7 PM COMPILATION

May, 2025

Features of 7 PM compilation

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

INDEX

Caste Census – Significance and Challenges- Explained Pointwise

The Cabinet Committee on Political Affairs headed by PM has decided to include caste enumeration as part of next Census exercise. The last time when India's entire population was counted by caste was in pre-independent India – in 1931. Since then, only Scheduled Castes & Scheduled Tribes have been counted in the Census exercise.

What is Caste Census and Caste Survey?

- **Census:** Census is the total process of collecting, compiling, analyzing and disseminating demographic, economic and social data of all persons in a country at a specific period of time. Census in India is conducted at regular intervals of 10 years. Under Article 246 of the Constitution, the Census is a Union subject.
- **Caste Census:** A caste census involves the systematic recording of individuals' caste identities during a national census. It aims to gather data on the distribution, socio-economic status, education levels, and other demographic details of various caste groups within the population.
- Every Census in independent India from **1951 to 2011** has published data on Scheduled Castes and Scheduled Tribes, but not on other castes. Before that, every Census until 1931 had data on caste. Thus, the most recent caste data available is from **1931 Census**.
- **Socio-Economic Caste Census (SECC):** SECC was conducted in based on the recommendations of Group of Ministers headed by then Finance Minister Pranab Mukherjee in 2010. It was done outside of the purview of Census exercise. However the **findings were never made public due to concerns about data accuracy & consistency**.
- **Caste Survey:** Since only the Union govt has the power to conduct census, several state governments like **Bihar, Karnataka, Telangana have already conducted caste surveys** to ascertain the social and economic status of different castes for better policymaking.

Difference between Census, Caste Census(Socio Economic Caste Census) and Caste Survey:

Parameters	Census	Caste Census (SECC)	Caste Survey
Legal Backing	Census is backed by the **Census Act 1948**	Caste Census is **not backed by any particular specific statute.** Central govt by notification may provide for collection of caste data	**No statutory backing.** Caste surveys are used by the State governments since they do not have powers to conduct census.
Caste Data	Socio economic data of only **SCs and STs** were collected and released.	Socio economic data of OBCs were collected for the **first time in 2011 census** after independence. However the data was not released.	State Governments conducts **caste surveys** to ascertain the socio economic data of castes.

Confidentiality	All census data are kept confidential	All the personal information given in the SECC is open for use by Government departments to grant and/or restrict benefits to households.	State governments use the Caste survey data for informed policy making of state policies.

Read More- **Forum IAS**

What are the advantages of Caste Census?

1. Evidence-based Policymaking: A caste census can provide precise and comprehensive data on the socio-economic status, educational attainment, health indicators, and representation of various caste groups at the national and regional levels. This granular data is crucial for formulating targeted and effective policies to address specific disparities faced by different communities. It can help in identifying castes and sub-castes that are particularly marginalized or lagging behind in development indicators, allowing for focused interventions.

2. Rationalization of reservation: The current policies are based on the last caste census which was conducted in 1931. The data can provide a factual basis for reviewing and rationalizing existing reservation policies in education and employment, ensuring they are aligned with the current socio-economic realities of different caste groups. For e.g. New caste census can help the government in **identifying the most benefited section and reduce their share** in the overall reservation to provide an opportunity to other castes. It can help in identifying the communities that may currently be excluded from affirmative action but are demonstrably backward and in need of such support for e.g. **Denotified, Nomadic & Semi-Nomadic Tribes**. Regular caste-based data collection can also help in monitoring the impact of reservation policies over time and make necessary adjustments.

3. Better targeting of Government welfare schemes: Caste census would lead to the identification of both the dominant & the dominated, which will have a positive effect in terms of targeting the welfare. Reliable caste-based data can inform the allocation of public resources, ensuring that funds are directed towards the communities that need them most and implementing the development programs that are tailored to the specific needs of different caste groups, leading to more efficient use of resources.

