member countries manage balance of payment crises.

BRICS BUSINESS COUNCIL

- Facilitates business collaboration and private sector involvement in economic initiatives.

KEY AREAS OF COOPERATION

ECONOMIC & FINANCIAL

- Promote local currency trade (de-dollarization).
- Support fintech, startups, and trade digitization.
- Launch of BRICS Pay—a unified payment system **(under development).**

ENERGY & ENVIRONMENT

- Cooperation on **renewable energy, nuclear energy, and oil and gas trade**.
- Joint initiatives on **climate change**, carbon markets, and clean tech.

TECHNOLOGY

- BRICS AI and Digital Economy forums.
- R&D collaboration in **space, biotech, and green tech**.
- Digital public infrastructure exchange (especially India's model of UPI and Aadhaar).

HEALTH

- Coordinated response during **COVID-19 pandemic**.
- Proposed **BRICS Vaccine Research and Development Centre** (still in progress).

EDUCATION & CULTURE

- Student exchange programs, academic forums, and cultural summits.
- BRICS Games, Film Festival, and Youth Summit held periodically.

BRICS VS. WESTERN INSTITUTIONS

Factor	BRICS	G7 / Western Bloc
Composition	Emerging economies + oil powers	Developed economies
GDP (PPP)	Higher than G7 (as of 2024)	Lower than BRICS
Currency Dominance	Promoting de-dollarization	USD/EUR dominated
Financial Institutions	NDB, CRA	IMF, World Bank
Geopolitical Stance	Multipolar, South–South cooperation	US/EU-centric, NATO-aligned

03 UN'S ICAO RATED INDIA ABOVE GLOBAL AVERAGE

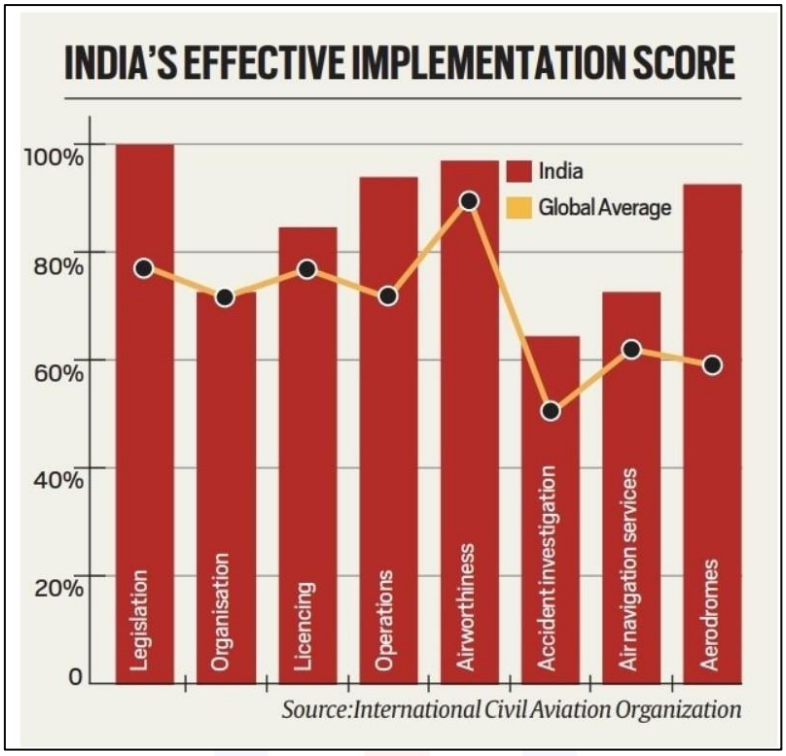
India was **rated well above the global average** in terms of its **operations and airworthiness by the International Civil Aviation Organization (ICAO).**

MORE ABOUT NEWS

- **The Directorate General of Civil Aviation (DGCA)** was last audited in **November 2022.**
- The **overall Effective Implementation score** rose to **85.65% from 69.95% in 2018,** indicating an improvement in the country's aviation safety ranking.
    - **India scored higher than the global average** in **all eight categories** under ICAO's **Universal Safety Oversight Audit Programme (USOAP).**
- **In the operations category,** India scored **94.02%**, significantly higher than the **global average of 72.28%,** and even surpassed countries like the **United States (86.51%) and China (90%).**
- **In terms of airworthiness,** India achieved a score of **97.06%,** again outperforming **the US (89.13%) and China (94.83%).**
- Although India was **audited in 2022,** while the **US and China were audited in 2024.**

India is currently the **third-largest domestic aviation market** in the world, after the **United States and China.**

It is also recognized as the **fastest-growing major aviation market**, reflecting the increasing demand and expansion in civil aviation infrastructure.



WHAT IS ICAO?

- **ICAO** is a **specialized agency of the United Nations** established in **1944** through the **Chicago Convention**.
- Headquartered in **Montreal, Canada**.
- It sets **international standards and regulations** for aviation safety, security, efficiency, and environmental protection.

KEY FUNCTIONS

- **Standardizes air navigation** systems and aviation infrastructure across nations.
- Develops **SARPs** (Standards and Recommended Practices) used by all **193 member countries**.
- Promotes **safe and orderly growth** of international civil aviation.
- Coordinates global **air traffic management**, airport operations, and aviation training.
- Facilitates the **issuance of passports and travel documents** based on uniform standards.

SIGNIFICANCE

- Plays a critical role in **investigating air accidents** and improving safety mechanisms.
- Ensures environmental sustainability through the **CORSIA** program (Carbon Offsetting and Reduction Scheme for International Aviation).
- Assists developing countries with **technical cooperation and training**.

INDIA & ICAO

- India is a **founding member** of ICAO.
- India is also part of the **ICAO Council**, contributing to global aviation policymaking.

ICAO AND SAFETY AUDITS

- ICAO is a **specialized agency** of the **United Nations** responsible for establishing **global standards and regulations** for civil aviation safety and operations.
- ICAO conducts the **Universal Safety Oversight Audit Programme (USOAP)** to assess the **ability of member states** to ensure effective safety oversight in civil aviation.

- **The USOAP evaluates eight critical areas:** legislation, organisation, licensing, operations, airworthiness, accident investigation, air navigation services, and aerodromes.

FAA'S SAFETY ASSESSMENT OF INDIA

- **The Federal Aviation Administration (FAA)** of the **United States** conducts the **International Aviation Safety Assessment (IASA)** to determine if a **country's civil aviation authority complies with ICAO standards.**
- In 2021, the DGCA of India was audited by the FAA, based on the positive findings, in 2023, the FAA reaffirmed **India's status as Category 1** under the IASA programme, indicating **full compliance with ICAO safety oversight standards.**
    - A Category 1 rating allows **Indian airlines to operate and expand flights to the United States** and to code-share with US carriers.

04 SIPRI YEARBOOK 2025

The SIPRI Yearbook 2025 revealed that India now possesses more nuclear warheads than Pakistan, but significantly fewer than China.

WORLD NUCLEAR FORCES, JANUARY 2025

	Military stockpile[a]				
	Deployed warheads[b]	Stored warheads[c]	Total	Retired warheads[d]	Total inventory[e]
USA	1 770	1 930	3 700	1 477	5 177
Russia	1 718	2 591	4 309	1 150	5 459
UK	120	105	225	–	225
France	280	10	290	..	290
China	24	576	600	–	600
India	–	180	180	..	180
Pakistan	–	170	170	..	170
North Korea	–	50	50	..	50
Israel	–	90	90	..	90
Total	**3 912**	**5 702**	**9 614**	**2 627**	**12 241**

WHAT IS STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE?

- **SIPRI** is an **independent international institute** based in **Stockholm, Sweden**, established in **1966**.
- Founded by the Swedish Parliament to commemorate **150 years of unbroken peace in Sweden**.
- It conducts research on **conflict, armaments, arms control**, and **disarmament**.

KEY FUNCTIONS

- Tracks global **military expenditures**, **arms transfers**, and **arms industries**.
- Publishes the annual **SIPRI Yearbook**, a leading source on global security and defense data.
- Maintains reliable databases on:
    - **World military spending**
    - **Nuclear weapons stockpiles**

- **Global arms trade**

- Provides impartial data used by **governments, UN bodies, media, and researchers**.

GLOBAL SIGNIFICANCE

- SIPRI is highly respected for its **neutral, evidence-based** research.
- Its reports influence **global arms control negotiations** and **peace policy formulation**.
- Works closely with international organizations like **the UN, EU**, and **OSCE**.

INDIA'S STATUS IN SIPRI YEARBOOK 2025:

- **Total Warheads:** India has **180 stored nuclear warheads** as of January 2025.
- **Modernization:** India continues to **develop new nuclear delivery systems**, including canisterised missiles capable of carrying multiple warheads.
- **Triad Development:** India's nuclear capability is structured into a **mature nuclear triad** land-based missiles, aircraft, and sea-based submarines (SSBNs).

- **Strategic Shift:** Indications suggest a move toward **mating warheads with launchers** in peacetime, changing India's traditional de-alerted posture.

PAKISTAN'S NUCLEAR CAPABILITY:

- **Total Warheads**: Estimated at **170 warheads** as of January 2025.
- **Trends:** Pakistan is expanding **fissile material production** and developing **new delivery systems**, with the arsenal likely to grow this decade.
- **Primary Focus:** Pakistan's nuclear strategy remains cantered on **deterring India**, with emphasis on short-range tactical weapons.

CHINA'S EXPANDING ARSENAL:

- **Total Warheads:** China has **600 nuclear warheads**, growing at **~100 per year** since 2023.
- **ICBM Silos:** Around 350 new ICBM silos developed across desert and mountain bases.
- **Shift in Posture:** China may now keep warheads mounted on missiles during peacetime, departing from past practices.

GLOBAL TRENDS IN NUCLEAR FORCES:

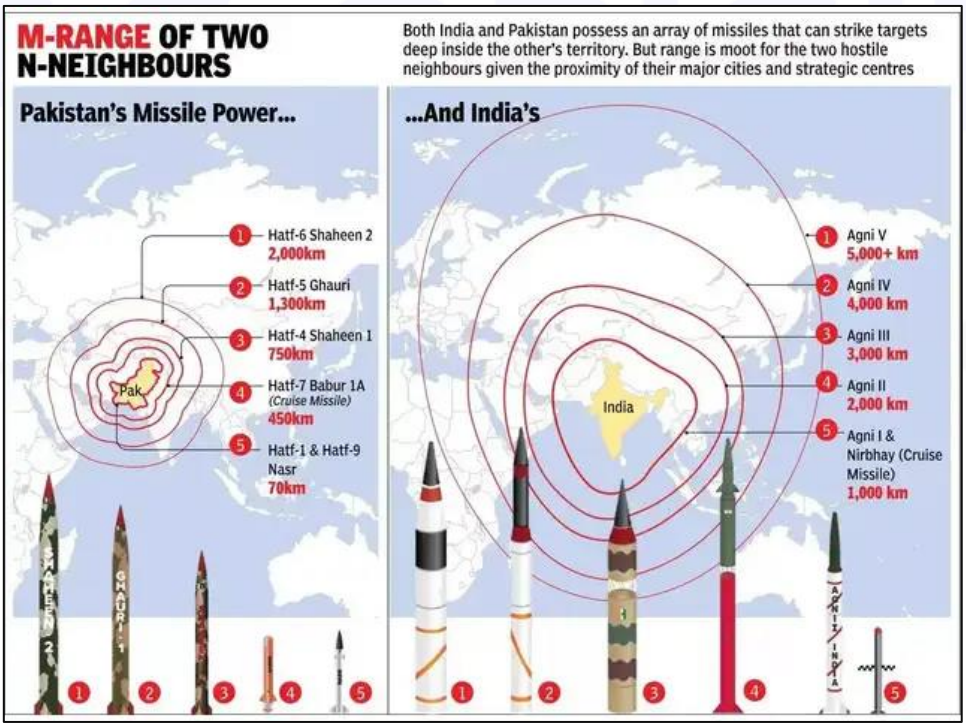
- **Total Global Inventory:** 12,241 nuclear warheads globally and ~9,614 in military stockpiles.
- **Top Powers:** Russia (5,459) and USA (5,177) hold over 90% of global warheads.
- **Deployment Rate:** Around **2,100 warheads** are in high operational alert states.
- **Modernization Across Board:** All 9 nuclear powers including UK, France, Israel, and North Korea—are actively upgrading or expanding their arsenals.

- **Arms Control Crisis:** The New START treaty expires in 2026, with no successor in sight, risking unregulated nuclear growth.

INDIA VS PAKISTAN: NUCLEAR POLICY & WARHEAD COMPARISON

Feature	India	Pakistan
First Nuclear Test	1974 – Operation Smiling Buddha	1998 – Chagai-I (shortly after India's Pokhran-II tests)
Declared Nuclear Doctrine	**'No First Use' (NFU)** policy	**'First Use' policy** – retains right to use nuclear weapons first
Nuclear Command Authority	Nuclear Command Authority (NCA) under **civilian control**	National Command Authority (NCA) under **military control**
Minimum Deterrence Strategy	Yes – "Credible Minimum Deterrence"	Claims minimum deterrence, but evolving towards **Full Spectrum Deterrence**
Warhead Estimate (2024)	~180 nuclear warheads *(source: SIPRI)*	~170 nuclear warheads *(source: SIPRI)*
Delivery Systems	Land-based missiles (Agni series), aircraft, sea-based platforms (INS Arihant)	Land-based missiles (Shaheen, Ghauri), aircraft, suspected cruise missiles

Missile Range	Up to 5,000+ km *(Agni-V)*	Up to 2,750 km *(Shaheen-III)*
Participation in NPT	Not a signatory, but follows many **non-proliferation norms voluntarily**	Not a signatory, history of **nuclear proliferation (A.Q. Khan network)**
Nuclear Use Policy in Conflict	Retaliatory strike only	Possible pre-emptive use in conventional war scenarios
Nuclear Triad Capability	Achieved – air, land, sea-based launch platforms	Partial – working toward sea-based capability



05 STRAIT OF HORMUZ

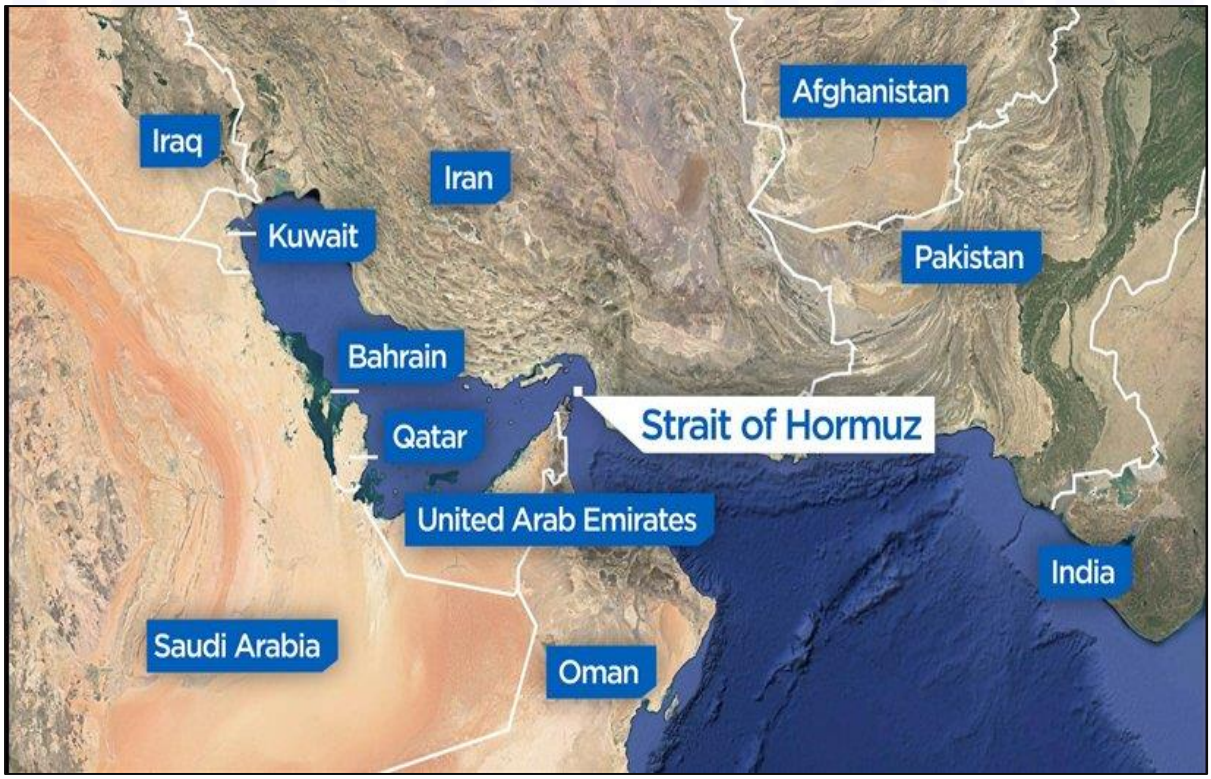
Two oil tankers, Adalynn and Front Eagle, caught fire following a collision near the Strait of Hormuz, triggering concern over energy security and trade stability.

WHAT IS THE STRAIT OF HORMUZ?

- The **Strait of Hormuz** is a narrow waterway that connects the **Persian Gulf** with the **Gulf of Oman** and the **Arabian Sea**.
- It lies between **Iran** to the north and the **United Arab Emirates (UAE)** and **Oman** to the south.
- Width: ~33 km at its narrowest point; shipping lanes are just **3 km wide in each direction** with a 2 km buffer zone.

COUNTRIES BORDERING THE STRAIT

- **North Coast**: Iran
- **South Coast**: Oman (Musandam Peninsula) and UAE



GLOBAL IMPORTANCE OF THE STRAIT

- One of the **most critical chokepoints** for global energy supplies.
- Nearly **1/5th of the world's oil** passes through this strait.
- Daily flow (as of 2024): Around **20–21 million barrels of oil per day**, which accounts for ~**21% of global petroleum liquids consumption**.
- Also, a key route for **LNG exports**, especially from **Qatar**, which exports nearly **77 million tonnes/year** (about 20% of global LNG).

MARITIME TRAFFIC THROUGH THE STRAIT

- Over **90% of the oil exported from the Persian Gulf** (by Saudi Arabia, Iran, Iraq, Kuwait, UAE, Qatar) passes through the Strait.
- It is used by:
    - Oil tankers
    - Liquefied natural gas (LNG) carriers
    - Container and cargo ships

STRATEGIC IMPORTANCE

- **Chokepoint**: Any disruption due to conflict, piracy, or sanctions can immediately spike global oil prices.
- **Military sensitivity**: Frequent tensions between **Iran and the West** (especially the U.S.) over control and access.
- It has been the site of **naval incidents**, such as tanker seizures and drone strikes, especially during **U.S.-Iran tensions (2019–2020)**.

INDIA AND THE STRAIT OF HORMUZ

ENERGY DEPENDENCE

- India imports around **85% of its crude oil** and **50% of natural gas**.
- Over **60% of India's oil imports** come from the Middle East, especially:
    - Iraq

- Saudi Arabia
- UAE
- Iran (partially resumed under special mechanisms)
- Kuwait

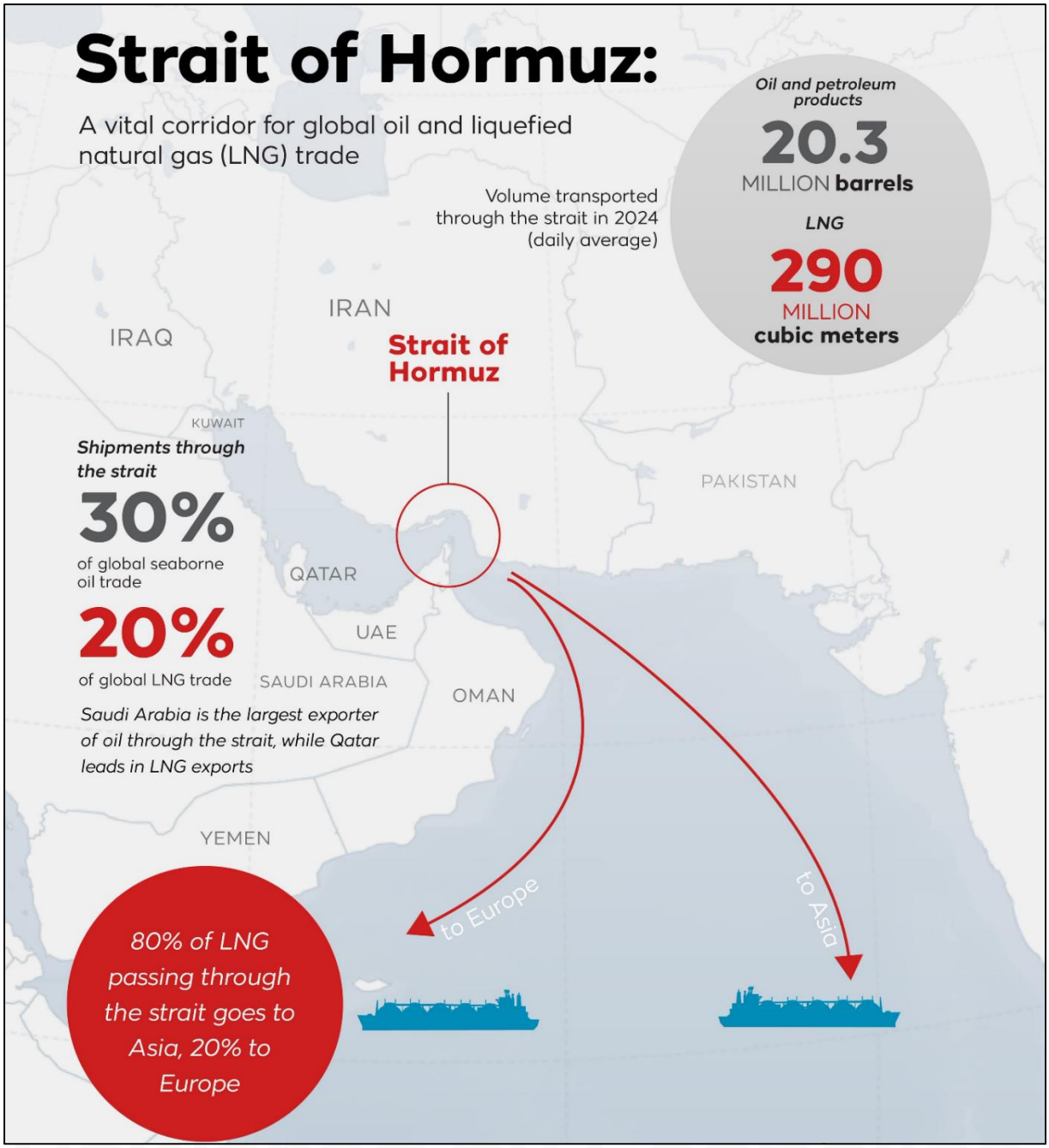
- These shipments pass through the **Strait of Hormuz**, making it **critical for India's energy security**.