Case Study = BIHAR:

Under the **National Food Security Act**, 83.92% of the population of Bihar is entitled to subsidized food grain. The Bihar caste survey reported that the population of the state has increased from 103.8 million in 2011 to 130.7 million in 2023. Thus by current population estimates,109.7 million persons are eligible for the subsidy. However the current beneficiary count is just 87.1 million. That is, in Bihar alone, 22.6 million persons have been excluded from this benefit at a time when food inflation is high.

4. Caste has an important position in Indian society: While census data has been captured for Scheduled Castes, Scheduled Tribes, religions and linguistic profiles, there has been **no profiling of all castes in India since 1931.** Caste has an important position in the Indian society and the data on caste can be helpful in ascertaining the socio-economic positions of different castes in India.

5. Addressing the prevalent inequalities: Unequal distribution of wealth, resources and education has meant an acute shortage of purchasing power among the majority of Indians. The census will help to address these issues in a democratic, scientific and objective manner. This will lead to **social justice** in the country.

6. Fulfilment of constitutional mandate: Our Constitution favours conducting a caste census. **Article 340** of the Constitution empowers the government to investigate the conditions of socially and educationally backward classes and make recommendations for their advancement. The constitutional body NCBC also urged the government to collect data on the population of OBCs as part of Census of India 2021 exercise.

7. Helpful in fulfilling the objectives of various commissions: Sachar committee which was formed to examine the socio-economic and educational status of the Muslim community in India, mentioned that the availability of data on religion was useful in highlighting the relative deprivation of minorities. So, similar data on caste is also desirable to identify vulnerable sections within castes. This data will be useful for **Justice Rohini Commission** which has been formed for the sub-categorization of OBCs.

8. Addressing inter-sectionality: Caste intersects with other factors such as gender, religion, and region, leading to **compounded disadvantages.** The census can reveal these intersections which will lead to more nuanced policy approaches that target multiple dimensions of marginalization.

9. Break the myths associated with castes: The caste census will reveal the actual data on castes and remove ambiguities associated with the caste. For instance, In Karnataka, there were claims that among the castes, the **Lingayats** are the most numerous. So the census can reveal the true information on that.

10. Empowering marginalized communities: Enumeration of castes within the Census exercise would likely lead to the emergence of new identities & aspirations. This would lead to opening of avenues for new political negotiations, coalitions, and party politics which will result in deepening of democracy.

What can be the challenges of Caste Census?

1. Caste based political mobilisation: The data can be used by the political parties for their narrow political gains. This will encourage **caste based mobilizations** in the country. As India seek to eliminate and weaken the notion of caste, a caste census would only strengthen it. There will be from every caste group for share in the power at the cost of administrative efficiency.

2. Hardening of caste identities may hamper growth of national integration: There have been concerns that counting caste may help **solidify or harden identities.** It might lead to a renewed emphasis on caste as a primary marker of identity. The process of enumeration and the subsequent use of the data could potentially exacerbate existing social tensions and create new fault lines between different caste groups, especially if perceived as leading to unequal benefits or discrimination. Due to these repercussions, nearly a decade after the SECC, a sizable amount of its data remains unreleased or released only in parts.

3. Strengthen demands for further reservations: Caste census may increase demand for larger or separate quotas. For instance, **Patels, Gujjars, Jats and other castes are demanding reservations**. The caste census might induce more such demands in future. The census would put pressure on the SC to lift the 50% ceiling.

4. Administrative and Logistical Complexities: India has thousands of castes and sub-castes, with significant regional variations in nomenclature and classification. Accurately identifying and categorizing each individual's caste can be a monumental task for enumerators, increasing the risk of errors and inconsistencies. The Registrar General of India rejected the request forwarded from PMO to conduct the caste census in 2010 due to logistical & practical difficulties.

5. Lack of a Uniform Definition: There isn't a universally agreed-upon definition of "caste" in the Indian context, making it challenging to establish clear and consistent criteria for enumeration. Enumerating the caste numbers in India is a complex task as the **same caste is spelt in different ways in different states.** Also one caste maybe extremely backward in one state and can be backward in the other state.

6. Potential stigmatization: Disclosure of caste identities could lead to individuals being **stigmatized or discriminated** against based on preconceived notions associated with certain castes. This can deter honest responses and undermine the survey's accuracy.

What should be the way forward?

1. Standardized Classification: Develop a clear and standardized list of castes and sub-castes, potentially drawing upon existing government classifications and involving anthropological and sociological expertise. Address the issue of synonymous caste names across regions.

2. Comprehensive Training: Provide extensive and sensitive training to enumerators on the importance of accuracy, respectful engagement, and handling potential sensitivities around caste identity. Emphasize the voluntary nature of participation and data confidentiality.

3. Ensuring Data Accuracy and Reliability:

- **Community Involvement:** Involve local community leaders and caste organizations in the process to build trust and ensure accurate identification.
- **Verification Mechanisms:** Implement mechanisms for data verification at multiple levels to minimize errors and inconsistencies.
- **Public Awareness Campaigns:** Conduct extensive public awareness campaigns to educate people about the purpose and benefits of the census, address privacy concerns, and encourage accurate participation.

4. Data Sensitivity: Information about an individual's caste is highly sensitive, and concerns about data privacy and potential misuse need to be addressed. Ensure that strong data protection laws and protocols are in place to safeguard the collected information and prevent its misuse.

5. Avoid Political Misuse: Establish clear protocols and legal safeguards to prevent the data from being used for divisive or partisan purposes. Frame the census as a tool for inclusive development, not as a means to deepen social divisions.

Conclusion:

Though there have been several apprehensions about the consequences of the caste census, however, it is up to the government & the civil society together to ensure that the caste census is not done for the fragmentation but for harmony in society. It would be a golden opportunity for better power sharing & for deepening of democracy.

Read More- The Indian Express
UPSC Syllabus GS-2: Government policies & interventions in various sectors

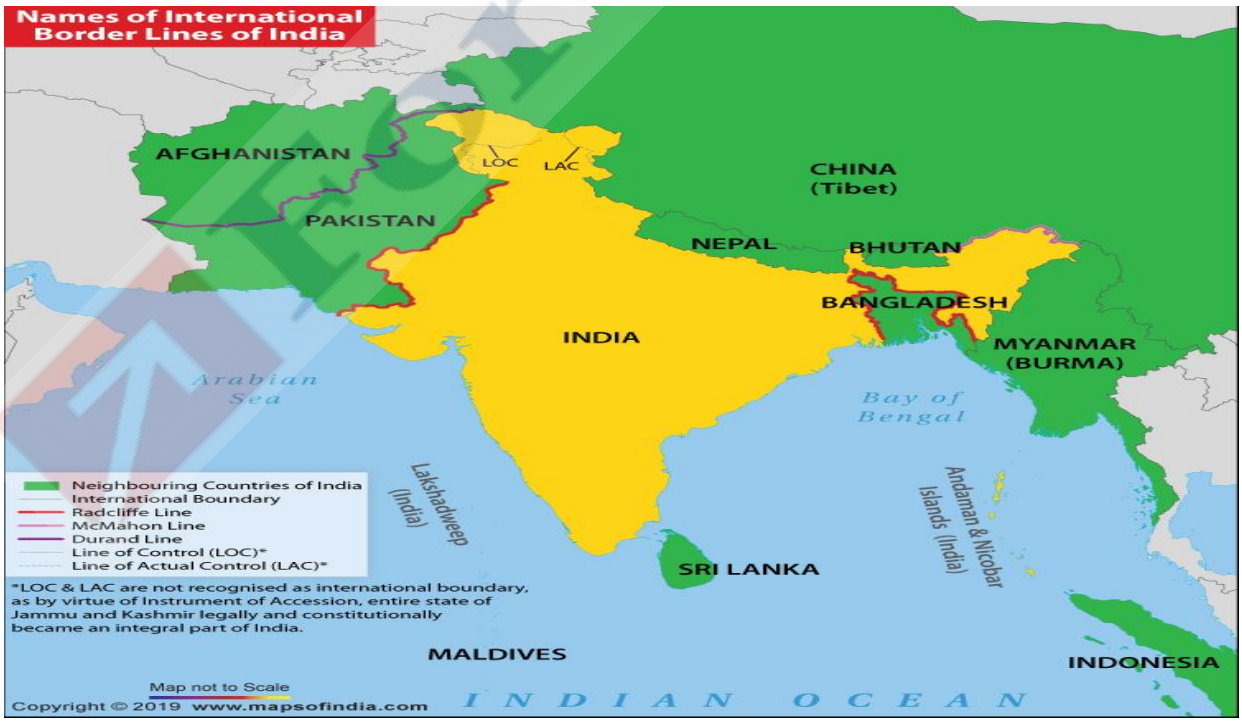
The Challenge of Cross-border Terrorism in India- Explained Pointwise