TRADE VOLUME

- India's **bilateral trade** with the Gulf Cooperation Council (GCC) was over **$180 billion (2023-24)**.
- Major seaborne exports from India to the Middle East and beyond also use the Strait.

KEY POINTS OF DEPENDENCE FOR INDIA

Area	Dependency Details
Oil Imports	>60% of India's oil comes via Persian Gulf through Hormuz
LNG Supplies	Qatar supplies ~**40% of India's LNG**, all through the Strait
Diaspora Ties	Over **9 million Indian expatriates** in the Gulf; remittances > $50 billion/year
Shipping & Trade	Over **2/3 of India's westbound maritime trade** passes via the Strait
Strategic Access	Indian Navy monitors the area via **Mission-based deployments** in Arabian Sea



06 GRAND CROSS OF THE ORDER OF MAKARIOS III

Prime Minister of India was awarded the Grand Cross of the Order of Makarios III, the highest civilian honour of Cyprus, during his historic visit.

GRAND CROSS OF THE ORDER OF MAKARIOS III:

The Grand Cross is one of the highest distinctions under the Order of Makarios III, Cyprus's premier national honour conferred on dignitaries for exceptional contributions.

Awarding Nation: It is presented by the President of the Republic of Cyprus and named after Makarios III, the first President and spiritual leader of Cyprus.

OBJECTIVE:

- To honour global leaders for **distinguished service to Cyprus** or **noteworthy global contributions** in diplomacy, peace, and human values.
- Reflects Cyprus's commitment to fostering international goodwill and alliances.

KEY FEATURES:

- **Hierarchy:** Part of a 6-tiered order ranging from Grand Collar to Knight.
- **Recipients:** Reserved for **Heads of State,** global leaders, and individuals with notable service to Cyprus.
- **Symbolism:** Embodies the Cypriot spirit of independence, integrity, and international cooperation.
- **Award Ceremony:** Conferred in a formal diplomatic setting by the President of Cyprus.

07 INDIA SENDS FINAL BATCH OF MACHINERY TO SURINAME

India has dispatched the second and final batch of machinery for Passion Fruit Processing to Suriname under the SEEDS (Supply of Equipment for Efficient Development of SMES) initiative.

ABOUT THE INITIATIVE

- The initiative is part of a **$1 million** SME grant from India to Suriname.
- It aims to support the establishment of a passion fruit packaging and processing unit in Suriname.
- The project is supported by **NABARD Consultancy Services (NABCONS).**

PASSION FRUIT (PASSIFLORA EDULIS)

- It is a **tropical fruit** native to **South America,** particularly southern **Brazil, Paraguay, and northern Argentina.**
    - It was introduced to **Europe in 1553** by **Spanish and Portuguese** colonists.
- **Nutritional Value:** Rich in Vitamin A, Vitamin C, dietary fiber, and antioxidants.

SURINAME

- **Location**: Northeastern coast of South America, bordered by Guyana, French Guiana, and Brazil.
- **Capital**: **Paramaribo**
- **Official Language**: **Dutch** (only Dutch-speaking country in South America).
- **Independence**: Gained from the Netherlands on **25 November 1975**.
- **Population**: ~620,000 (2024 est.) – one of the smallest populations in South America.

- **Ethnic Diversity**: Highly multicultural – includes **Hindustanis (descendants of Indian indentured laborers)**, Creoles, Javanese, Maroons, and Indigenous peoples.
- **Religion**: Predominantly **Christian**, but large **Hindu and Muslim** communities.
- **Economy**: Relies on **bauxite, gold, oil**, and agriculture; facing challenges like inflation and debt.
- **Currency**: Surinamese Dollar (SRD)
- **Political System**: Parliamentary republic; current President (2024): **Chandrikapersad "Chan" Santokhi** – of Indian origin.
- **India-Suriname Ties**: Strong cultural links due to large Indian diaspora (nearly 27% of population).

INDIA–SURINAME RELATIONS: A HISTORICAL AND STRATEGIC BOND

HISTORICAL & CULTURAL TIES

- Relations trace back to **June 5, 1873**, when the first **Indian indentured laborers** arrived in Suriname from Bihar and Eastern UP under British rule.
- Today, about **27% of Suriname's population is of Indian origin** (called **Hindustanis**), making it a vital part of the country's social and political fabric.
- The **Sarnami Hindustani** dialect and Indian traditions (like Holi, Diwali, Hindi language) are actively preserved in Suriname.

DIPLOMATIC ENGAGEMENT

- India and Suriname share warm diplomatic ties since Suriname's independence in **1975**.
- Suriname opened its embassy in New Delhi in 2000; India has an embassy in Paramaribo.
- Suriname's President **Chandrikapersad Santokhi**, of Indian origin, has strengthened ties further since 2020.

- President Santokhi was the **chief guest at Pravasi Bharatiya Divas 2023**.

ECONOMIC AND DEVELOPMENT COOPERATION

- India provides **lines of credit** and **development assistance** for:
  - Rural electrification
  - Water supply systems
  - Healthcare and IT
- Trade is modest but includes pharmaceuticals, machinery, and textiles from India.

EDUCATION & PEOPLE-TO-PEOPLE LINKS

- Scholarships under **ITEC** and **ICCR** are granted annually to Surinamese students.
- Indian cultural troupes and yoga experts often participate in cultural exchanges.

STRATEGIC SIGNIFICANCE

- Suriname supports India at international forums, including on **UN reforms**.
- Both nations are members of the **Global South cooperation framework** and engage in **climate diplomacy**.

08 INTERNATIONAL ENERGY AGENCY

India, the world's third-largest oil-consuming and importing nation, will lead global oil demand growth by a large margin, adding a steep 1 million barrels per day by 2030, the International Energy Agency (IEA) said recently.

HISTORY & MANDATE

- **Founded on 18 November 1974**, in the wake of the 1973–74 oil crisis under the OECD framework to safeguard against disruptions in oil supply.
- Initially focused on coordinating **emergency oil stock releases** and promoting **energy conservation** among industrialized nations.
- Over time, mandate expanded to include **comprehensive energy security**, **environmental sustainability**, **climate change**, and **clean energy transitions**.
- It is based in Paris, France.

MEMBERSHIP

MEMBER COUNTRIES

- Currently comprises **32 full-member countries**, all OECD members that meet specific criteria.
- Founding members include the US, UK, Japan, Germany, France, Canada, etc.
- Later additions: Greece (1976), Finland/France (1992), Korea (2002), Mexico (2018), Lithuania (2022), Latvia (2024), and others.

ASSOCIATION COUNTRIES

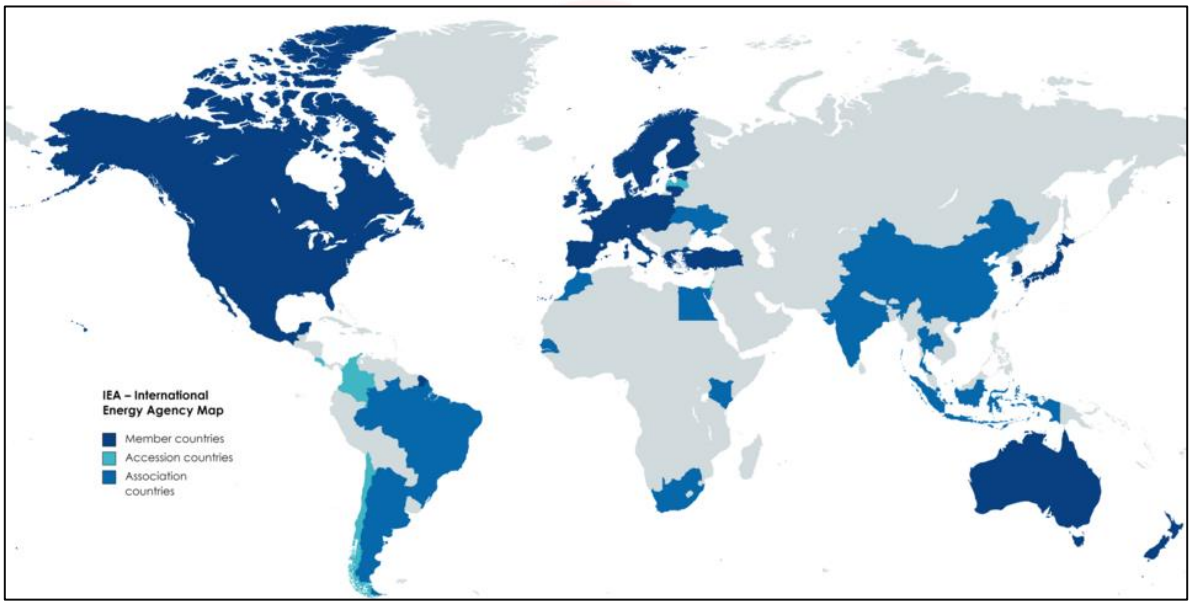
- Since 2015, **13 'association' countries** (e.g., India, China, Brazil, Indonesia, South Africa, Egypt, Argentina, Ukraine, Kenya, Senegal) participate in many IEA activities.
- These participants benefit from technical cooperation and access to working groups, though they do not have voting rights

ACCESSION-IN-PROGRESS

- Chile, Colombia, Israel, Costa Rica, and others are currently undergoing the process for full membership.

MEMBERSHIP CRITERIA

- Must be an **OECD member**.
- Must hold **90 days' worth of net oil imports in reserves**, have a **demand restraint program**, co-ordinate emergency measures (CERM), report company data, and be capable of participating in collective response actions.



GOVERNANCE & STRUCTURE

GOVERNING BOARD

- The **Governing Board**, composed of energy ministers or senior officials, sets policy and approves budget/programs biennially.
- Decisions are taken by **qualified majority vote**, though most are reached by **consensus**; emergency measures require **unanimity**.

STANDING GROUPS & COMMITTEES

- Support the Governing Board with technical expertise. Key groups include:

- **Standing Group on Emergency Questions (SEQ)** – oil emergency planning.
- **Oil Market Analysis Group (SOM)**.
- **Long-Term Cooperation Group (SLT)** – energy security and efficiency.
- **Global Energy Dialogue Group (SGD)** – external engagement.
- **Committee on Budget and Expenditure (CBE)**.
- **Committee on Energy Research and Technology (CERT)** – coordinates clean-tech policy.

TECHNOLOGY COLLABORATION PROGRAMMES (TCPS)

- Labels 39 thematic R&D collaborations covering fossil fuels, renewables, transport, buildings, industry, and fusion power.
- Includes advisory boards for the private sector (oil, coal, renewable, energy efficiency, etc.).

FUNDING & BUDGET

- Core budget for **2022** stood at approximately **€61.8 million**.
- Funding primarily comes from **member country dues**, with **voluntary contributions** adding to it.
- Example: The **U.S. contributes ~14%**, about **$6 million/year**, to the total €30–35 million budget.

- Core budget covers staffing (~420 analysts as of 2024), operations, and basic reporting capabilities.
- Voluntary "clean energy transition" funds and special programs add about **€20 million annually**, supporting analytic expansion.

CORE FUNCTIONS & REPORTS

DATA AND STATISTICS

- Operates the **Energy Data Centre**, collecting energy supply, demand, price, R&D, efficiency, trade, and policy data for 150+ countries.
- Publishes **Oil Market Report** monthly (since 1983) with data, forecasts, market analysis.
- Tools include the **Policies and Measures Database (PAMS)**, tracking carbon reduction policies since 1999.

WORLD ENERGY OUTLOOK (WEO)

- IEA's flagship annual publication since 1977 (annual since 1998).
- Three core scenarios:
    - **Net Zero by 2050** (normative climate-aligned path).
    - **Announced Pledges** (current policy pledges).
    - **Stated Policies** (baseline model).
- Provides 30-year forecasts, investment trends, energy transitions, and climate implications.

WORLD ENERGY INVESTMENT REPORT

- Tracks global investments in energy supply, clean energy technologies, efficiency, and infrastructure.

ENERGY TECHNOLOGY PERSPECTIVES (ETP)

- Provides roadmaps and analysis of emerging energy technologies and pathways for decarbonization.

COUNTRY AND REGIONAL REPORTS

- Includes **India Energy Outlook**, joint analyses, and bespoke studies of national energy systems.

EMERGENCY ADVISORY & COORDINATION

- Supports members through **Co-ordinated Emergency Response Measures (CERM)**, with historical recalls in the 1991 Gulf War, 2005 hurricanes, 2011 Libya conflict, and 2022 Ukraine crisis.

LEADERSHIP

- **Fatih Birol** (Turkey) has served as Executive Director since **September 2015**.
- Under his leadership, staff doubled (~200 → ~420), and report production increased (37 in 2015 → 197 in 2022).
- Birol has pushed IEA toward **clean energy transition**, climate engagement, and inclusion of emerging economies.

ROLE IN CLEAN ENERGY & EMERGING ECONOMIES

- The **2015 strategic shift** expanded mission beyond oil to include **emerging economies** and **clean energy tech**.
- The **2022 mandate** added **critical minerals and metals** essential for green energy systems.
- Created platform for clean energy policy, emission pathways, and **net-zero strategies**.
- The **Net Zero by 2050** roadmap pioneered global decarbonization modeling.

ENGAGEMENT & GLOBAL ROLE

- Participates in key international forums: **G7, G20, APEC, ASEAN**, shaping global energy/climate policy.
- Works with **EU (Eurostat, JODI)** and numerous organizations via data-sharing and technical cooperation agreements.

- Maintains active dialogue with **China, India, Brazil**, and other major emerging economies through association framework.
- In 2024, IEA initiated full membership negotiations with India, acknowledging its strategic importance.

CRITICISMS & CHALLENGES

- Criticized for **pay walling detailed data collections**, even though it's publicly funded.
- In response, IEA moved towards more **open access**, publishing datasets under Creative Commons by late 2023 for non-commercial use.
- Despite its climate focus, IEA faces pushback from **fossil fuel producers** and potential political resistance (e.g., criticism from Trump administration).

FUTURE OF THE IEA

- Expected to fully transition to a **global energy organization**, continuing expansion in membership (Chile, Colombia, Israel, Costa Rica).

- Likely to strengthen its **Net Zero roadmap** and increase coverage of **critical minerals**, **digital energy**, and **energy equity**.
- May launch a **global unified data platform**, fulfilling calls for open data and increasing transparency.
- Will continue shaping energy policy in **decarbonization, resilience, and investment mobilization**, with flagship tools like WEO remaining central.

SUMMARY

The IEA has evolved from an **oil emergency responder** into a **leading global authority** in energy, covering everything from clean energy transitions to climate mitigation. Its expansion into emerging economies, dynamic leadership, and pioneering analytics render it indispensable to policy-makers, businesses, and researchers. While facing challenges on data access and geopolitical pressures, the IEA continues to evolve as it shapes a **secure, sustainable, and inclusive energy future**.

09 INDIA AND CROATIA

India and Croatia have agreed to develop a long-term defence cooperation plan.

MAJOR HIGHLIGHTS

Both sides agreed to develop a long-term Defence Cooperation Plan including:

- Joint military training.
- Personnel exchanges.
- Industry-level defence partnerships.
- Emphasis on cooperation in cybersecurity and defence production.
- MoUs Signed on Agriculture, Cultural Exchange, Science & Technology and setting up of an ICCR Chair of Hindi in Zagreb.

INDIA-EU FTA:

- India and Croatia have discussed the long-pending India-EU Free Trade Agreement.
- Croatia has reiterated its strong support for the early conclusion of the FTA.

INVESTMENT:

- Commitment to enhance investment in Croatia's critical industries, including pharmaceuticals, agriculture, information technology, clean technology, digital technology, and semiconductors.

ACADEMIC AND CULTURAL EXCHANGES:

- Academic institutes from both countries would carry out joint research projects.
- The two sides finalised a five-year plan for cultural exchange programs, institutionalising the people-to-people connections.

ENHANCED MOBILITY AND DIPLOMATIC ENGAGEMENT:

- India and Croatia would "soon" sign a mobility agreement to facilitate the movement of people between the two countries.
- This agreement is expected to boost tourism, educational exchanges, and business cooperation.

SPACE AND ACADEMIC COLLABORATION:

- Joint work in space ventures announced.
- India to share its space expertise with Croatia.

INDIA–CROATIA RELATIONS

HISTORICAL BACKGROUND

- India and Croatia established **diplomatic relations on July 9, 1992**, soon after Croatia declared independence from Yugoslavia in 1991.
- However, **India's historical ties with Yugoslavia**, of which Croatia was a part, date back to the **Non-Aligned Movement (NAM)** era.
- The **friendly ties between India and the Socialist Federal Republic of Yugoslavia** laid a foundation for future engagement with Croatia.

POLITICAL AND DIPLOMATIC RELATIONS

- **Embassies:**
  - **India** has an embassy in **Zagreb** (opened in 1996).
  - **Croatia** has an embassy in **New Delhi** (opened in 1995).
- Both nations have **cordial and cooperative political relations** marked by high-level visits, cultural exchanges, and growing people-to-people ties.

HIGH-LEVEL VISITS:

Year	Visit	Key Outcome
2019	Vice President M. Venkaiah Naidu to Croatia	Boosted political and economic ties; signed MoUs
2023	Croatian Speaker of Parliament to India	Strengthened parliamentary diplomacy
June 2025	**Indian Minister of External Affairs visit to Zagreb**	Key agreements signed (detailed below)

Ongoing	Visits of business and cultural delegations	Strengthened bilateral outreach

ECONOMIC AND TRADE RELATIONS

- The **bilateral trade** has been modest but growing steadily.
- Total trade stood at **~USD 245 million in 2023**, with the balance slightly in India's Favor.
- **Main Indian exports to Croatia:**
  - Pharmaceuticals
  - Chemicals
  - Machinery
  - Textiles
  - Automotive parts
- **Croatian exports to India:**
  - Electrical machinery
  - Optical instruments
  - Fertilizers
  - Industrial equipment

INVESTMENT:

- Indian companies like **Tata Consultancy Services (TCS)** and **Infosys** operate in Croatia.
- Croatia is seen as a **gateway to the EU market** and the **Adriatic region** for Indian firms.

CULTURAL AND EDUCATIONAL TIES

- Croatia has a significant academic interest in **Indology, Hindi, and Sanskrit**.
- The **University of Zagreb** has a **Department of Indology**.

- ICCR (Indian Council for Cultural Relations) provides **scholarships to Croatian students**.
- Events like **International Yoga Day, Diwali, Holi** are celebrated in Croatian cities like Zagreb, Split, and Rijeka.

AGREEMENTS:

- **MoU on Cultural Cooperation (2000)**: Framework for exchanges in dance, art, literature.
- **Hindi Chair established** at the University of Zagreb with ICCR support.

SCIENCE, TECHNOLOGY & INNOVATION COOPERATION

- India and Croatia have signed agreements to foster cooperation in:
  - **Information Technology**
  - **Biotechnology**
  - **Nanotechnology**
  - **Space technology**
- Collaborative research is being encouraged through universities and R&D institutions.

DEFENCE AND SECURITY COOPERATION

- Defence ties are at a nascent stage but show promise.
- Croatia has shown interest in **Make in India defence manufacturing**, and knowledge sharing.
- Cooperation is growing in the fields of:
  - Maritime security
  - Counter-terrorism
  - Cybersecurity
- Joint participation in **UN Peacekeeping missions** has been a shared interest.

KEY BILATERAL AGREEMENTS & MOUS

IMPORTANT AGREEMENTS SIGNED TILL 2025

Year	Agreement/MoU	Sector
1999	Agreement on Avoidance of Double Taxation	Finance
2000	Cultural Cooperation Agreement	Culture
2000	MoU on Cooperation in S&T	Science
2013	Air Services Agreement	Civil Aviation
2019	MoU on Tourism Cooperation	Tourism
2019	MoU between Croatian Chamber of Economy and CII	Trade & Industry
2023	MoU on Academic Cooperation	Education
June 2025	**MoU on Renewable Energy Cooperation**	Green Energy
June 2025	**Framework Agreement on Start-up & Innovation**	Innovation/Tech
June 2025	**MoU on Maritime Cooperation in Adriatic Sea**	Shipping, Blue Economy
June 2025	**Defence Industry Dialogue Agreement**	Defence
2025 (proposed)	Mutual Recognition of Academic Degrees	Education

MULTILATERAL COOPERATION

- Croatia supports India's **bid for permanent membership of the UN Security Council**.
- Both countries cooperate in multilateral fora such as:
  - **UN**
  - **WTO**
  - **NAM**
  - **India-EU strategic dialogue**
- **India-EU FTA negotiations** also indirectly benefit India-Croatia trade interests.

INDIAN DIASPORA IN CROATIA

- The Indian community in Croatia is small (~300 people), including:
  - Professionals in IT, healthcare
  - Students
  - Businesspeople
- The diaspora plays a key role in **soft diplomacy and cultural outreach**.

CHALLENGES IN THE RELATIONSHIP

Issue	Details
Low trade volumes	Despite strong potential, bilateral trade remains modest.
Lack of direct connectivity	No direct flights between the two countries hampers tourism and business.
Awareness gap	Indian investors still relatively unaware of Croatian market.
Visa & travel delays	Tourist and business visa processes can be streamlined.

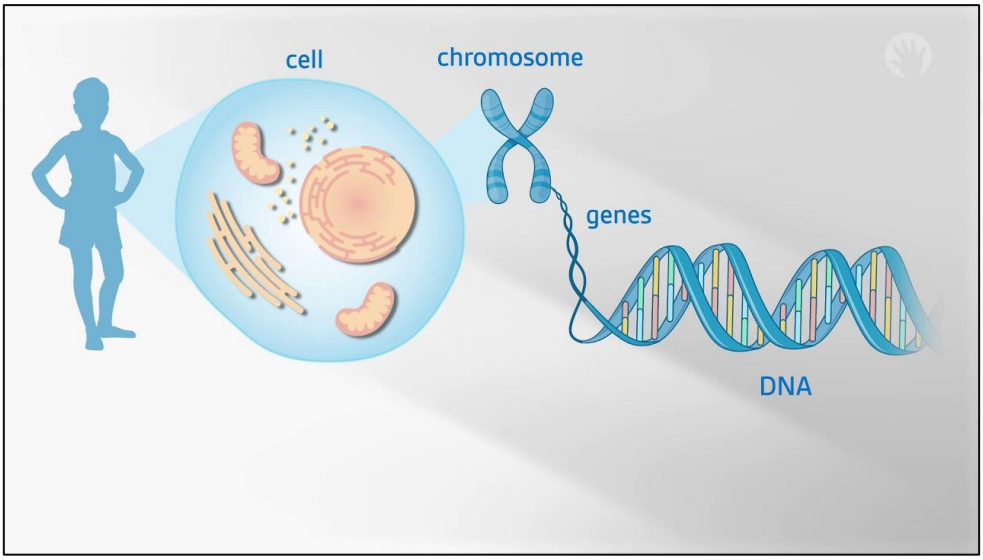
SCIENCE & TECHNOLOGY

01 DNA IDENTIFICATION

After the Air India Boeing 787 Dreamliner crash in Ahmedabad, authorities are using DNA analysis to identify the remains of those killed in the accident.

WHAT IS DNA?

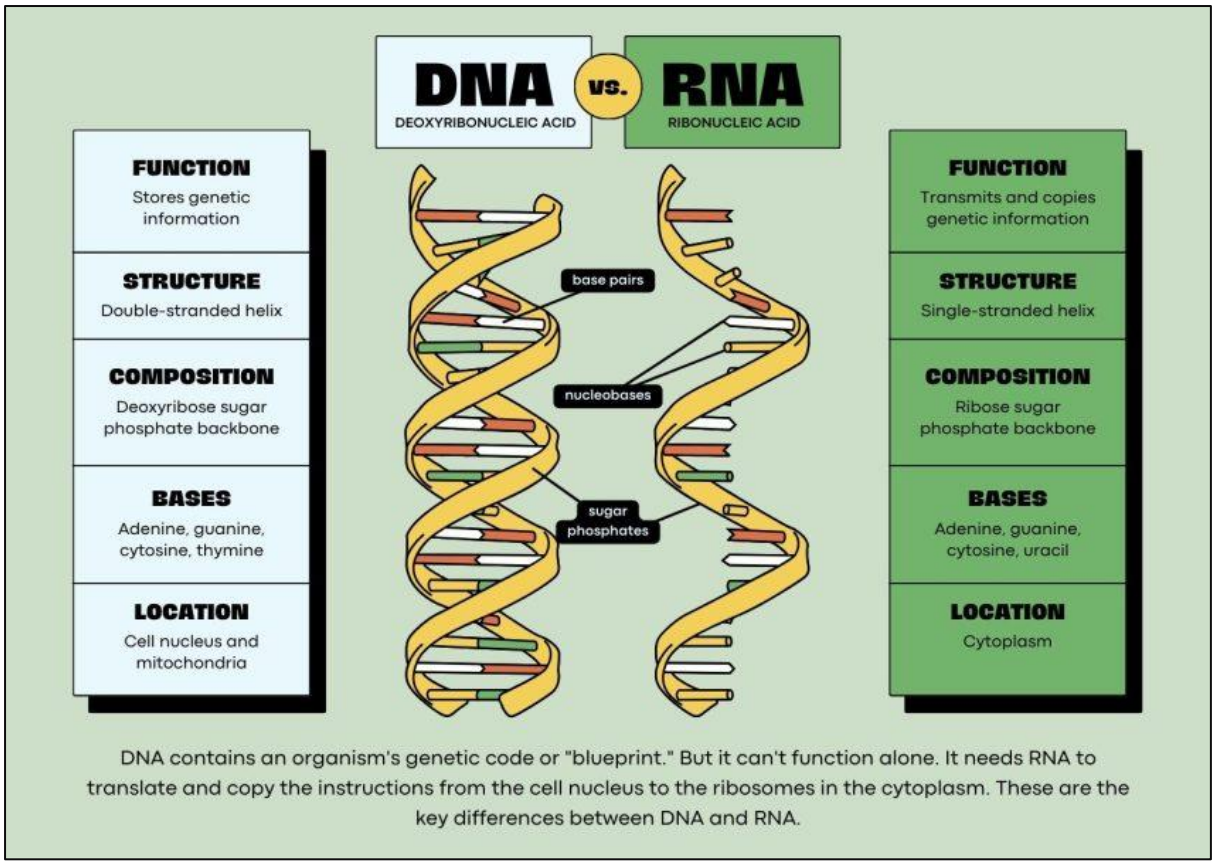
- **DNA** stands for **Deoxyribonucleic Acid**.
- It is the **hereditary material** in humans and almost all living organisms.
- Nearly every cell in a person's body has the same DNA.
- **Shape**: Double helix, discovered by James Watson and Francis Crick in 1953.
- Composed of **nucleotides**, each containing:
    - A **phosphate group**
    - A **sugar** (deoxyribose)
    - One of **four nitrogen bases**: Adenine (A), Thymine (T), Cytosine (C), and Guanine (G)



FUNCTIONS OF DNA

GENETIC BLUEPRINT

- DNA contains the instructions needed for an organism's development, functioning, growth, and reproduction.
- Genes, which are segments of DNA, encode **proteins** essential for biological processes.



DNA contains an organism's genetic code or "blueprint." But it can't function alone. It needs RNA to translate and copy the instructions from the cell nucleus to the ribosomes in the cytoplasm. These are the key differences between DNA and RNA.

PROTEIN SYNTHESIS

- **Transcription**: DNA is transcribed into messenger RNA (mRNA) in the nucleus.
- **Translation**: mRNA is translated into a protein by ribosomes in the cytoplasm.

INHERITANCE

- DNA is passed from parents to offspring.
- Half from the mother (via ovum), half from the father (via sperm).

- Unique DNA sequences allow for identification and genealogy tracing.

CELL FUNCTION REGULATION

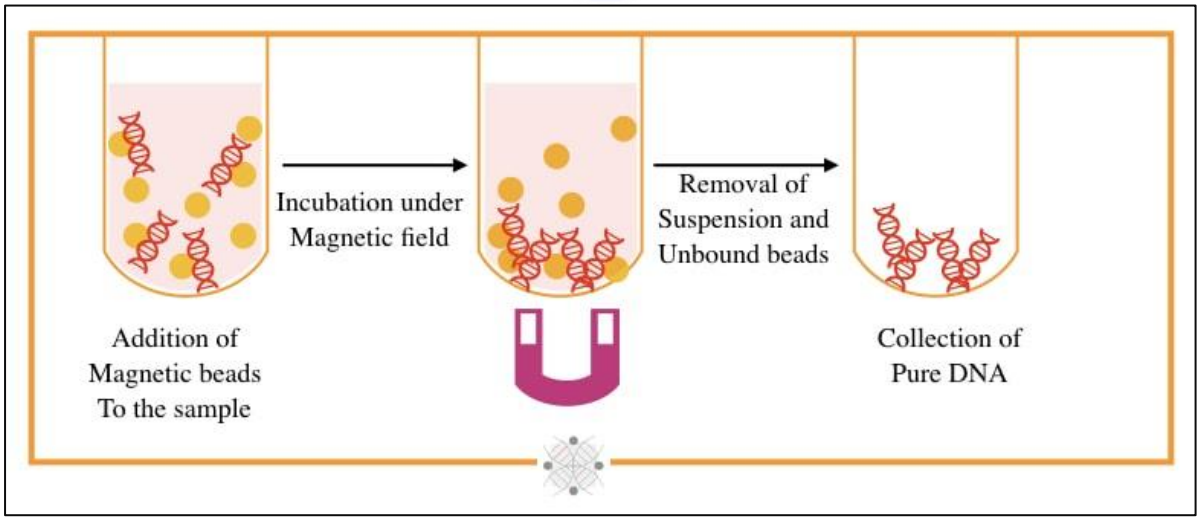
- Controls cell behavior by regulating gene expression (which genes are active/inactive).

METHODS OF DNA ANALYSIS

DNA analysis is essential in forensic science, medical diagnostics, ancestry tracing, and biological research.

POLYMERASE CHAIN REACTION (PCR)

- **Amplifies** tiny DNA samples into millions of copies.
- Invented by Kary Mullis in 1983.
- Essential for forensic analysis, diagnostics, and research.
- Fast, sensitive, requires minimal DNA.



RESTRICTION FRAGMENT LENGTH POLYMORPHISM (RFLP)

- Uses **restriction enzymes** to cut DNA into fragments.
- Fragments are separated by **gel electrophoresis**.
- Useful in paternity testing and crime scene analysis.
- Requires large DNA sample and good-quality DNA.

SHORT TANDEM REPEATS (STR) ANALYSIS

- Detects **repeating sequences** in DNA (usually 2-6 base pairs).
- STRs vary greatly among individuals.
- The FBI uses 20 standard STR loci in CODIS (Combined DNA Index System).
- Highly accurate for identity matching.

MITOCHONDRIAL DNA (MTDNA) ANALYSIS

- Analyzes DNA found in mitochondria.
- Passed only from mother to offspring.
- Useful in degraded samples (e.g., bones, hair shafts).
- Less specific than nuclear DNA, used in historical and disaster investigations.

Y-CHROMOSOME ANALYSIS

- Targets markers on the **Y chromosome**, which is passed from father to son.
- Used in male lineage tracking and sexual assault cases involving male perpetrators.

WHOLE GENOME SEQUENCING (WGS)

- Decodes an individual's entire DNA sequence.
- Comprehensive but expensive.
- Used in medical genomics and research.

DNA MICROARRAY (GENE CHIP TECHNOLOGY)

- Detects the expression of thousands of genes at once.
- Used in medical diagnostics and cancer profiling.

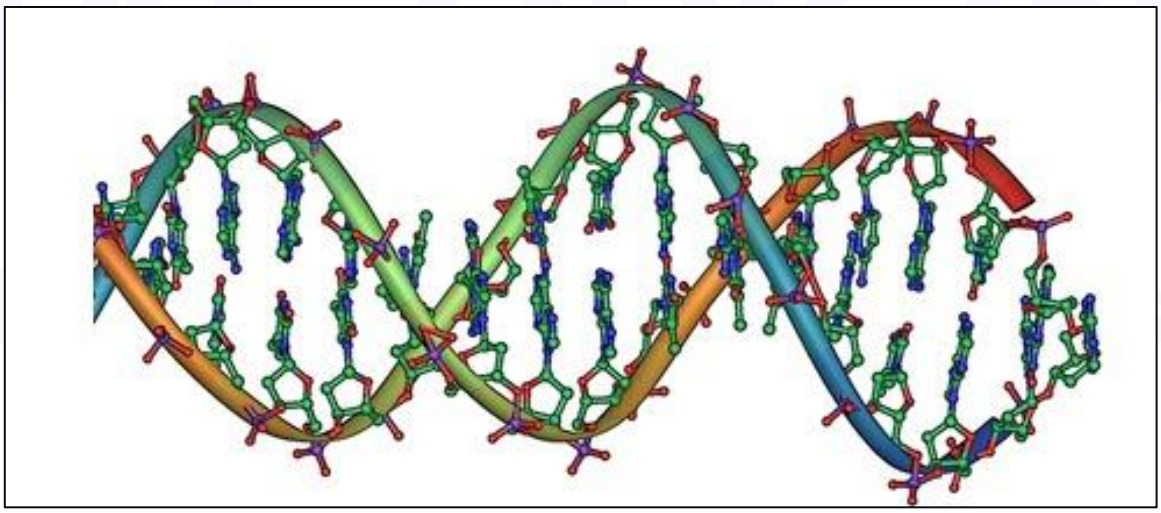
APPLICATIONS OF DNA IDENTIFICATION

FORENSIC SCIENCE

- DNA left at crime scenes (blood, hair, skin cells) helps identify suspects or victims.
- Can link a person to the scene or exonerate the innocent.

PATERNITY AND RELATIONSHIP TESTING

- Confirms biological relationships using STR markers.



MEDICAL DIAGNOSIS

- Detects genetic mutations for inherited diseases (e.g., BRCA1 for breast cancer).
- Pharmacogenomics helps customize drug therapies.

ANTHROPOLOGY AND EVOLUTIONARY BIOLOGY

- Tracks human migration patterns and evolutionary relationships.

MISSING PERSONS AND DISASTER VICTIM IDENTIFICATION

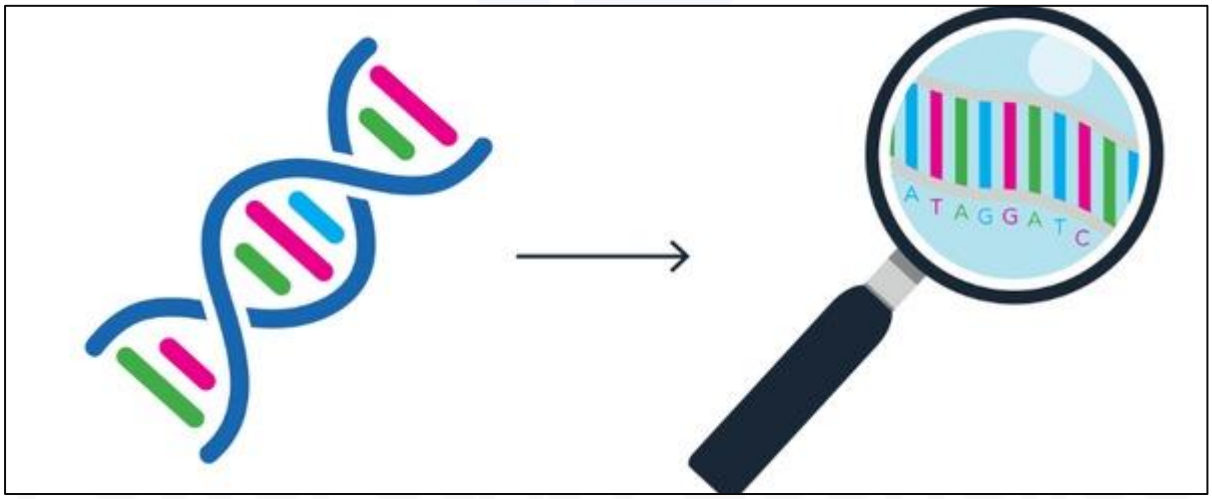
- mtDNA and STR analysis help in identifying decomposed remains.

CHALLENGES IN DNA IDENTIFICATION

Despite its power, DNA analysis faces several scientific, ethical, and legal challenges.

DEGRADED OR CONTAMINATED SAMPLES

- DNA breaks down due to heat, moisture, or time.
- Environmental contamination can lead to false results.
- **Example:** 2004 Indian Ocean tsunami—many victims were unidentifiable due to DNA degradation.



MIXTURES OF DNA

- Crime scenes often contain DNA from multiple people.
- Interpretation becomes complex, especially in gang crimes or sexual assault cases.

PARTIAL PROFILES

- Sometimes, only a small part of the DNA is recoverable.

- May lead to inconclusive results or misidentification.

PRIVACY CONCERNS

- DNA reveals sensitive health and ancestry data.
- Misuse of databases (e.g., for surveillance) raises ethical issues.
- Laws like **India's DNA Technology (Use and Application) Regulation Bill, 2019** aim to regulate DNA data usage.

LEGAL AND ETHICAL ISSUES

- Chain of custody must be perfect; any tampering can void evidence in court.
- Consent for DNA sampling is essential in civil rights cases.
- False positives, lab errors, or misinterpretations can lead to wrongful convictions.

LACK OF STANDARDIZATION

- Not all countries use the same DNA loci or testing standards.
- Makes cross-border investigation difficult.

COST AND ACCESSIBILITY

- Advanced DNA tests (like WGS) are expensive.
- Rural or underfunded forensic labs may lack infrastructure.

LANDMARK CASES IN DNA FORENSICS

COLIN PITCHFORK CASE (UK, 1986)

- First criminal conviction using DNA fingerprinting.
- Helped catch the real rapist and exonerated an innocent suspect.

NIRBHAYA GANG RAPE CASE (INDIA, 2012)

- DNA analysis matched semen samples with accused.
- Played a key role in conviction.

GOLDEN STATE KILLER (USA, 2018)

- Identified using public genealogy database (GEDmatch).
- Sparked debate on privacy vs. justice.

INDIA'S DNA LAWS AND INFRASTRUCTURE

DNA TECHNOLOGY (USE AND APPLICATION) REGULATION BILL, 2019

- Aims to regulate DNA profiling.
- Proposes setting up a **National DNA Data Bank** and **DNA Regulatory Board**.
- Addresses privacy, consent, and usage of DNA data.