The India-Pakistan border is a prominent hotspot for cross-border terrorism. Recent events, such as the deadly **Pahalgam attack** in Jammu and Kashmir that killed 26 tourists, have intensified accusations and diplomatic fallout between the two countries. Even though India and Pakistan have tried many times to bring peace through talks and agreements still the situation has not improved to the desired level. This is mainly because Pakistan continues to support terrorist groups like Lashkar-e-Taiba (LeT), Jaish-e-Mohammed (JeM) etc, which carryout cross-border terrorist attacks to disturb the peace in the region. Thus, in this article we will analyze the causes & consequences of cross-border terrorism and various government initiatives as well as what could be the way forward.

What is cross-border Terrorism & what are its sources in India?

- **Cross Border Terrorism:** Cross-border terrorism refers to terrorist activities where the territory of one country is used to plan, support, or launch attacks against another country. This form of terrorism often involves non-state actors receiving support-tacit or explicit-from states or entities across international borders. It is considered a form of "grey zone" conflict, amounting to an undeclared war aimed at destabilizing a nation through sustained, low-intensity violence.
- **Key Features:**
    - Terrorist groups operate from one country and infiltrate into neighboring states to carry out attacks.
    - Methods include armed incursions, bombings, cyberattacks, smuggling of arms and narcotics, and sponsoring proxy fighters.
    - The intent is often to intimidate populations, disrupt governance, or further ideological, political, or religious objectives.

Sources of Cross Border Terrorism



Source- India Map

Indo-Pakistan Border	The Indo-Pakistan Border (3,323 Km) runs along the states of Gujarat, Rajasthan, Punjab and J&K. India consistently accuses Pakistan of providing material, logistical, and financial support to terrorist groups operating across the border, especially in Jammu and Kashmir. Groups such as Lashkar-e-Taiba (LeT) and Jaish-e-Mohammad (JeM), which have claimed responsibility for major attacks, are believed by Indian authorities and many international analysts to operate from Pakistani territory. Several militant organizations, including LeT, JeM, and The Resistance Front, act as proxies for larger terrorist networks and are used to launch attacks from across the border. Inadequate cooperation from Pakistan has made the management of border further difficult for India.
Indo-Bangladesh Border	The Indo-Bangladesh Border (4,096 Km) passes through West Bengal, Assam, Meghalaya, Tripura and Mizoram. Illegal migration across this border poses serious security threats and acts as a fertile ground for organisations like the Inter-Services Intelligence of Pakistan to penetrate and expand their activities. Poor law and order situation at the border, has led to smuggling of arms and drugs. The supply of arms helps in sustaining any conflict.
Indo-Nepal Border	India-Nepal Border (1,751 Km) is an open border to facilitate the free movement of people across the border. Anti-India organizations use this border to plant their people in the territory of India. Smuggling of gold, small arms, drugs and fake currency helps terrorists in executing an attack.
Indo-Myanmar Border	The Indo-Myanmar Border (1,643) passes through the north-east states of Arunachal Pradesh, Nagaland, Manipur and Mizoram. The insurgents and terrorist groups like the National Socialist Council of Nagaland (NSCN) and United Liberation Front of Asom (ULFA) operate from Myanmar, which threaten the security of India as well as Myanmar.
India-Bhutan	The Indo-Bhutan border (699 km) passes through the states of Assam, Arunachal Pradesh, West Bengal and Sikkim. Illicit establishment of camps by militant outfits in the dense jungles of south-east Bhutan helps insurgents from India in executing anti-India activities.