INDIA'S FORENSIC CAPACITY

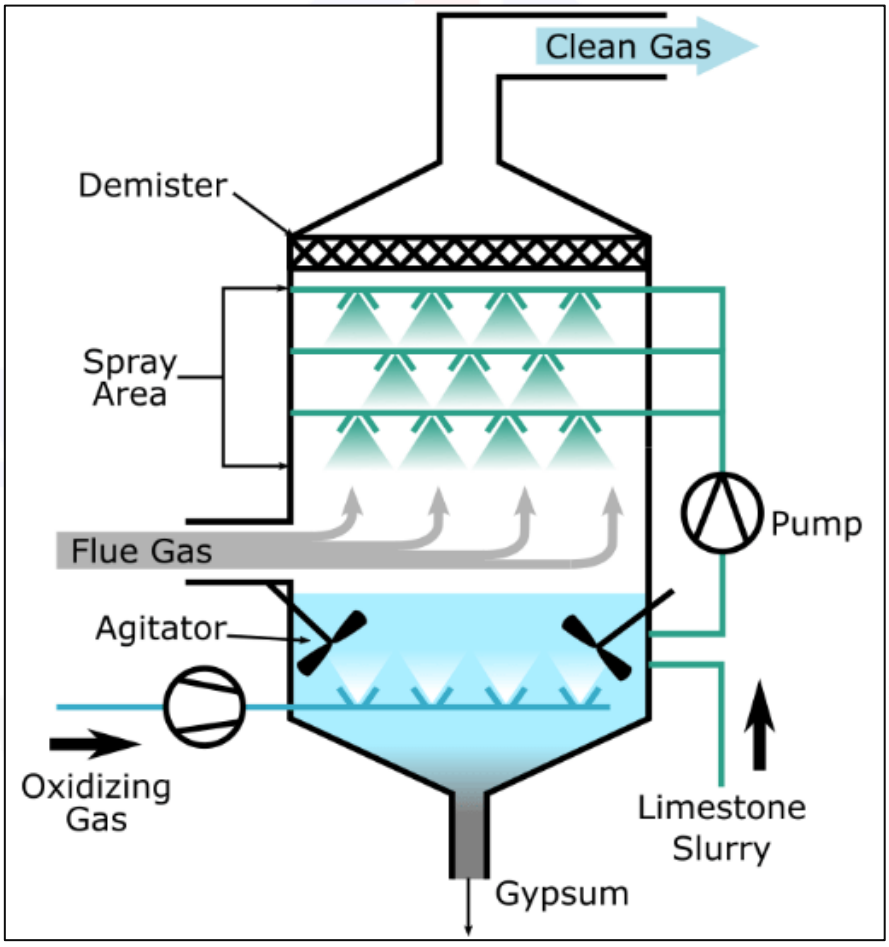
- CDFD (Centre for DNA Fingerprinting and Diagnostics), Hyderabad is a leading center.
- FSLs (Forensic Science Labs) exist in most states but vary in quality and equipment.

02 FLUE GAS DESULPHURISATION

A committee chaired by Principal Scientific Advisor (PSA) Ajay Sood, has recommended that India do away with mandating Flue Gas Desulphurisation (FGD) units in all coal-fired thermal power plants (TPPs).

WHAT IS FGD?

Flue Gas Desulphurisation (FGD) is a set of technologies used to remove sulphur dioxide (SO_2) from the exhaust (flue) gases of fossil fuel–burning power plants, industrial boilers, and waste incinerators. Sulphur dioxide is a major contributor to air pollution, acid rain, and respiratory diseases.



WHY IS IT IMPORTANT?

- SO_2 is harmful to human health and vegetation.
- Causes acid rain, which acidifies soil and water bodies.

- FGD is essential to meet air quality standards and emission norms, especially in coal-dominated countries like India and China.

WHAT ARE METHODS OF FGD?

WET FGD (WET SCRUBBING)

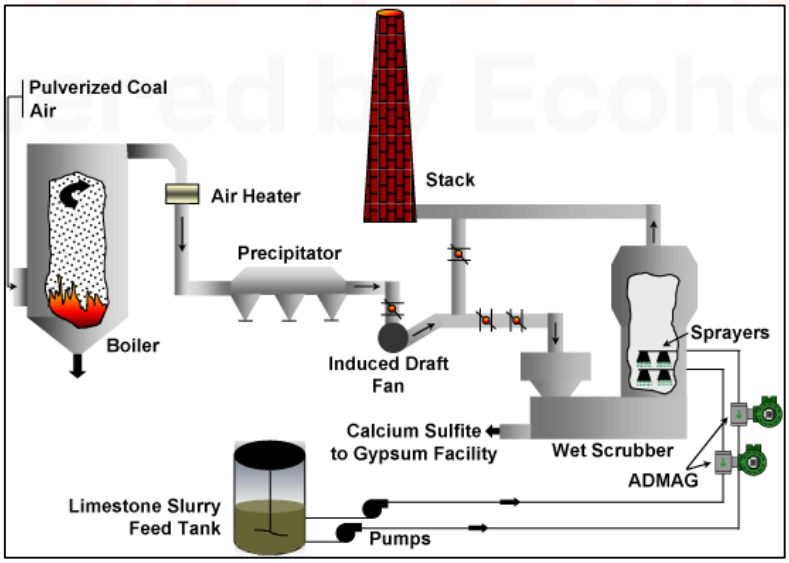
Most widely used (over 90% of installations globally). Involves use of a liquid to scrub SO_2 from flue gas.

LIMESTONE–GYPSUM PROCESS (MOST COMMON)

- Flue gas is sprayed with limestone ($CaCO_3$) slurry.
- SO_2 reacts to form calcium sulphite, which is then oxidized into gypsum ($CaSO_4 \cdot 2H_2O$).
- Efficiency: 90–98%
- By-product: Gypsum (used in cement/plaster)
- Example: NTPC's FGD systems

SEA WATER SCRUBBING

- Uses alkaline sea water to absorb SO_2.
- Common in coastal power plants (e.g., in Gujarat or Tamil Nadu).
- SO_2 is neutralized by natural carbonates/bicarbonates.
- Eco-friendly, but limited to coastal areas.



DRY FGD

No water used; simpler system, suitable for low-capacity plants.

SPRAY DRYER ABSORBER (SDA) / SEMI-DRY

- Atomized slurry of lime ($Ca(OH)_2$) is sprayed into a hot flue gas stream.
- Water evaporates, and dry solids ($CaSO_3$ or $CaSO_4$) are collected as dust.
- Efficiency: 70–90%
- Lower water use, lower maintenance.
- Suitable where gypsum sale is not viable.

DRY SORBENT INJECTION (DSI)

- Dry powdered sorbents (like hydrated lime or sodium bicarbonate) are injected directly into the flue gas.
- Reaction occurs in the ductwork before the dust collector.
- Efficiency: 50–80%
- Lower cost, ideal for older or smaller plants.

REGENERABLE (RECOVERY) FGD

- Involves recovering and reusing the sorbent.
- Sulphur can be recovered as elemental sulphur or sulfuric acid.
- Includes methods like:
- Wellman–Lord process (sodium sulfite-based)
- SNOX process (catalytic + H_2SO_4 production)
- More expensive and complex, but waste-free.
- Used in advanced or chemical plants.

FGD IN INDIA: CURRENT STATUS

BACKGROUND

- India is heavily reliant on **coal-based power**, which emits high levels of SO_2.
- According to the **Central Pollution Control Board (CPCB)**, India is one of the largest emitters of SO_2 globally.

POLICY DIRECTIVE

- In **2015**, the **Ministry of Environment, Forest and Climate Change (MoEFCC)** set new emission standards requiring all thermal power plants to install FGD systems.
- Deadlines for FGD installation extended to **2022–2025** in phases, depending on location and size.

CHALLENGES

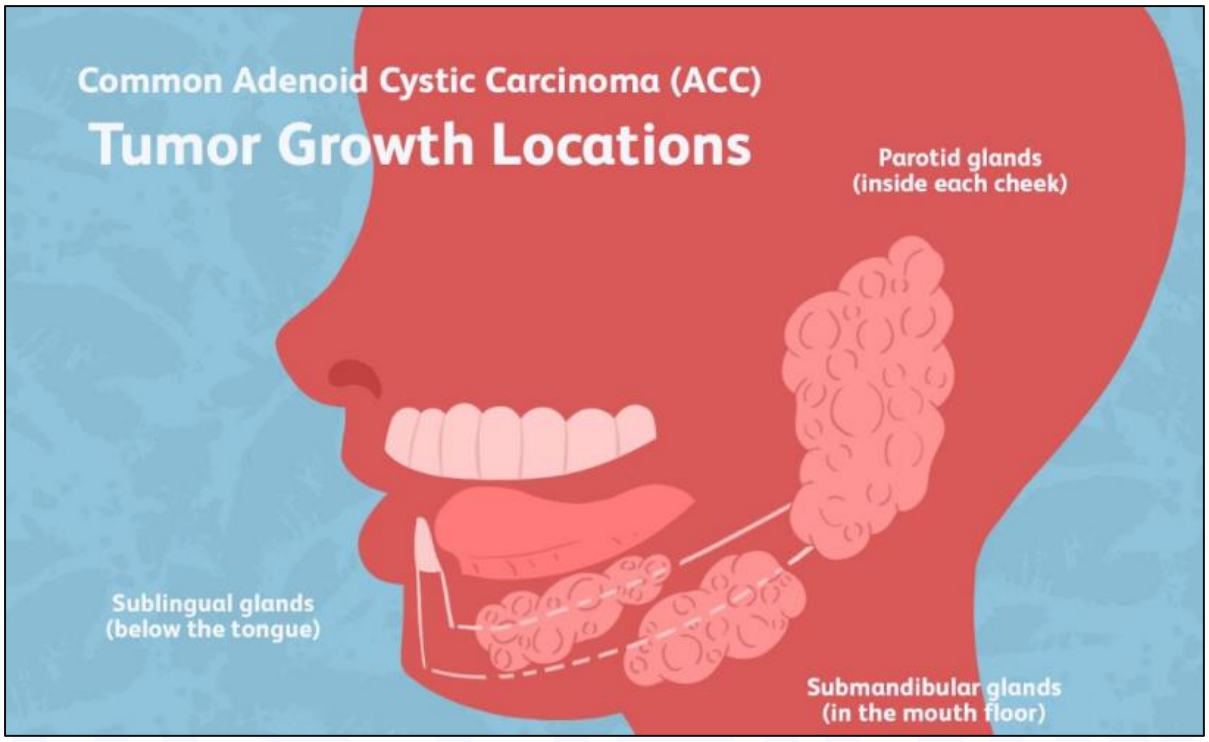
- High installation costs (₹5–7 crore per MW).
- Delays due to technical, financial, and regulatory issues.
- As of 2024, FGD is operational in fewer than **20%** of India's thermal power units.

BENEFITS OF FGD

- **Reduces air pollution** and protects public health.
- Helps in meeting **international emission standards** (e.g., Paris Agreement).
- Produces **gypsum**, which has economic value.
- Supports **sustainable industrial growth**.

03 STEP-AND-SHOOT SPOT-SCANNING PROTON ARC THERAPY (SPARC)

A team at Corewell Health William Beaumont University Hospital in the U.S. for the first time successfully used step-and-shoot spot-scanning proton arc therapy (SPArc) to treat Adenoid cystic carcinoma.



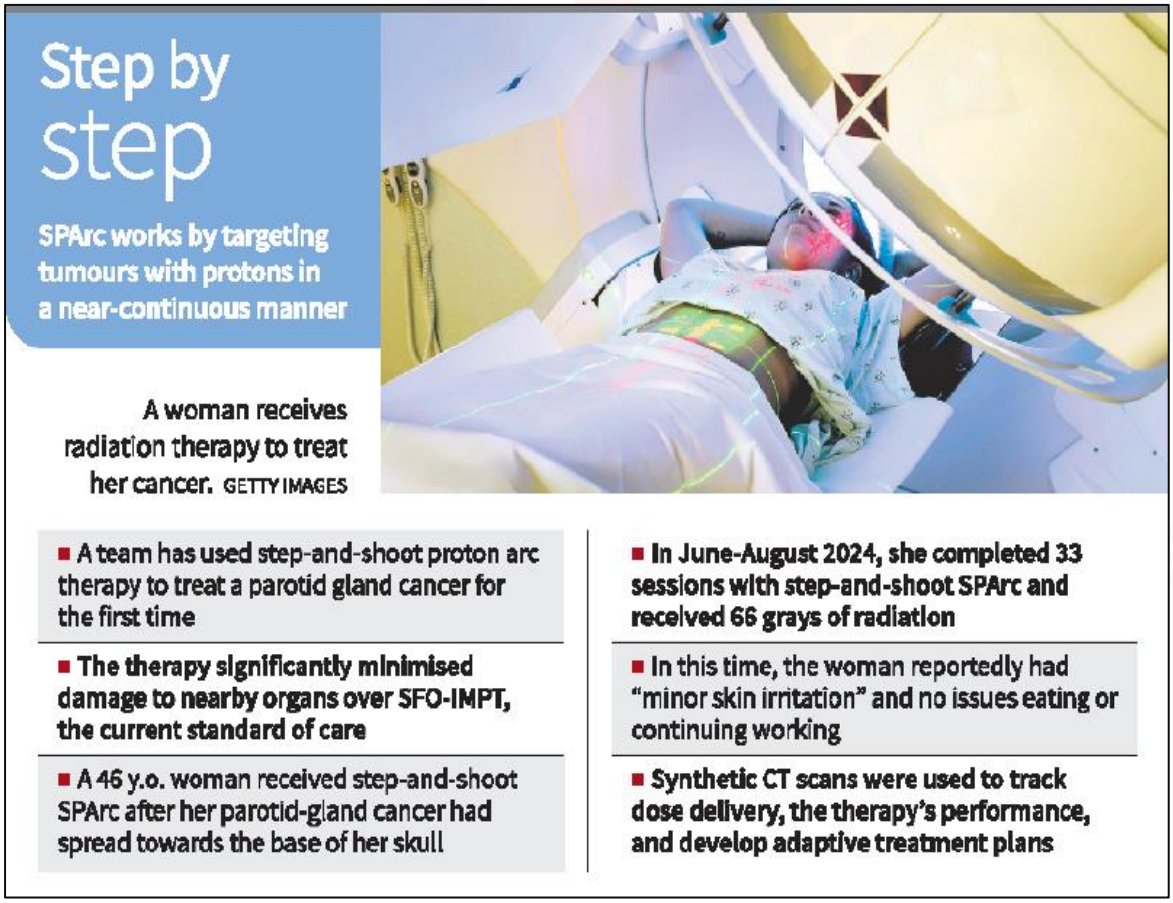
WHAT IS ADENOID CYSTIC CARCINOMA?

- **ACC** is a rare type of **malignant tumor**, most commonly affecting **salivary glands**, but can also arise in the **breast, skin, trachea, lacrimal glands**, or other secretory glands.
- It accounts for **less than 1%** of all head and neck cancers, but up to **10% of salivary gland cancers**.
- Characterized by **slow growth**, but it is **highly invasive** and tends to spread along **nerve pathways (perineural invasion)**.
- Often leads to **late distant metastasis**, especially to the **lungs**.
- Histologically, it has a **cribriform or "Swiss cheese" pattern**.
- Symptoms may include **pain, numbness, or a painless mass**, depending on location.

- Diagnosis is confirmed through **biopsy and imaging (MRI/CT)**.
- Treatment includes **surgical excision with clear margins**, often followed by **radiation therapy**.
- **Chemotherapy** has limited effectiveness.

WHAT IS STEP-AND-SHOOT SPOT-SCANNING PROTON ARC THERAPY (SPARC)?

- **SPArc** is an advanced **proton therapy technique** combining **spot-scanning proton therapy** with **arc-based delivery**.
- It uses a **step-and-shoot method**, delivering discrete proton spots from multiple angles in an **arc-like path** around the patient.
- Unlike conventional proton therapy, SPArc offers **more conformal dose distribution** and **better sparing of healthy tissue**.



- Improves **linear energy transfer (LET)** and **biological effectiveness** by optimizing beam paths dynamically.

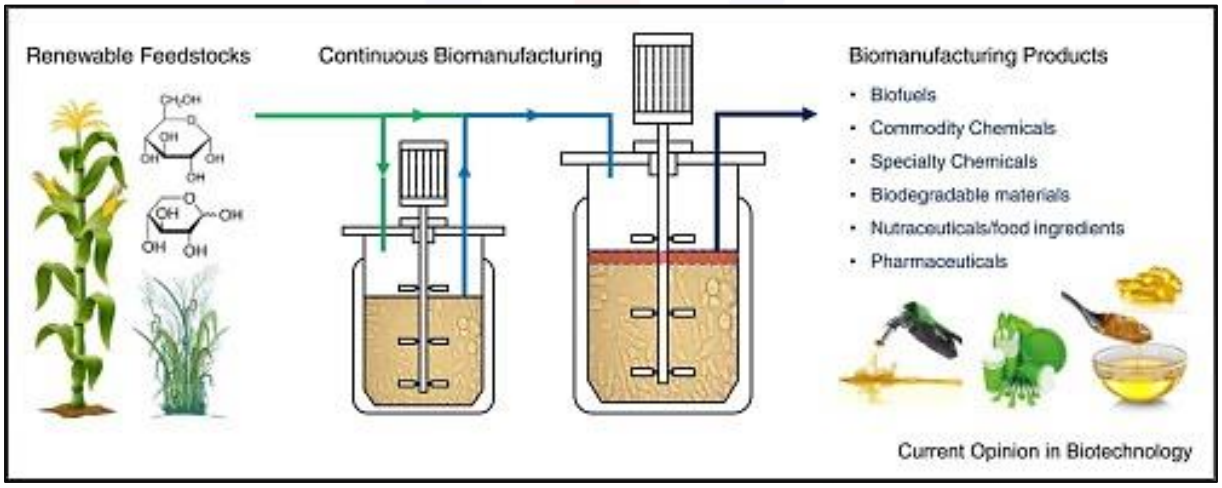
- Allows for **finer modulation of dose**, especially useful in **tumors near critical organs**.
- Enhances **robustness against motion and setup uncertainties**.
- Particularly beneficial for **head & neck, brain, and pediatric cancers**.
- Simulation studies show SPArc can **reduce treatment time and improve tumor control probability**.
- Still in **research and clinical development stages**, with **Monte Carlo simulations** commonly used for planning and validation.

04 ARTIFICIAL INTELLIGENCE (AI) AND BIOMANUFACTURING

As global industries increasingly leverage AI for precision-driven bioproduction, India's efforts are becoming more evident, though challenges remain, particularly in policy frameworks and innovation.

WHAT IS BIOMANUFACTURING?

- **Biomanufacturing** is the use of **biological systems (cells, enzymes, or organisms)** to produce **commercially valuable products**.
- It involves **genetic engineering, fermentation, and bioprocessing** to produce items such as **vaccines, therapeutic proteins, biofuels, enzymes, and bioplastics**.



- Common biological systems used: **bacteria (e.g., *E. coli*)**, **yeast**, **mammalian cells (e.g., CHO cells)**, and **plant cells**.
- It's a key pillar of **biotechnology and synthetic biology**.
- **Example**: Production of **insulin** using genetically modified *E. coli* bacteria.
- In **biopharmaceuticals**, it enables large-scale manufacturing of **monoclonal antibodies**, **mRNA vaccines**, and **gene therapies**.
- Plays a major role in **green chemistry**, reducing reliance on petrochemicals.

- Requires precise **quality control**, **bioreactors**, and **GMP (Good Manufacturing Practice)** environments.
- Used in industries like **medicine, agriculture, food, energy**, and **environmental engineering**.

ROLE OF AI IN BIOMANUFACTURING

PROCESS OPTIMIZATION

- AI algorithms help in optimizing **fermentation parameters** (temperature, pH, oxygen, etc.) to maximize **yield and quality**.
- **Machine learning models** can predict how changes in input affect final product concentration.
- Example: AI improves **monoclonal antibody** production by adjusting bioreactor settings in real time.

PREDICTIVE MAINTENANCE

- AI systems predict **equipment failures** before they occur using **sensor data** and pattern recognition.
- Minimizes downtime, reduces costs, and improves overall **plant efficiency**.

QUALITY CONTROL & ASSURANCE

- AI detects deviations in product quality early using **real-time analytics and imaging**.
- Enables **in-line monitoring** instead of post-production testing.
- Example: AI can analyze protein folding or contamination risks in real-time.

DIGITAL TWINS AND SIMULATION

- AI helps create **digital twins** of the biomanufacturing process—virtual replicas that simulate real-world conditions.
- These models can test multiple scenarios without stopping production.

- Example: Predicting the outcome of different culture media combinations before actual trials.

SUPPLY CHAIN & INVENTORY MANAGEMENT

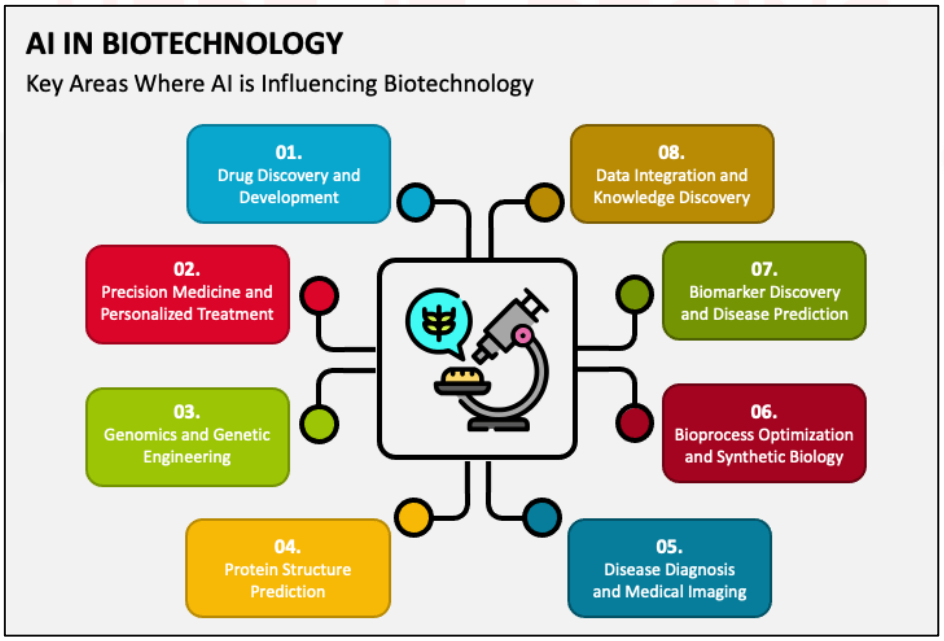
- AI forecasts **demand and supply** for raw materials and finished products.
- Enhances **logistics, inventory planning**, and reduces waste.
- Especially useful during global challenges like **COVID-19 vaccine distribution**.

AUTOMATED EXPERIMENTATION & DESIGN

- AI designs **biological pathways** and suggests **genetic edits** to improve biosynthesis.
- Used in **synthetic biology** to accelerate strain development and metabolic engineering.
- Example: AI-designed enzymes for more efficient **biofuel** production.

REGULATORY COMPLIANCE

- AI aids in managing **regulatory documentation**, ensuring processes meet **FDA and GMP standards**.
- Automates data logging and traceability for audits and approvals.



CHALLENGES IN POLICY AND REGULATION

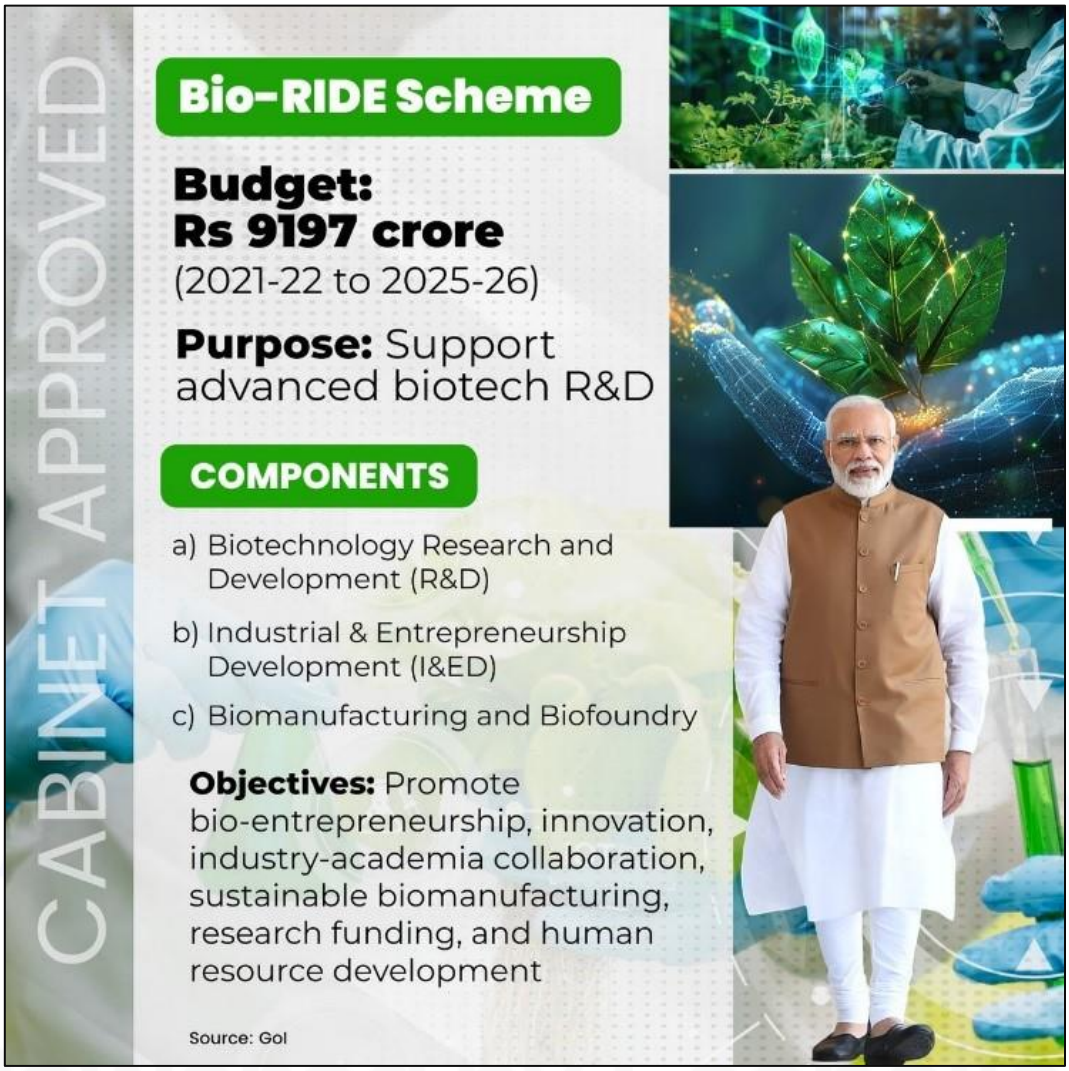
- **Data & AI Integration Gaps:** AI-driven biomanufacturing requires large-scale bioinformatics infrastructure, predictive modeling tools, and real-time analytics.
    - India's AI in biotech regulations remains fragmented, posing hurdles for seamless integration.
- **Funding & R&D Ecosystem:** Biomanufacturing demands high capital investment, particularly for AI-driven automation and synthetic biology research.
    - While initiatives like **Biotechnology Industry Research Assistance Council (BIRAC)** support innovation, private sector participation remains **limited compared to nations like the US and China.**
- **Intellectual Property & Ethical Regulations:** AI-generated biotech innovations challenge traditional patent laws.
    - India needs to clarify IP regulations on AI-assisted bioengineering, ensuring ethical practices without stalling innovation.
- **Manufacturing Scalability & Workforce Upskilling:** AI-powered biomanufacturing requires advanced robotics and computational biology expertise.
    - Upskilling initiatives must align with demand, fostering an AI-ready workforce.

KEY GOVERNMENT INITIATIVES

- **National Biotechnology Development Strategy:** Focuses on bio industrial growth, but AI integration requires more direct incentives.
    - India hosts over 5,300 biotech startups (as of 2024), and aims to scale this to 50,000 by 2030.
- **National Biomanufacturing Policy (Proposed):** The **Department of Biotechnology (DBT)** has drafted a policy to promote indigenous

biomanufacturing capabilities, reduce dependence on petrochemicals, and enhance sustainability.

- **Biomanufacturing Mission (2023):** It aims to support R&D, scale bio-based industrial production, and attract global investments.



- **PLI Scheme for Biotech**: It incentivizes domestic production of biopharmaceuticals, enzymes, and fermentation-based inputs.
- **Regulatory Framework for AI & Biotechnology:** Addressing ethical concerns, data security, and AI-powered genetic research will be crucial.
- **Academic-Industrial Collaboration:** Leading institutions like IISc, IITs, and DBT-supported Biotech Parks have become innovation engines for biomanufacturing solutions.

POLICY RECOMMENDATIONS

- **Establish AI-Biomanufacturing Regulatory Framework:** A dedicated policy mechanism for AI-driven bioengineering can streamline approvals and address ethical concerns.
- **Enhance Public-Private Partnerships:** Encouraging private investments in AI-powered biomanufacturing can accelerate infrastructure development.
- **Strengthen AI & Biotech R&D Ecosystems:** Increased funding in genomic AI, predictive biomanufacturing tools, and quantum-powered bioinformatics can drive next-gen solutions.
- **Develop AI-Based Compliance Tools:** AI-assisted tracking and regulatory automation can enhance safety protocols while ensuring ethical biotech applications.

05 COOKING OILS CAN HELP RECOVER SILVER FROM E-WASTE

Researchers in Finland have developed a green chemical process that uses natural fatty acids found in cooking oils to recover silver from electronic waste (e-waste). This innovation emerges amid a global surge in silver demand and escalating e-waste challenges, especially in countries like India.

WHAT IS E-WASTE?

- E-waste refers to the discarded electronic and electrical devices that have reached the end of their lifespan or become obsolete due to rapid technological changes, including computers, phones, TVs, and other equipment.
- India ranks as the third-largest producer of electronic waste globally, following China and the United States.
- According to the **World Silver Survey 2024, industrial applications account for over 50% of total silver demand.**
- **Yet, only around 15% of silver is currently recycled, causing significant loss of a non-renewable, high-demand resource.**

CHALLENGES IN E-WASTE MANAGEMENT

- **Lack of Consumer Incentives:** Consumers lack economic or logistical incentives to dispose of e-waste responsibly.
- **Sparse Collection Infrastructure:** There is a dearth of authorised collection centres, especially in Tier-II and Tier-III cities.
- Informal scrap dealers remain the primary point of contact for most consumers.
- **Unsafe Recycling Practices:** Over 90–95% of e-waste is handled by the informal sector, which uses crude methods such as acid leaching, open burning, and manual dismantling without protective gear.
- **Grey Channel Imports:** Used electronic goods often enter India under the guise of "donations" or "refurbished items," which eventually become waste.

SILVER RECOVERY USING COOKING OILS

- **Silver recovery** refers to the extraction of **silver ions (Ag^+)** from waste solutions, commonly from **photographic fixer**, **X-ray film processing**, or **industrial wastewater**.
- Traditional methods involve **chemical reduction**, **electrolysis**, or **precipitation**, but these can be expensive or environmentally harmful.
- **Used cooking oils**, especially those rich in **unsaturated fatty acids**, can act as **green reducing agents** to recover silver in **metallic form (Ag^0)**.
- Cooking oil contains compounds like **oleic acid**, **linoleic acid**, and **glycerides**, which can reduce silver ions under **heat or catalytic conditions**.
- This method is **cost-effective**, **eco-friendly**, and reuses waste oils, contributing to **sustainable chemistry**.

- The silver precipitate is collected as **fine particles or powder**, which can be filtered, dried, and reused in various industries (e.g., electronics, jewelry).
- Research has shown high recovery efficiency when using **waste vegetable oils** in alkaline medium at moderate temperatures (60–80°C).
- This method avoids toxic chemicals like cyanide or formaldehyde traditionally used in silver extraction.
- **Example**: Academic studies in India and elsewhere have demonstrated successful silver recovery using **sunflower or soybean oil** from photographic waste.

E-WASTE MANAGEMENT IN INDIA – KEY INITIATIVES & POLICIES

E-WASTE MANAGEMENT RULES (2011, 2016, & 2022)

- The **E-Waste (Management) Rules, 2011** were the first legal framework, enforcing **Extended Producer Responsibility (EPR)**.
- Updated in **2016** to widen scope included **CFLs, mobile phones, washing machines**, etc.
- The **E-Waste (Management) Rules, 2022** (effective from April 2023):
    - Mandate **EPR registration** for manufacturers, importers, and recyclers.
    - Focus on **digital tracking of waste flow** through an **online portal**.
    - Enforce **targets** for collection and recycling (60% in first year, rising gradually to 80%).
    - Introduce a **market for EPR certificates** and penalties for non-compliance.

EXTENDED PRODUCER RESPONSIBILITY (EPR)

- Under EPR, producers are **legally responsible** for the collection and environmentally sound disposal of their products.

- Companies like **Samsung, Dell, Apple** have started setting up **take-back programs** and e-waste bins.

India is the **third-largest e-waste generator** in the world after China and the USA.
According to the **Central Pollution Control Board (CPCB)**, India generated **1.6 million tonnes** of e-waste in 2021–22.

STATE & URBAN LOCAL BODY (ULB) INITIATIVES

- **Karnataka State Pollution Control Board (KSPCB)** created a model e-waste collection and recycling system.
- **Pune and Bangalore** have partnered with NGOs to promote community-level awareness and collection drives.
- **Swachh Bharat Mission** includes components for **electronic waste awareness**.

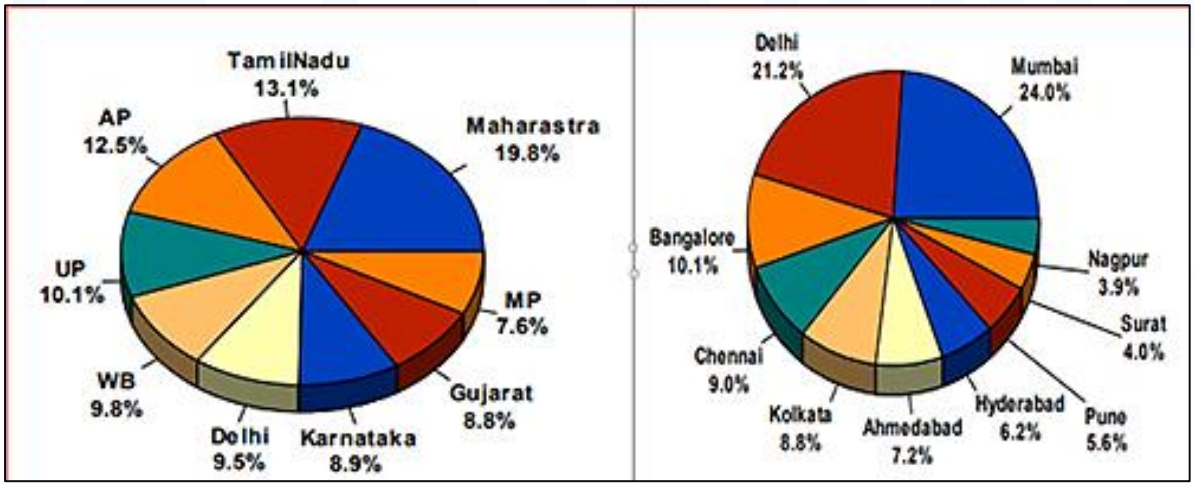
AWARENESS & EDUCATION PROGRAMS

- NGOs like **Toxics Link**, **Saahas**, and **GIZ India** run workshops in schools and RWAs.
- Government campaigns like **'Digital India' and 'Green India'** emphasize responsible electronics usage and disposal.
- **Awareness programs** on Doordarshan and All India Radio are run periodically.

FORMAL RECYCLING INFRASTRUCTURE

- India now has over **470 authorized e-waste recyclers** (as of 2023), an increase from less than 50 in 2010.
- Facilities are encouraged to use **scientific methods like shredding, pyrometallurgy, and hydrometallurgy**.
- **CPCB and SPCBs** monitor recycler performance and licensing.

India's first e-waste clinic was inaugurated in Bhopal, Madhya Pradesh. It's a facility for segregating, processing, and disposing of e-waste from both households and commercial units.



06 INDIA JOINS ELITE GROUP OF RINDERPEST VIRUS 'CATTLE PLAGUE' CONTAINMENT

India has joined the elite global group for **Rinderpest Virus 'Cattle Plague' Containment**, as ICAR-National Institute of High Security Animal Diseases (NIHSAD), Bhopal has been designated as **Category A Rinderpest Holding Facility.**

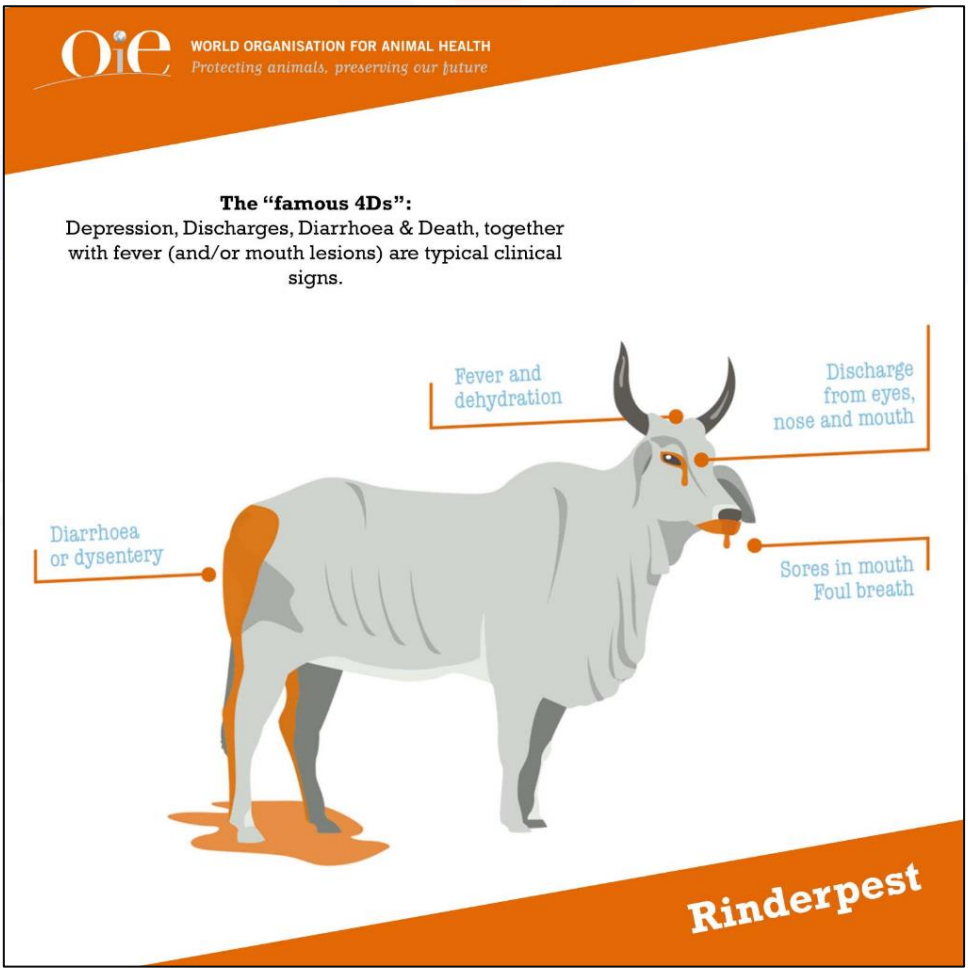
ABOUT

- It has been recognised by the **World Organisation for Animal Health** – WOAH and the **Food and Agriculture Organization**– FAO of the United Nations.
- India formally submitted its application for **Rinderpest Holding Facility status in 2019.**
    - A joint inspection of ICAR-NIHSAD was conducted in **2025 by international experts appointed by FAO and WOAH.**
    - Following a comprehensive evaluation, the **institute has now been officially approved as a Category A RHF for a one-year term.**

- This recognition places India among a **distinguished group of only six facilities worldwide** entrusted with the **critical responsibility of securely holding rinderpest virus material.**
    - The other five facilities are located in the **UK, USA, France, Japan, and Ethiopia.**

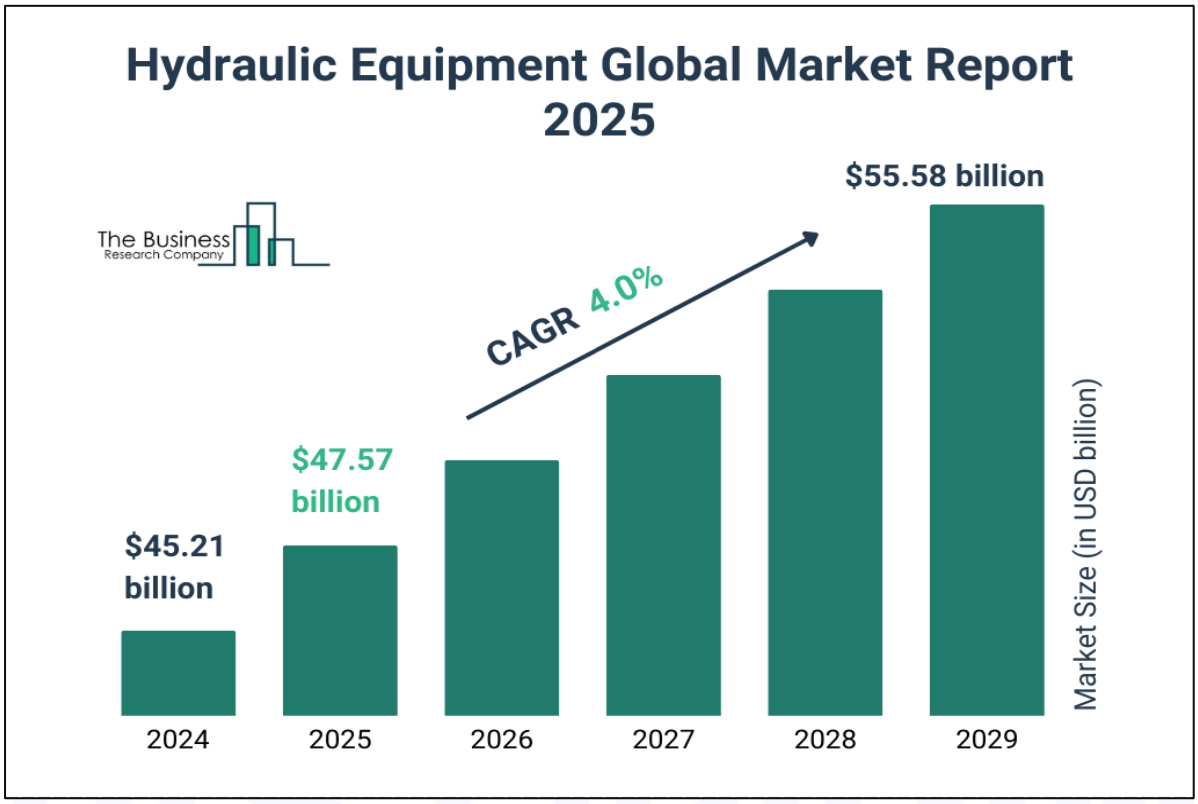
RINDERPEST

- Rinderpest, once known as **cattle plague,** was one of the **most destructive livestock diseases** in history before its **global eradication in 2011.**
- However, Rinderpest Virus-Containing Material (RVCM) still remains in a **few laboratories, posing potential risks if released.**
- To preserve global freedom from the disease, FAO and WOAH have implemented **strict measures to limit the storage of RVCM** to a small number of high-security laboratories worldwide.