Maritime Borders	India's long coastline remains comparatively unguarded with minimal presence of coast guards. The 26/11 cross-border terrorist attack took place through maritime borders.

What are the reasons behind cross-border terrorism in India?

1. State-sponsored Policy by Pakistan:

- Pakistan's military-intelligence establishment, particularly the Inter-Services Intelligence (ISI), has deliberately used terrorism as a tool of state policy to destabilize India, especially in Jammu and Kashmir. It is a part of Pakistan's policy of ***'bleeding India through thousand cuts'***.
- Pakistan has sought to challenge Indian control over Kashmir and keep the issue active on the international stage by supporting militant groups that operate across the border.
- Pakistan has cultivated and deployed non-state actors such as Lashkar-e-Taiba and Jaish-e-Mohammad as proxies to conduct attacks in India, providing them with funding, training, and safe havens. This proxy strategy allows Pakistan to wage asymmetric warfare while maintaining plausible deniability.
- Pakistan has also supported insurgency in other Indian regions, such as Punjab, to destabilize India further *e.g. Terrorist attack on Pathankot Airbase in 2016*.

2. Porous and difficult-to-secure borders: India's borders with Pakistan, Bangladesh, Nepal, Bhutan, Myanmar, and even along the coastline are often porous and challenging to monitor due to difficult terrain (mountains, jungles, rivers, deserts). These geographical complexities make infiltration, smuggling of arms, and movement of militants easier. Smuggling of arms, drugs, and fake currency across these borders helps sustain terrorist operations.

3. Over Ground Workers: The local population is recruited as over-ground workers by the terrorist outfits in border areas. These over-ground workers support and facilitate the cross-border movement of terrorists by providing them transportation, shelter, and other assistance.

4. Corruption among officials: Corrupt officials allow illegal cross-border movement in exchange for bribes. This provides avenues for criminal elements and terrorists to enter India.

5. Inadequate border management & security gaps: Inconsistent or inadequate border security infrastructure and lack of strategic coordination among security agencies can create vulnerabilities that are exploited by terrorists.

What are the consequences of cross-border terrorism in India?

Cross-border terrorism has had severe consequences for India. These are mentioned below-

1. Loss of civilian and defence personnel lives: There has been loss of lives of thousands of civilians in acts of cross-border terrorism over the years. Thousands of defense, paramilitary and police personnel have sacrificed their lives in the line of duty fighting cross-border terrorism *e.g. Attack on CRPF convoy in Pulwama in 2019*.

2. Disruption of peace and security: Cross-border terrorism has disrupted peace and security along India's borders, particularly with Pakistan. It has led to a deterioration of bilateral relations between India and Pakistan, leading to suspension of treaties (like the Indus Waters Treaty), closure of trade routes, and reduced

cooperation. It consolidates nationalism and deepens divisions between India and Pakistan, making conflict resolution more difficult.

3. Economic disruption: Cross-border terrorism causes significant economic loss by disrupting trade, commerce, tourism, agriculture, and other vital activities, especially in conflict-prone regions like Jammu & Kashmir. Major attacks, such as the Pahalgam massacre, have led to mass cancellations in the tourism sector, loan defaults, stalled infrastructure projects, and rising unemployment. The perception of risk deters both domestic and foreign investment, reduces FDI inflows, and increases the cost of doing business. Ancillary sectors such as transport, horticulture, banking, and retail also suffer ripple effects from these disruptions.

4. Social & Psychological impact: Frequent terror attacks inflict heavy psychological trauma on victims and their families, leading to long-term mental health issues and increased medical costs. The constant threat of cross-border terrorism has also created an atmosphere of fear and insecurity among the civilian population living along the borders. The radicalization of local populations, especially youth, is exacerbated by persistent violence and extremist propaganda. It also leads to attack on Kashmiri people in other parts of the country.