07 HYDRAULICS

Worldwide, hydraulics constitute a $45-50 billion market and is growing steadily.



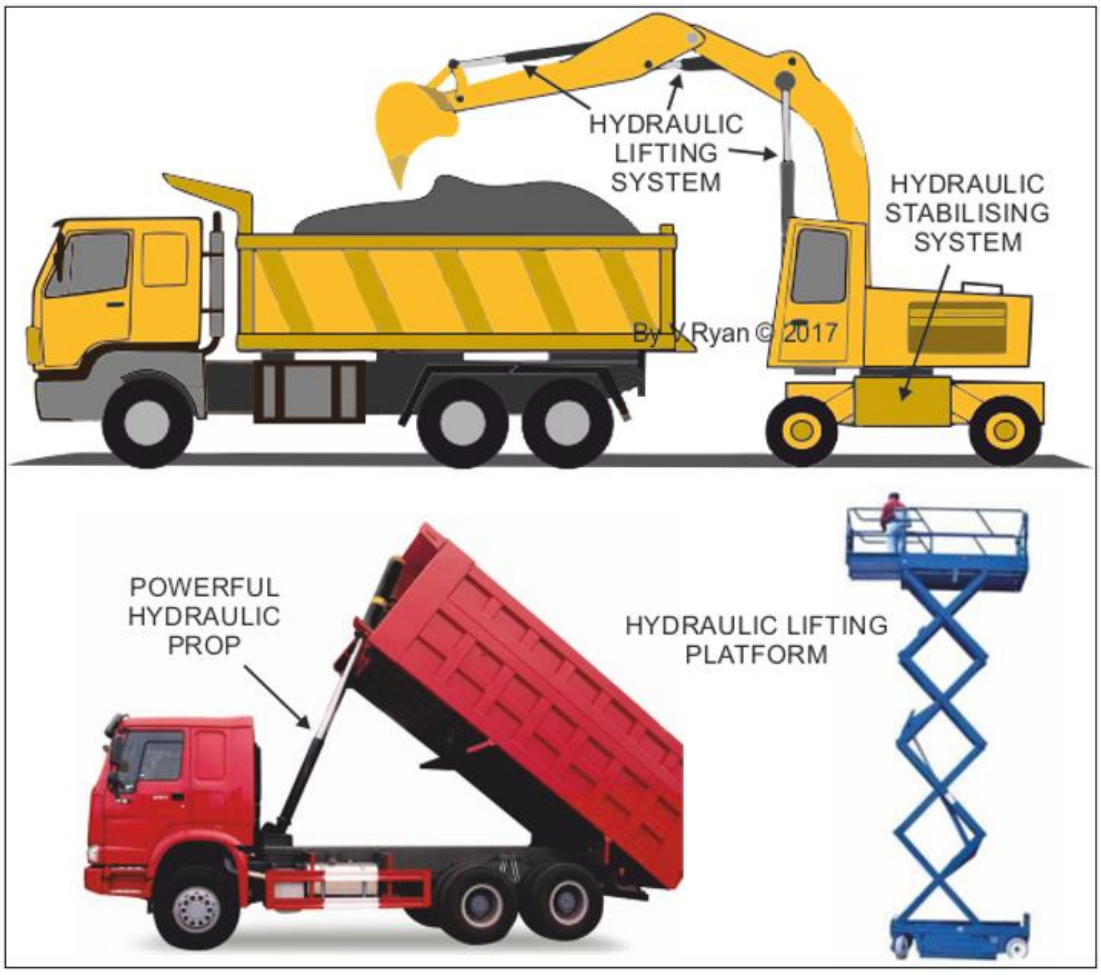
WHAT ARE HYDRAULICS?

- A hydraulics system is based on the simple principle of Pascal's law, named for the 17th century French scientist Blaise Pascal.
- The law states that when pressure is applied to an incompressible fluid, it is transmitted equally in all directions throughout the fluid. (Pressure here is simply the amount of force per unit area).

HOW HYDRAULICS SYSTEM WORKS?

- In a hydraulic system, pressure is created by applying force to a fluid.
    - And because it is subsequently transmitted equally in all directions, a small force applied over a small area can create a much larger force over a larger area.

- A small force applied at one end can be used to generate a much larger force at the other end just by having a larger area of contact.
- There's no need to change the pressure. This is perhaps the simplest use of hydraulics. There are many more actions that a hydraulic system can perform than just lifting.
- Parts of a hydraulic system are **Pumps, Pipes, Valves, Linear actuators or rotary actuators, Tank (with filters) and Sensors or switches.**

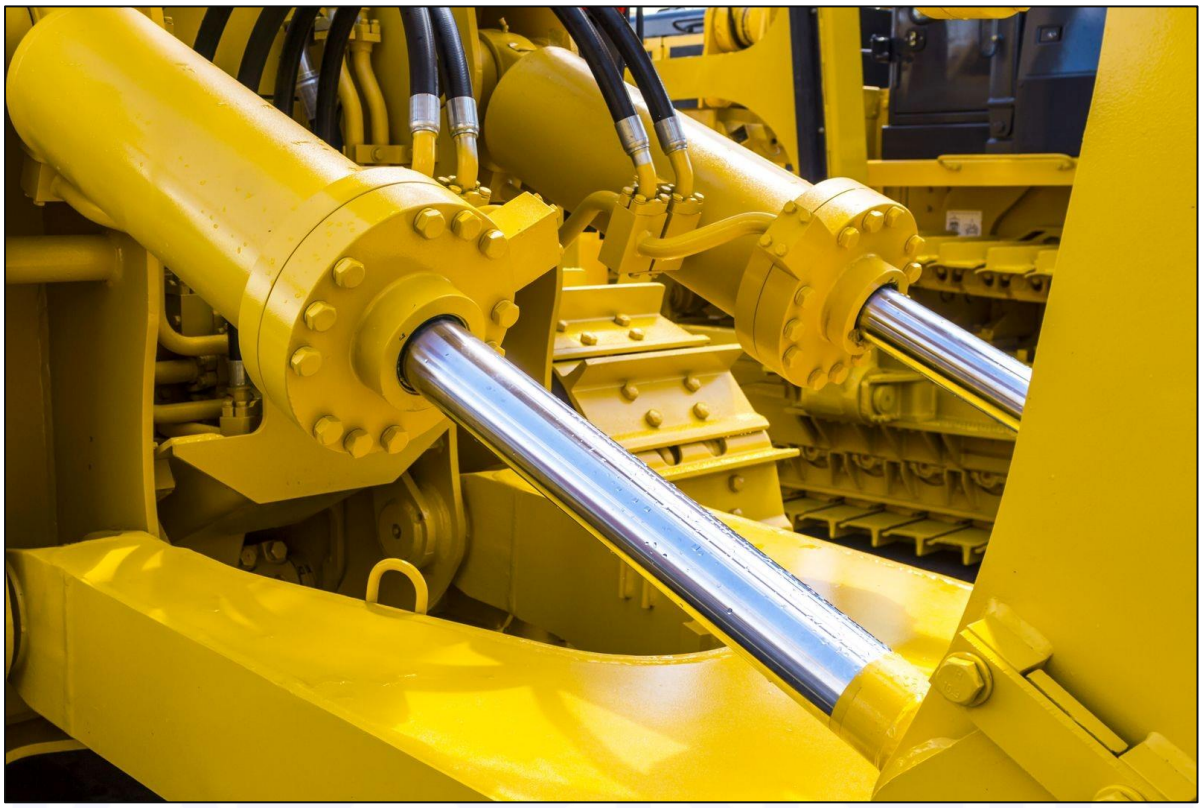


WHAT ARE THE APPLICATIONS OF HYDRAULICS?

- They can be used for both mobile equipment cranes, excavators, etc. which move on wheels or tracks and static applications such as a hydraulic press, moulding machines, windmills,
- They are equipped with sensors to track movement, temperature, pressure, flow, oil contamination.

WHAT ARE ADVANTAGES OF HYDRAULICS?

- Hydraulics have many advantages over mechanical methods of transmitting energy.
- The principal ones are smooth movements, high power to weight ratio, better heat dissipation, smooth controls, and higher precision.



08 FASTAG ANNUAL PASS SCHEME LATEST NEWS

Recently, the union Minister of Road Transport and Highways announced a FASTag-based annual pass of Rs 3,000 for “hassle-free-highway travel”.

WHAT IS FASTAG?

- **Fastag is an electronic toll collection system.**
- It has been developed by the National Highways Authority of India (NHAI).
- It is a sticker based on Radio Frequency Identification (RFID) technology, which is pasted on the front windscreen of the vehicle.

WHAT IS FASTAG ANNUAL PASS SCHEME?

- Fastag Annual Pass Scheme is a new government initiative, which will be implemented from 15 August 2025.
- Under this scheme, private vehicle owners will get a pass for ₹3,000 that will allow them to travel on national highways across the country without paying toll repeatedly.
- The new annual pass scheme, activated on the FASTag, will allow free passage of private car, jeep or van at National Highway (NH) and National Expressway (NE) fee plazas for the given duration, without per-trip user fee charges.
- Once the Annual Pass completes either 200 trips or one year from the date of activation, it will automatically revert to a regular FASTag.

- However, the user may re-purchase the Annual Pass once the 200-trip limit is exhausted, even if the one-year validity period has not yet ended.
- The pass is non-transferable and is valid only for the vehicle on which the FASTag is affixed and registered.
- For the point-based fee plazas, each crossing of the fee plaza will be counted as one trip. A round trip (to and fro) will be counted as two trips. For closed tolling fee plazas, one pair of entry and exit will be counted as one trip.
- The Annual Pass is applicable only for private non-commercial cars, jeeps and vans.
    - **It is valid only at National Highway and National Expressway fee plazas.**

Feature	Description
Cost of the Pass	₹3,000 (Three thousand rupees)
Beneficiaries	Only non-commercial private vehicles (such as cars, jeeps, vans)
Validity Period	The pass will be valid for one year or up to 200 trips (whichever is earlier)
Objective	To ensure seamless, faster, and economical travel on national highways
Implementation Date	Effective from 15th August 2025

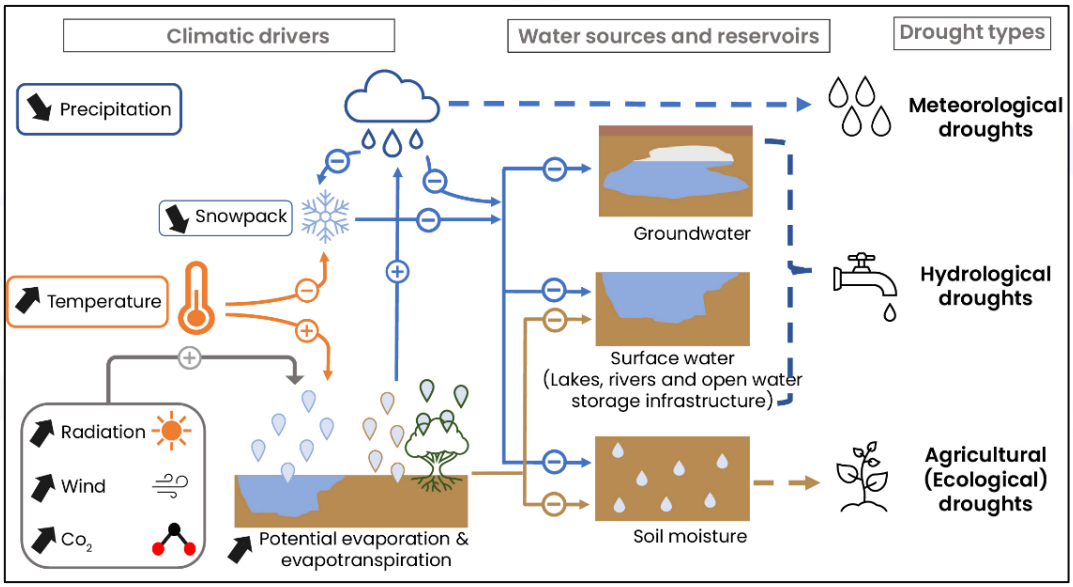
ENVIRONMENT & ECOLOGY

01 GLOBAL DROUGHT OUTLOOK

The Organisation for Economic Co-operation and Development (OECD) has released its Global Drought Outlook, highlighting the increasing frequency, and geographical spread of droughts globally.

WHAT IS DROUGHT?

- Droughts are periods characterised by a significant hydrological imbalance in water sources or reservoirs, typically marked by "drier-than-normal" weather conditions.
- These periods are primarily driven by low rainfall and can be further intensified by high temperatures or strong wind, which accelerate water evaporation, as well as human activities.



WHAT IS THE CLASSIFICATION OF DROUGHT?

- Meteorological drought refers to a prolonged period of low precipitation.
- Agricultural (or ecological) drought refers to a condition where soil moisture is insufficient to meet the needs of crops and vegetation.

- Hydrological drought occurs when surface or groundwater water levels drop below average over a prolonged period.

KEY FINDINGS

INCREASE IN SEVERITY:

- 40% of the world's land area faces increasingly frequent and severe droughts.
- Some of the recent examples of major droughts include Europe (2022), California (2021), Horn of Africa & Somalia, etc.

ECONOMIC IMPACT:

- 3% - 7.5% annual increase in the economic cost of an average drought episode.
- Countries like India, Australia, etc. may face water-related disruptions in the operations of hydroelectric power stations.
- Inland water transport is impacted (E.g. recent drought in Panama Canal).
- Crop yields can decline by up to 22%.

ECOLOGICAL:

- Reduction in soil moisture since 1980, 37% of global land has experienced significant soil moisture decline.

GROUNDWATER DECLINE:

- Groundwater levels are falling globally, with 62% of monitored aquifers in decline.

OTHER:

- Droughts are responsible for 34% of disaster-related deaths (World Meteorological Organization (WMO), 2021) and exacerbate poverty, inequality and displacement.

02 OECD: ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

- **Establishment**: Founded in **1961**, evolving from the **Organisation for European Economic Co-operation (OEEC)**, which was formed in 1948 to administer the Marshall Plan.

- **Headquarters**: **Paris, France**
- **Members**: **38 countries** (as of 2025), including USA, UK, Germany, Japan, South Korea, and most EU nations.
- **India is not a member** but has been an **active key partner** since 2007.
- **Aim**: Promote **economic growth**, **global trade**, **employment**, and **sustainable development** through policy coordination and best practices.
- **Key Reports & Indices**:
  - **Economic Outlook**
  - **OECD Employment Outlook**
  - **Programme for International Student Assessment (PISA)**
  - **Base Erosion and Profit Shifting (BEPS) Framework**
- **Recent Initiatives (2024–25)**:
  - Leading global discussions on **minimum corporate tax (15%)** under the **Two-Pillar Solution**.
  - Promoting **AI governance** and **climate finance transparency**.

- **India-OECD Collaboration**: India works with OECD on **taxation, education, anti-corruption, green growth, and digital economy**.
- **Criticism**: Biased toward developed nations; less representative of Global South.

03 THIRD UNITED NATIONS OCEANS CONFERENCE (UNOC)-2025

Recently, the third United Nations Oceans Conference (UNOC), held in Nice, France, concluded with commitments aimed at safeguarding the planet's marine ecosystems.

WHAT IS UNOC?

- The **3rd UN High-Level Conference** dedicated to **Sustainable Development Goal 14** ("Life Below Water"), held **9–13 June 2025** in Nice, France, co-hosted by **France and Costa Rica**.

THEME & FORMAT

- Theme: **"Accelerating action and mobilizing all actors to conserve and sustainably use the ocean."**
- Comprised of **plenary sessions**, **10 Ocean Action Panels**, and adoption of the **"Nice Ocean Action Plan"** a political declaration with voluntary commitments.

- **Background: United Nations Oceans Conference (UNOC)**
  1st UNOC (2017): In New York, Co-hosted by Sweden and Fiji; To support **SDG 14: Life Below Water.**
- **2nd UNOC (2022):** In Lisbon, co-hosted by Portugal and Kenya; To emphasize the **need for science-based solutions** and innovative partnerships.

- **3rd UNOC (2025):** In Nice, France, and co-hosted by Costa Rica
  Theme: Accelerating action and mobilizing all actors to conserve and sustainably use the ocean.

PURPOSE & PRIORITIES

IMPLEMENT SDG 14 BY:

- Advancing multilateral ocean processes (e.g., BBNJ Treaty, WTO fisheries discussions)
- Mobilizing finance and supporting the blue economy
- Enhancing scientific knowledge for policy-making.

SCALE OF THE SUMMIT

- Largest edition to date: over **10,000 participants**, including **60+ Heads of State**, ~190 ministers, 4,000 officials, and 6,000 civil society actors.

KEY HIGHLIGHTS

- **High Seas (BBNJ) Treaty** nearing entry into force: 49–55 ratifications toward the 60 needed, enabling marine reserves in international waters by early 2026.
- Launch of **Blue Economy & Finance Forum** in Monaco pre-conference to mobilize public-private investment.
- **One Ocean Science Congress** & **Ocean Rise & Coastal Resilience Summit** aimed at integrating science, policy, finance and coastal adaptation.

KEY OUTCOMES & COMMITMENTS

- **30×30 target**: Protect 30% of ocean areas by 2030 currently just **2.7% effectively protected**.
- Pledged **≈ $10 billion**, far below the **$175 billion/year** needed; calls for clearer governance to attract private capital.

- Special emphasis on halting **deep-sea mining**, **plastic pollution**, **#Protect30%**, and **fisheries reform**.

KEY OUTCOMES OF THE CONFERENCE (2025)

- **High Seas Treaty Nears Enforcement:** Fifty-six of the required sixty countries have ratified the **Biodiversity Beyond National Jurisdiction (BBNJ) Agreement** (aka **High Seas Tre*aty***).
    - It enables the creation of **marine protected areas (MPAs)** in international waters, regulate marine genetic resources, and mandate environmental impact assessments.
- **Voluntary Commitments and Financial Pledges**: The European Commission **pledged 1 billion Euro** to support ocean conservation and sustainable fishing.
    - **French Polynesia** announced plans to establish the **world's largest marine protected area**, covering its entire exclusive economic zone about five million square km.
- **Global Political Declaration:** Over 170 countries adopted the **Nice Ocean Action Plan**, a political declaration paired with **more than 800 voluntary commitments.**
    - These range from youth advocacy to deep-sea ecosystem literacy and capacity-building in marine science.
- **Pushback Against Deep-Sea Mining:** A growing coalition of nations called for a precautionary pause on deep-sea mining, citing its potential to irreversibly damage fragile marine ecosystems.
- **India's Role and Roadmap:** India pledged to ratify the High Seas Treaty and proposed a **10-point roadmap** for sustainable ocean governance. It includes:
    - Expand Marine Protected Areas (MPAs)
    - Scale Up the Blue Economy
    - Reduce Marine Pollution
    - Promote Offshore Renewable Energy

- Support the Global Plastics Treaty
- Invest in Ocean Science and Technology
- Strengthen Coastal Resilience
- Ensure Equitable Access to Marine Resources
- Pause Deep-Sea Mining
- Foster Global Partnerships

HIGH SEAS

- The high seas refer to areas of the ocean that lie **beyond the jurisdiction of any single country** specifically, **beyond 200 nautical miles** (about 370 kilometers) from a nation's coastline **(United Nations Convention on the Law of the Sea-UNCLOS).**
  - These waters are **considered part of the global commons**.
- The high seas make up **nearly two-thirds of the ocean's surface** and are vital for regulating Earth's climate, supporting marine biodiversity, and sustaining global fisheries.

IMPORTANCE OF OCEANS

- **Climate Regulation:** Oceans absorb over 25% of global carbon emissions and generate 50% of the oxygen.
  - They act as Earth's largest carbon sink and heat buffer, helping stabilize the climate.
- **Food Security:** Oceans provide 15% of the animal protein consumed globally.
  - In some developing nations, seafood is the primary protein source for over half the population.
- **Livelihoods and Economy:** More than 3 billion people depend on marine and coastal resources for their livelihoods.
  - The ocean economy is valued at $3–5 trillion annually, supporting industries like fisheries, tourism, and shipping.

- **Biodiversity Reservoir:** Oceans host an immense variety of life from coral reefs to deep-sea ecosystems that are essential for ecological balance and future scientific discoveries.

KEY CONCERNS

- **Ocean Pollutions:** An estimated 75 to 199 million tonnes of plastic. Each year, 8 to 12 million metric tons more are added.
    - **Asia largest (81%) contributors** of ocean plastic pollution (largely due to inadequate waste management systems).
    - About 92% of **microplastics** have been found in 60% of fish consumed by humans annually.
    - Five major **ocean garbage patches**, with the **Great Pacific Garbage Patch** containing an estimated **1.8 trillion pieces of trash**.

- About 14 million metric tons of ocean **garbage rest on the seafloor.**
- By 2050, plastic in the **ocean is projected to outweigh all fish** if current trends continue.
- Currently, the **ocean's average pH is 8.1** which is about **30% more acidic than in pre- industrial times**.

- **Other Concerns:**
  - Overfishing, threatening marine species and food chains.
  - Climate change, causing acidification, sea-level rise, and coral bleaching.
  - Deep-sea mining, which risks irreversible damage to fragile ecosystems.

04 50 YEARS OF CROCODILE CONSERVATION PROGRAMME

India began its Crocodile Conservation programme in 1975, and this year marks 50 years of this initiative.

50 YEARS OF CROCODILE CONSERVATION PROGRAMME IN INDIA (1975–2025)

- **Launch and Purpose (1975):** The Crocodile Conservation Programme was initiated in **1975** by the **Government of India**, in collaboration with the **United Nations Development Programme (UNDP)** and the **Food and Agriculture Organization (FAO)**. It aimed to **reverse the alarming decline** of crocodile populations in the wild due to habitat destruction, poaching for skins, and unregulated hunting.
- **Pre-Conservation Scenario:** By the early 1970s, India's crocodile population had dropped below **300 individuals**. Many rivers and wetlands had lost crocodiles altogether, with certain species especially the **Gharial** on the verge of extinction.

- **Target Species:** The programme focused on conserving all **three native crocodilian species** found in India:
    - **Mugger crocodile (Crocodylus palustris)** – Freshwater species, wide distribution.
    - **Saltwater crocodile (Crocodylus porosus)** – Largest living reptile, found in coastal Odisha, Sundarbans, Andaman & Nicobar Islands.
    - **Gharial (Gavialis gangeticus)** – Fish-eating, riverine species, critically endangered.

OBJECTIVES:

- Prevent extinction of crocodile species.
- Establish captive breeding and rearing centres.
- Protect and restore natural habitats (rivers, wetlands, mangroves).
- Involve local communities in conservation.
- Create awareness and support eco-tourism.

IMPLEMENTATION MECHANISM:

- The programme followed a "rear-and-release" strategy: eggs were collected from nests in the wild, hatched in captivity, and juveniles reared under controlled conditions before being released into the wild.
- Over 35 breeding, rearing, and rehabilitation centres were established across 16 states.

KEY CONSERVATION SITES:

- **Bhitarkanika National Park (Odisha)**: Became the largest wild population site for **saltwater crocodiles**. From only **96 individuals in 1976**, the population crossed **1,800 in 2025**.
- **Chambal River Sanctuary (Madhya Pradesh, Rajasthan, Uttar Pradesh)**: Major habitat for **Gharials**, with increasing breeding success.

- **Madras Crocodile Bank Trust (Tamil Nadu)**: Established in 1976 by Romulus Whitaker; became a premier captive breeding centre and education facility.
- **Katarniaghat and Son Gharial Sanctuaries**: Crucial sites for Gharial recovery.

SPECIES-WISE ACHIEVEMENTS:

- **Mugger crocodile**: Once limited in range, now stable with populations spread across Gujarat, Rajasthan, Maharashtra, Tamil Nadu, and Madhya Pradesh.
- **Saltwater crocodile**: Odisha's population revived due to Bhitarkanika efforts.
- **Gharial**: From <200 in 1975 to ~900 in 2025. Still **Critically Endangered** due to river pollution, sand mining, and damming.

INTEGRATION WITH OTHER INITIATIVES:

The programme later aligned with **Project Tiger**, **Project Elephant**, **Wetland Conservation Programmes**, and **National Biodiversity Action Plan** for integrated ecosystem management.

COMMUNITY INVOLVEMENT:

- Local communities, especially in Odisha, were trained as **"Croco-dile Scouts"** to assist in monitoring.
- Eco-tourism initiatives created alternative livelihoods (e.g., Dangamal, Satkosia).
- School education and public awareness campaigns increased community support.

LEGISLATION SUPPORT:

- Crocodiles are protected under **Schedule I of the Wildlife (Protection) Act, 1972**, which provides the **highest level of legal protection**.
- Hunting, capturing, and trading are strictly prohibited.

CHALLENGES STILL PERSIST:

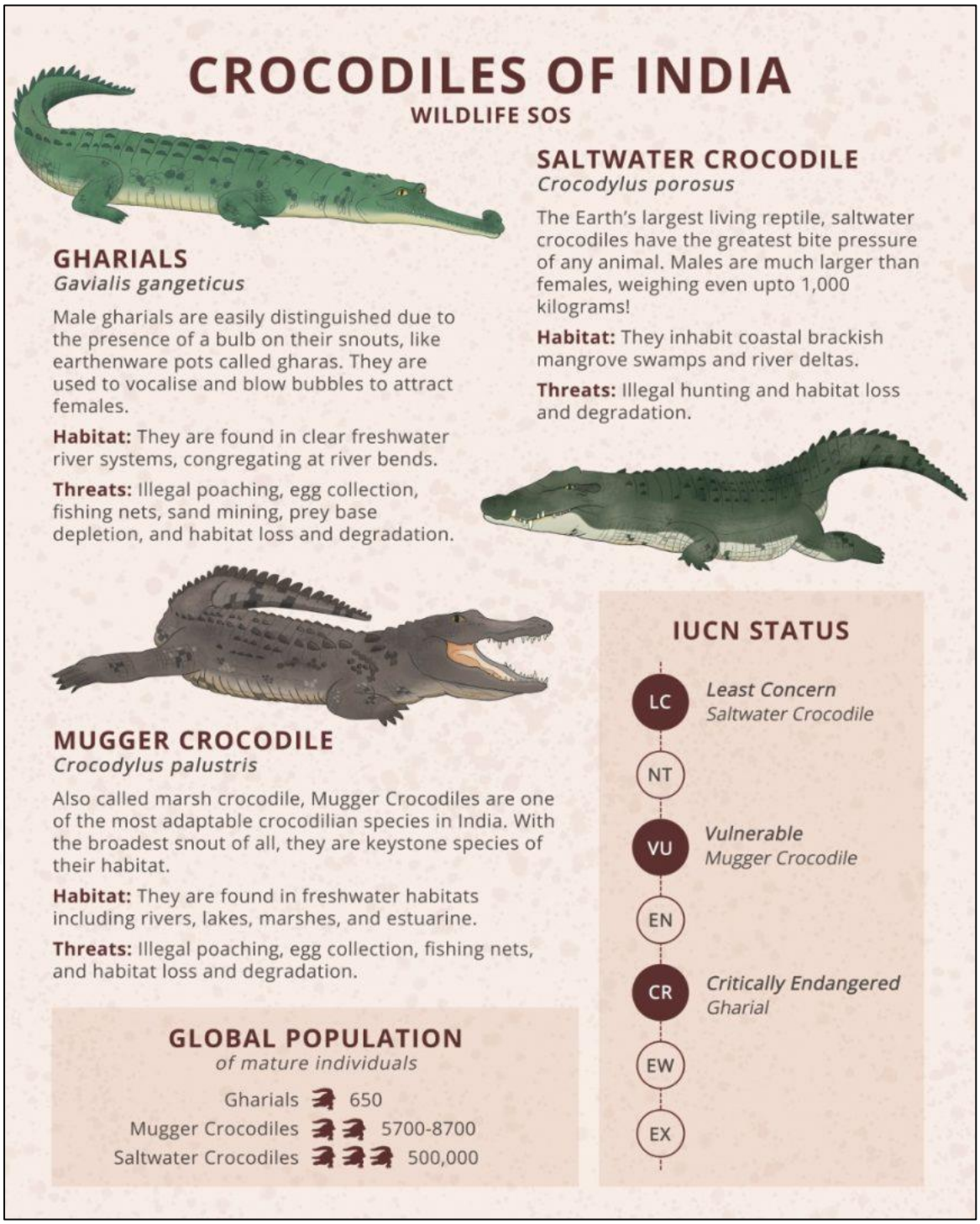
- **Gharial habitats** remain under threat from river fragmentation, water pollution, illegal fishing, and human encroachment.
- **Human-crocodile conflicts** are rising, especially in Gujarat, Odisha, and Maharashtra due to expanding human settlements near wetlands.
- Climate change poses threats to nesting beaches and hatchling survival.

GOLDEN JUBILEE (2025) HIGHLIGHTS:

- In 2025, India celebrated **50 years of the programme** with the launch of the **"National Crocodile Conservation Action Plan 2025–2035."**
- The plan focuses on **habitat restoration, conflict mitigation, climate resilience, and genetic studies**.
- Events and workshops were held across India, especially in Odisha, Tamil Nadu, and Madhya Pradesh, recognizing forest staff, biologists, and community members.

GLOBAL RECOGNITION:

- India's programme is considered among the **world's most successful reptile conservation models**.
- The **IUCN SSC Crocodile Specialist Group** acknowledges India's leadership in crocodile recovery and captive breeding.



CONCLUSION:

The Crocodile Conservation Programme has transformed India's reptile conservation history from near extinction to healthy, thriving populations. While challenges remain, the model of **science-backed conservation with community involvement** sets an enduring example for species recovery worldwide.

05 KANDALA PORT CONGESTION MAY CAUSE EDIBLE OIL SHORTAGE

Kandla port congestion may cause edible oil shortage: Traders to Govt

RAVI DUTTA MISHRA
NEW DELHI, JUNE 19

TRADERS HAVE warned of edible oil shortages in local markets and supply disruptions as several vessels — mainly carrying Indonesian crude palm oil — remain stranded at Kandla Port, awaiting cargo unloading amid "heavy congestion".

India is the world's largest importer of palm oil, with monthly imports totalling 750,000 tonnes. Kandla is a key port that supplies major refineries catering to western and northern India.

In letters to the government, the Solvent Extractors' Association of India (SEA), representing key stakeholders in the edible oil industry, has said that only two vessels with a combined capacity of 45,000 tonnes are currently discharging cargo, while as many as eight vessels carrying 157,000 tonnes — are waiting for berths. The congestion is particularly concerning as

CONTINUED ON PAGE 2

EDIBLE OIL IMPORTS SURGED IN MAY

Source: Solvent Extractors' Association of India

MAJOR EDIBLE OILS IN INDIA:

Groundnut, mustard/rapeseed, sesame, safflower, linseed, niger seed, castor, Soybean, and sunflower.

- **Plantation-based oils:** Coconut, oil palm (grown in Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Andaman and Nicobar).
- **Non-conventional oils:** Rice bran oil, cottonseed oil.
- **Forest-based oils:** Collected from tree and forest sources, mainly in tribal regions.

EDIBLE OIL SCENARIO IN INDIA?

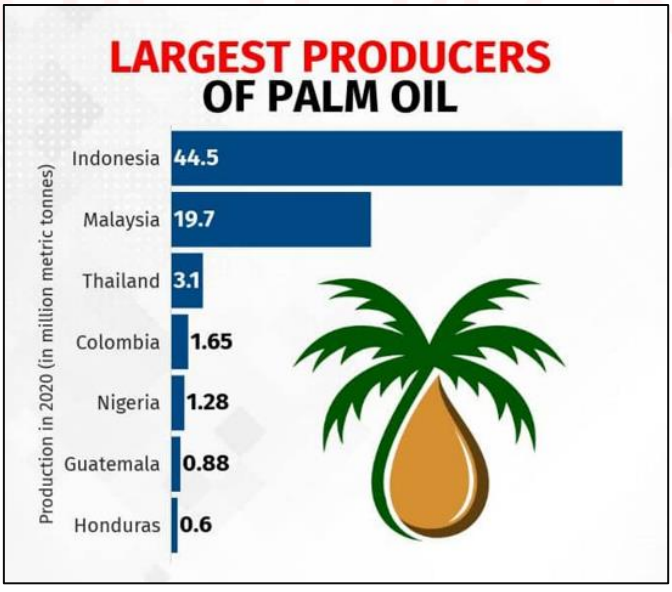
- India, one of the largest oilseed producers, contributes 5-6% to global production, with an estimated 39.66 million tonnes in 2023-24.
- Major oilseeds include Groundnut, Soybean, Sunflower, Mustard, Sesame, Niger, and Safflower.

WHAT IS PALM OIL?

- Palm oil is derived from the fruit of the African oil palm tree (Elaeis guineensis).
- **There are 2 types of palm oil:**
- Crude palm oil (the extract from the fruit pulp) which is primarily used for cooking.
- Palm kernel oil (the extract from its seed) which is used for non-edible purposes (Cosmetics, pharmaceuticals etc.).
- Both oils are colourless, odourless, and relatively tasteless.
- Oil palm trees are native to Africa but currently Indonesia and Malaysia make up over 85% of global supply.

PALM OIL PRODUCTION IN INDIA

- Andhra Pradesh, Telangana and Kerala are the major Oil palm growing States and account for 98% of the total production.
- **India is the largest importer of palm oil in the world.**
- **India has launched National Mission on Edible Oils - Oil Palm (NMEO-OP) in 2021 to promote oil palm cultivation and reduce import burden on edible oils.**



PLACES IN NEWS

01 MOUNT LEWOTOBI LAKI-LAKI

Recently, a volcanic eruption in Mount Lewotobi Laki-laki in Indonesia spewed ash cloud to a whopping 11 km.

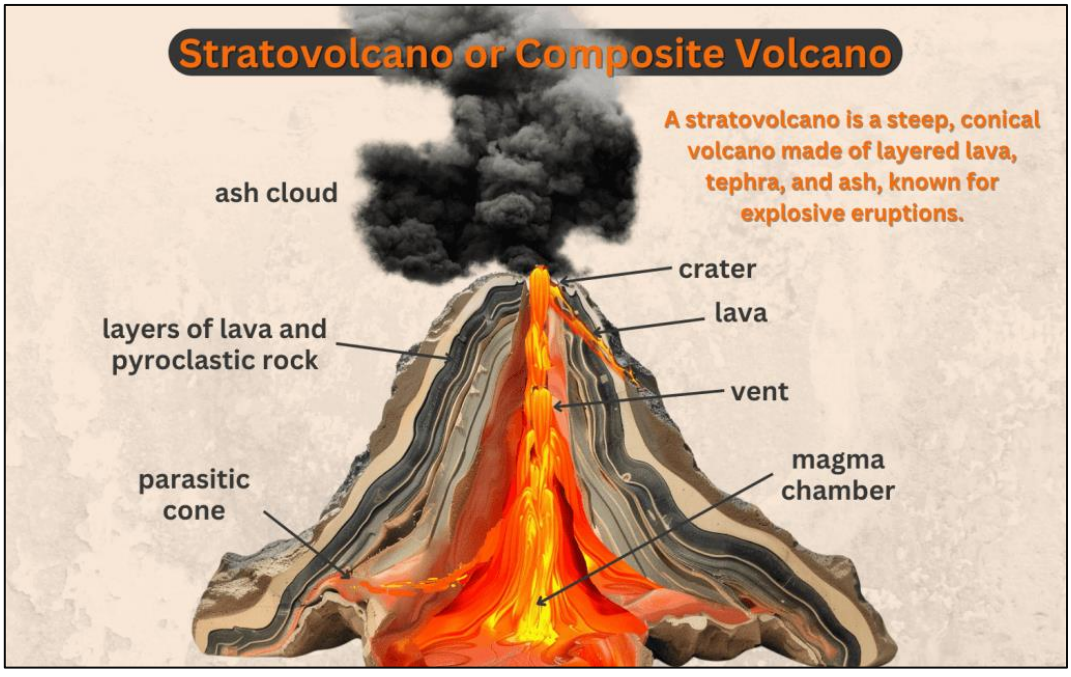
MOUNT LEWOTOBI LAKI-LAKI

- It is located in **Indonesia's East Nusa Tenggara province on Flores Island.**
- It is situated along the famous 'Ring of Fire' in the Pacific region.
- It is one of the most frequently active volcanoes in the region.
- It has two peaks arranged on a NW-SE line separated by 2 km and a 1232 m high saddle. This gave the twin volcano its name, Lewotobi, "husband and wife".
- The two peaks correspond to the **Lewotobi Lakilaki (man) and Lewotobi Perempuan (woman) stratovolcanoes.**

- Lewotobi Lakilaki (1584 m) has a summit crater of 400 m diameter open to the north.
- Lewotobi Perampuan (1703 m)'s crater is 700 m wide.
- Lewotobi Lakilaki has been frequently active during the 19th and 20th centuries, while the taller and broader Lewotobi Perempuan has erupted only twice in historical time.
- Small lava domes have grown during the 20th century in the summit craters of both volcanoes.

WHAT ARE STRATOVOLCANOES?

- Stratovolcanoes, also known as **composite volcanoes**, are large, steep-sided, symmetrical volcanic cones formed from **layers of hardened lava, ash, and tephra**.
- **Famous Examples**:
  - **Mount Fuji** (Japan)
  - **Mount St. Helens** (USA)
  - **Mount Vesuvius** (Italy)
  - **Mount Merapi** (Indonesia)
  - **Mount Etna** (Italy – partly stratovolcanic)



STRUCTURE OF A STRATOVOLCANO

The structure of a stratovolcano includes several key components:

- **Magma Chamber:** A reservoir of magma or molten rock beneath the surface.
- **Conduit:** A passage through which magma travels to reach the surface.
- **Vent:** The opening at the Earth's surface through which volcanic material is expelled. The location of the main vent often changes over time. Parasitic vents and cones often form.
- **Crater:** A bowl-shaped depression around the vent. Some craters contain fumaroles (vents that leak gases), lakes, or even ice.
- **Lava Flows:** Streams of molten rock that solidify as they cool.
- **Pyroclastic Flows:** Fast-moving currents of hot gas and volcanic matter.
- **Lahars:** Volcanic mudflows or debris flows. The composition may be thick and slow-moving, or liquid and fast-flowing.

MAJOR CHARACTERISTICS OF STRATOVOLCANOES

- **Steep Profile**: Stratovolcanoes have steep, conical slopes formed by the accumulation of viscous lava and tephra.
- **Explosive Eruptions**: These volcanoes often produce powerful, explosive eruptions due to the high viscosity and gas content of their magma.
- **Composite Layers**: Alternating layers of lava flows, ash, and tephra create a complex internal structure.
- **Long Dormant Periods**: Stratovolcanoes often remain dormant for centuries between eruptions.
- **High Elevation**: They can reach significant heights, often towering over surrounding landscapes. That being said, the tallest volcanoes

on Earth (Mauna Kea in Hawaii) and in the Solar System (Olympus Mons on Mars) are actually shield volcanoes.

DIFFERENCES FROM OTHER TYPES OF VOLCANOES

The two other common types of volcanoes are cinder cones and shield volcanoes:

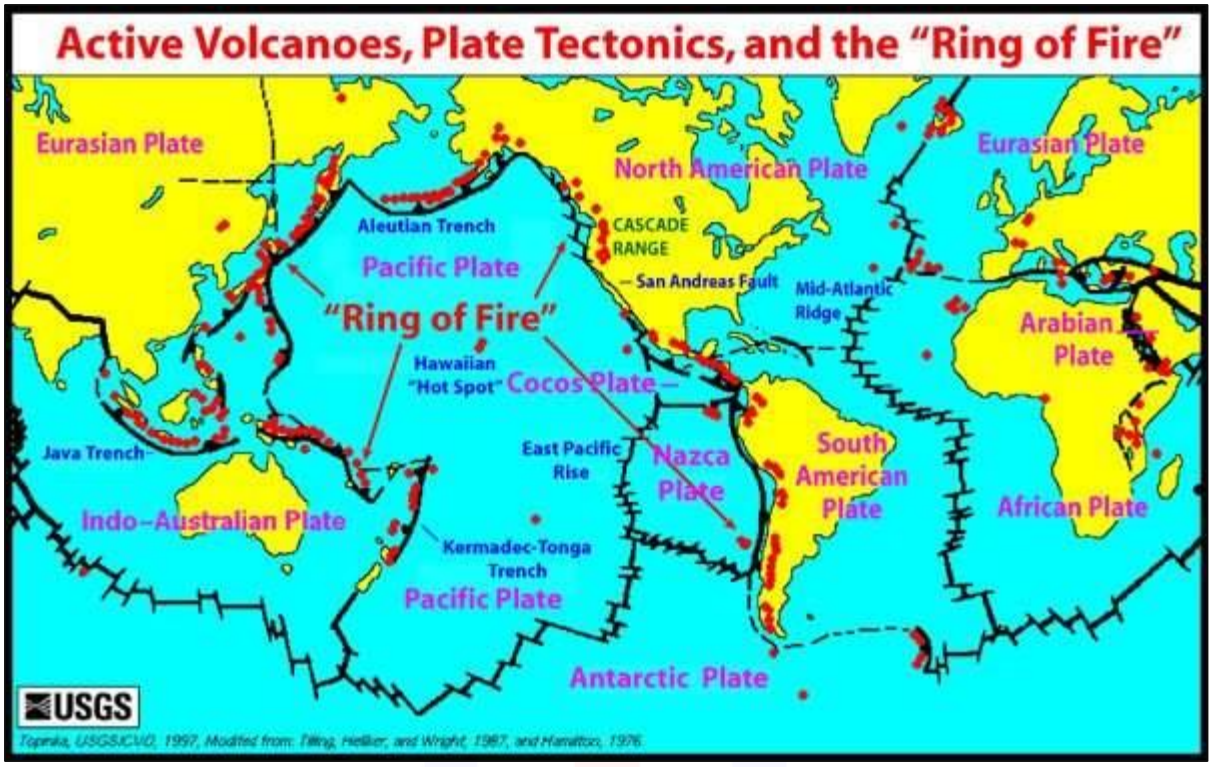
CINDER CONE VOLCANOES:

- **Shape**: Cinder cones are smaller with steep, conical profiles.
- **Eruption Type**: They produce relatively small, short-lived eruptions.
- **Lava Composition**: Typically, basaltic and less viscous.
- **Examples**: Parícutin (Mexico), Sunset Crater (USA).

SHIELD VOLCANOES:

- **Shape**: Broad, gently sloping profiles.
- **Eruption Type**: Effusive eruptions with low-viscosity lava.
- **Lava Composition**: Primarily basaltic.
- **Examples**: Mauna Loa (Hawaii), Galápagos Islands (Ecuador).

Name	Shape	Eruption Type	Lava Composition	Hazards	Examples
Strato volcano	Conical	Explosive	Andesitic to Rhyolitic	Pyroclastic flows, lahars, ashfall, lava flows, volcanic bombs	Mount Fuji, Mount St. Helens
Cinder Cone	Conical	Small, Short-lived	Basaltic	Lava flows, minor tephra fall	Parícutin, Sunset Crater
Shield Volcano	Broad, Gentle	Effusive	Basaltic	Lava flows	Mauna Loa, Galápagos Islands


Active Volcanoes, Plate Tectonics, and the "Ring of Fire"
Eurasian Plate
North American Plate
Eurasian Plate
Aleutian Trench
CASCADE RANGE
Pacific Plate
San Andreas Fault
Mid-Atlantic Ridge
"Ring of Fire"
Arabian Plate
Hawaiian "Hot Spot"
Cocos Plate
Java Trench
East Pacific Rise
Nazca Plate
South American Plate
African Plate
Indo-Australian Plate
Kermadec-Tonga Trench
Pacific Plate
Antarctic Plate
USGS

02 KANHA TIGER RESERVE

The Kanha Tiger Reserve has emerged as the leading tiger habitat in India in terms of ungulate (hoofed herbivore) population, according to the recently released report by the Wildlife Institute of India (WII), Dehradun.

KANHA TIGER RESERVE

- Also **called Kanha National Park**, is located in the **"Maikal" ranges of the Satpuras and falls in the Mandla and Balaghat districts of Madhya Pradesh.**
- It is located in the Central Indian Highlands, which are part of the extensive tableland that forms India's main peninsula.
- It is **the largest national park in Madhya Pradesh.**
- **It sprawls over an area of 2074 sq.km., with 940 sq. km. of core area and 1,009 sq. km. of buffer zone**.
- It was declared a reserve forest in 1879 and revalued as a wildlife sanctuary in 1933. Its position was further upgraded to a national park in 1955.

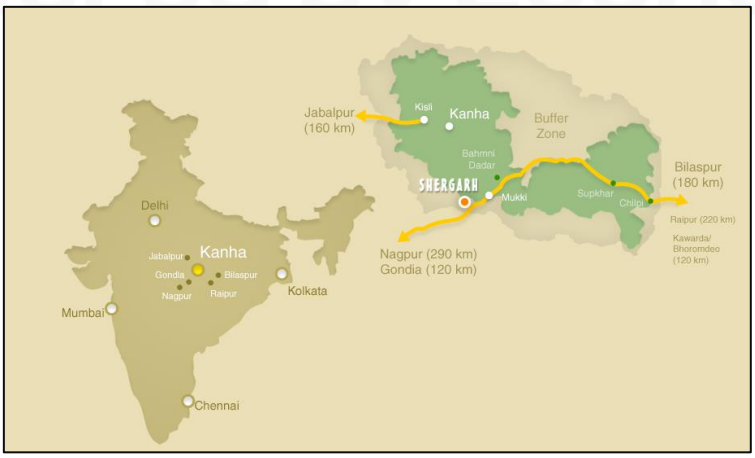
- **It has an active corridor between Kanha and Pench Tiger Reserves. Kanha is also connected with the Achanakmar Tiger Reserve of Chhattisgarh State.**
- It is characterized mainly by forested shallow undulations, hills with varying degrees of slopes, plateaus, and valleys.
- The forest depicted in the famous novel by Rudyard Kipling, The Jungle Book, is thought by some to be based on jungles, including this reserve.
- The region is known for some of the ancient tribal communities, like the Gond and Baiga, that still inhabit the region.
- **It is also the first tiger reserve in India to officially introduce a mascot, "Bhoorsingh the Barasingha".**

FLORA:

- It is primarily a moist Sal and moist mixed deciduous forest where Bamboo, Tendu, Sal, Jamun, Arjun, and Lendia flourish.

FAUNA:

- The park has a significant population of Royal Bengal Tigers, leopards, sloth bears, and Indian wild dogs.
- The Park is respected globally for saving the Barasingha (the state animal of Madhya Pradesh) from near extinction and has the unique distinction of harbouring the last world population of this deer species.



WILDLIFE INSTITUTE OF INDIA (WII)

- **Founded in 1982**, WII is an **autonomous institute** under the **Ministry of Environment, Forest and Climate Change**, based in **Dehradun, Uttarakhand**.
- **Mandate includes** wildlife research, conservation management, training, and advisory support nationwide.
- Offers academic programs: **M.Sc. in Wildlife Science**, postgraduate diplomas, certificate courses, and a **Ph.D. affiliation** through AcSIR.
- Research areas encompass **biodiversity, endangered species**, wildlife forensics, habitat ecology, spatial modelling, eco-development, and climate change.
- Houses specialized facilities: **forensic labs, remote sensing & GIS, herbarium, electronic library**, and a **National Wildlife Database Centre**.

- Conducts major initiatives like the **All-India Tiger Estimation** for NTCA, **Project Cheetah** technical support, and livestock reintroductions (e.g., gaur in Sanjay Tiger Reserve).
- WII's **UNESCO Category-2 Centre** (est. 2015) leads Asia-Pacific Natural World Heritage capacity-building.

- Engaged in **frontline field conservation**: recent actions include Great Indian Bustard chick relocations and desert prey studies in Similipal, Jaisalmer census support.
- Collaborates with **national and international bodies**, training Forest Service officers and wildlife professionals.

SPECIES IN NEWS

01 PORTULACA BHARAT

A new flowering plant species with unusual morphological characteristics named Portulaca bharat has been recently discovered in the rocky and semi-arid landscape of Aravali hills near Jaipur.

PORTULACA BHARAT

- It is a new species of flowering plant.
    - **It was discovered in the rocky and semi-arid landscape of the Aravali hills near Jaipur, Rajasthan.**
- With no other populations currently known, **Portulaca bharat has been provisionally assessed as "data deficient" under the IUCN Red List guidelines.**
    - **It adds to the list of Indian endemics.**
- The plant's narrow endemism and specific habitat requirements make it highly vulnerable to habitat degradation and climate change.

- The genus Portulaca currently comprises about **153 species worldwide, primarily found in tropical and subtropical regions.**
- These succulent plants are known for their toughness, water-storing tissues, and adaptation to extreme environments.
- **In India, 11 species are currently known, including four endemics, mostly distributed in dry and semi-arid habitats.**

ARAVALLI HILLS

- The **Aravalli Range** is the **oldest fold mountain range in India** and one of the oldest in the world.
- Age: Estimated at **over 3 billion years**.
- Extends for about **692 km**, from **Rajasthan** (near Mount Abu) through **Haryana** and **Delhi** to **Palampur in Gujarat**.
- Highest peak: **Guru Shikhar** (1,722 meters) in **Mount Abu, Rajasthan**.

STATES COVERED

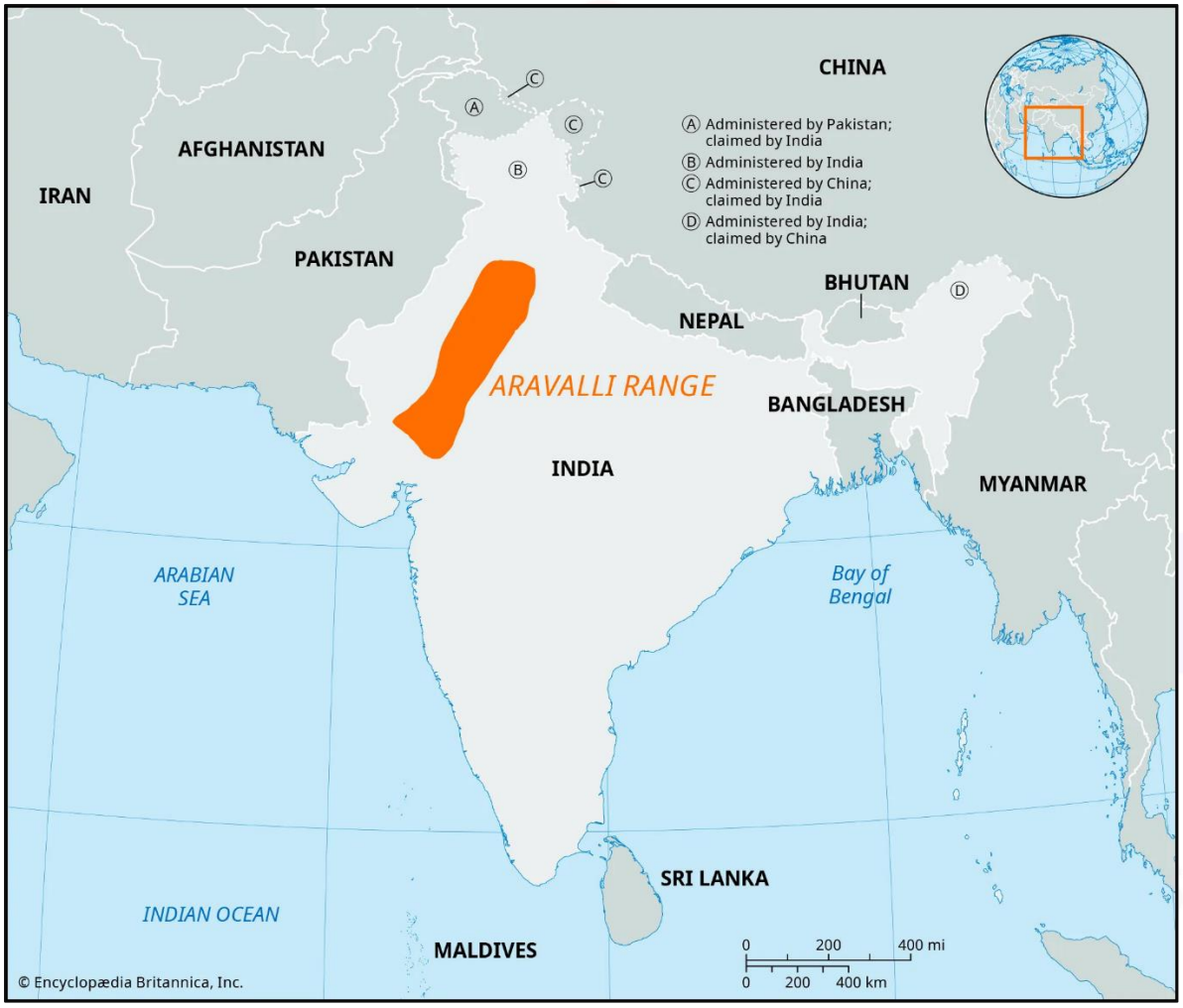
- Passes through **Rajasthan**, **Haryana**, **Delhi**, and **Gujarat**.
- Covers about **10% of India's geographical area**.
- Acts as a **natural barrier** between the **Thar Desert and the fertile plains** of north India.

ECOLOGICAL IMPORTANCE

- Critical for maintaining **groundwater recharge**, particularly for **Delhi-NCR and Rajasthan**.
- Supports a variety of **biodiversity**, including species like leopards, hyenas, sloth bears, and migratory birds.
- Part of the **Northern Tropical Dry Deciduous Forest** zone.
- Home to protected areas like **Sariska Tiger Reserve** and **Mount Abu Wildlife Sanctuary**.

THREATS AND ENVIRONMENTAL CONCERNS

- Facing serious degradation due to **illegal mining, deforestation**, and **urban encroachment**.
- A **2022 report by CSE** revealed that only **7.6% of the original Aravalli range remains forested** in Haryana.
- Over **31 Aravalli hills have vanished** in some districts due to mining (especially in Gurugram, Faridabad, Alwar).



02 KANCHURIA TRIPURAENSIS AND KANCHURIA PRIYASANKARI

Conservation activists have expressed concern over tourism promotion through wildlife safari in the Kali Tiger Reserve.

GENUS *KANCHURIA* (FAMILY MEGASCOLECIDAE)

- **Genus Overview**: *Kanchuria* is a group of **endogeic (soil-dwelling) earthworms** in the family Megascolecidae, found primarily in India's **Northeastern biodiversity hotspot**, especially **Meghalaya** and **Tripura**.
- **Species Diversity**: Known species include *K. octotheca*, *K. turaensis*, and recently described ones like *K. daribokgrensis*, *K. karorensis*, *K. makhulensis*, *K. mohiskulensis*, among the six documented in 2020.
- **Kanchuria tripuraensis has been named after Tripura**, where it was found thriving in rubber and pineapple plantations highlighting the ecological diversity of even agriculturally modified landscapes.
- **Kanchuria priyasankari is a tribute to Prof. Priyasankar Chaudhuri,** whose four-decade-long dedication to earthworm

taxonomy has placed Tripura on the national and international map for soil biodiversity studies.

- **K. tripuraensis is unique within its genus for having single ventromedian spermathecae in segments 7 and 8—a distinguishing morphological feature.**
- K. priyasankari, a member of the turaensis species group, is characterised by its comparatively smaller size and a distinctive spermathecal structure that sets it apart from its close relative, K. turaensis.

KEY FACTS

- *Kanchuria* worms are **soil-mixing detritivores**, improving soil porosity and fertility.
- Most identified species are **endemic to Meghalaya**, with some records from Tripura.
- Identified via **morphological taxonomy** and **DNA barcoding** (cytochrome oxidase I), revealing clear species divergence (intraspecific ≤ 6.1%, interspecific ≥ 14.8%).

KALI TIGER RESERVE

LOCATION & GEOGRAPHY

- Located in **Uttara Kannada district, Karnataka**, covering **1,411.9 km^2**, comprising **Dandeli Wildlife Sanctuary (475 km^2)** and **Anshi National Park (339.9 km^2)**.
- Situated in the **Western Ghats**, with elevations from **27 m to over 1,700 m MSL**.
- Dominated by **moist deciduous and semi-evergreen forests**, with rich biodiversity.

FLORA & FAUNA

- **Flora**: Around **923 plant species**, including rare orchids like *Vanda wightii* and endangered species such as *Eriocaulon anshiense*.

- **Fauna**:
    - **Tigers**: Approximately **12–15 tigers** recorded in recent census; district-wide tiger population ~30.
    - Hosts **black panther**, elephants, Indian bison (gaur), sloth bear, leopards, wild dogs, and diverse primates.
    - Rich in avifauna—**200+ bird species**, featuring all four hornbill species.

03 SHARAVATHI LION-TAILED MACAQUE WILDLIFE SANCTUARY

Following the arrest and subsequent bail of farmers accused of entering the Sharavati Lion Tailed Macaque Wildlife Sanctuary in Sagar taluk with country-made weapons, the situation has become increasingly tense.

SHARAVATHI LION-TAILED MACAQUE WILDLIFE SANCTUARY

- It is located in the Sharavathi River Valley of Sagar taluk in Shivamogga District, Karnataka.
- The sanctuary is part of the Western Ghats, a UNESCO World Heritage Site.
- The area of the sanctuary is around 431.23 sq. km.,with the Linganamakki reservoir covering 124 sq.km.
- It was formed by combining the existing Sharavathi Valley Wildlife Sanctuary, Aghanashini Lion-Tailed Macaque Conservation Reserve, and the adjoining reserve forest blocks.
- The sanctuary shares its southwestern boundary with the Mookambika Wildlife Sanctuary.

- The overall terrain of the sanctuary is highly undulating, with altitude ranging from 94 m to 1102 m.
- It mainly consists of tropical evergreen to semi-evergreen types of forests, moist deciduous forests, and grasslands and savanna.

FLORA:

- The sanctuary is immensely rich in species like Dhoopa, Gulmavu, Surahonne, Mavu, Nandi, etc.

FAUNA:

- It is considered a key habitat for protecting the endangered lion-tailed macaque (Macaca silenus), considered endemic to the Western Ghats.
- Other mammals include the tiger, leopard, wild dog, jackal, sloth bear, spotted deer, sambar,barking deer, mouse deer, wild pig, common langur, bonnet macaque, Malabar giant squirrel, etc.

SHARAVATI RIVER

- Sharavati River is one the west-flowing rivers in the Indian state of Karnataka.
    - **It rises in the Western Ghats and runs northwest for 60 miles (100 kilometres) to the Arabian Sea in Honavar.**
- Sharavati River starts at the Ambuthirtha at Thirthahalli village in Shimoga district of Karnataka.
- The Sharavati reaches a width of 230 feet (70 metres) about 18 miles (29 kilometres) upriver from its source before a stunning 830-foot (250-metre) drop, dividing into four spectacular waterfalls known as Jog Falls.
- The main tributaries of Sharavati River are Nandihole, Haridravathi, Mavinahole, Hilkunji, Yennehole, Hurlihole, and Nagodihole.
- The Sharavati river basin is divided into two Karnataka districts: Uttara Kannada and Shimoga.
- The river basin is mostly made up of Precambrian rocks.
- The Dharwar system and peninsular gneiss are the two primary rock groups found in the Sharavathi river basin.

LION-TAILED MACAQUE

- Lion-tailed macaque (or **wanderoo**), sometimes called **bearded monkey**, is an **Old-World monkey endemic to the Western Ghats**.
- They are covered in black fur and have a striking gray or silver mane that surrounds their face, which can be found in both sexes. The mane that surrounds its face gives it the nickname "**beard ape**".
- **Unlike other macaques**, they are **shy** and **avoid humans** when possible. **Males define the boundaries** of their home ranges **by calls.**
- They are **arboreal** and **diurnal** (active exclusively in daylight hours).
- Found in three states, namely, **Karnataka, Kerala,** and **Tamil Nadu.**

- Prefers **tropical evergreen rainforests** but also found in **monsoon forests**.
- They are **omnivorous,** but their diet consists mainly of fruit. They also eat a wide variety of vegetation such as leaves, stems, flowers, buds, and fungi.
- Habitat loss, hunting and wood harvesting.
- **Conservation Status: IUCN: Endangered | CITES: Appendix I | Wildlife Protection Act, 1972: Schedule I**
- It is an **indicator** of the **health of rainforests**.
    - It is an **Umbrella species** for the conservation of other wildlife species in the region.

04 AGARWOOD

The soaring market demand has led to widespread overharvesting, pushing wild populations of agarwood to the brink of extinction.

ABOUT AGARWOOD

- **Aquilaria malaccensis, commonly known as agarwoo**d, is a species of tree belonging to the Thymelaeaceae family.
- It is well-known for producing a fragrant resinous wood, which is highly valued for its distinct aroma.
- The resin is produced as a defence mechanism due to the intense stress suffered by the trees when they are infected by a type of mold belonging to the Phaeoacremonium species (Phialophora parasitica).
- Agarwood, known as Oud, Gaharu or Agar is prized as the world's most valuable incense.
- In the wild, it takes nearly a decade for a tree to mature.

- It grows in the wild in the Northeast, especially in Assam, Tripura, Arunachal Pradesh, Nagaland, Mizoram and Manipur.
    - **The name of Tripura's capital, 'Agartala' is derived from agarwood trees that were abundant in the past.**
- There are references to its therapeutic properties in ancient Ayurvedic texts, including the Charaka Samhita.
- The Government of India submitted a Non-Discretionary Finding (NDF) to prevent inclusion of agarwood in the Review of Significant Trade (RST) of the CITES.

CONSERVATION STATUS

- **IUCN:** Critically Endangered
- **CITES:** Appendix II
- **Wildlife (Protection) Act, 1972:** Schedule IV.

IAS ORIGIN

HERE IT BEGINS

Powered by Ecoholics

CONTACT IAS ORIGIN TEAM AT 7880-00-9099