5. Long-term developmental setbacks: Persistent terrorism erodes investor confidence, leading to capital flight and stunted industrial growth. Educational opportunities are lost as institutions close or are disrupted, impacting future income and social mobility.

6. Illegal infiltration and smuggling: Cross-border terrorism has facilitated illegal infiltration and smuggling of narcotics, arms and weapons across India's borders, especially with Pakistan and Bangladesh.

What are the steps taken by India to counter cross border terrorism in India?

1. Strengthening Security and Intelligence Infrastructure

- **National Investigation Agency (NIA):** The NIA is India's primary agency for investigating and prosecuting terrorism-related cases, especially those involving cross-border elements. It coordinates with other agencies to ensure a unified response to terror threats.
- **Research and Analysis Wing (R&AW):** This external intelligence agency focuses on countering cross-border terrorism, particularly from Pakistan-based groups.
- **National Intelligence Grid (NatGrid):** Integrates data from multiple agencies to provide real-time threat analysis and improve intelligence sharing.

2. Legislative and Policy Measures:

- **Unlawful Activities (Prevention) Act (UAPA):** Provides a robust legal framework to prosecute terrorism-related offenses, designate terrorist organizations, and freeze assets.
- **National Security Act (NSA):** Allows preventive detention of individuals suspected of involvement in terrorism.
- **Amendments to Laws:** The UAPA and Prevention of Money Laundering Act have been strengthened to address new forms of terrorism and its financing.

3. Enhanced Border Management:

- **Central Armed Police Forces (CAPFs):** Agencies like BSF, CRPF, ITBP, and SSB are deployed in sensitive border areas to prevent infiltration and support anti-terror operations.
- **Smart Fencing and Surveillance:** India is investing in smart fencing, drones, sensors, and surveillance cameras along borders to detect and prevent cross-border infiltration.
- **Coastal Security:** Upgradation of coastal security infrastructure to prevent maritime infiltration.

4. Specialized Counter-Terrorism Units:

- **National Security Guard (NSG):** An elite force specializing in counter-terrorism operations, including hostage rescues and response to large-scale attacks.
- **NSG Hubs:** Established in major cities for rapid deployment during emergencies.

5. Diplomatic and Strategic Actions:

- **Suspension of Bilateral Agreements:** In response to major attacks, India has suspended the Indus Waters Treaty, closed border check posts, and reduced diplomatic staff with Pakistan to signal zero tolerance for cross-border terrorism.
- **International Advocacy:** India raises the issue of cross-border terrorism in multilateral forums, presses for global action on terror financing, and seeks extradition of perpetrators.

6. International Cooperation:

- **Intelligence Sharing:** Collaboration with international intelligence agencies to improve the accuracy and timeliness of counter-terrorism operations.
- **Action Against Terror Financing:** Efforts to choke the flow of funds to terrorists by monitoring financial transactions and working with global partners.

What should be the way forward?

1. Strengthening border security: There is a need to reassess policies related to management of India's international borders such as intelligence apparatus, internal security and border management. The smart fencing of all Indian borders must be expedited.

2. Kinetic Strikes: The surgical strikes like the Uri Surgical Strike and the airstrike like the Balakot airstrikes must be carried out to deter the terrorists. The military should also look at alternative means to strike at the terror camps across the LoC (Line of Control) and LAC (Line of Actual Control) through mechanisms like Precision Engagement Capability.

3. Specialized force and training- India should move in the direction of specialisation of military to fight cross-border terrorism. A judicious mix of properly trained manpower and affordable and tested technology is likely to yield better results.

4. Beefing up cyber defence Mechanism: A holistic cyber defense mechanism must be developed to effectively counter cyber-linked terrorism, including conducting cyber operations and implementing strong counter-measures against cyber attacks from foreign soil.

5. Speeding up judicial process: India's national criminal justice system must be enhanced and legal protocols must be streamlined to enable speedy trials of cross border terrorism cases.

6. Counter-radicalization programmes: The counter-radicalization programs focusing on promoting non-violence and tolerance must be implemented, especially in educational institutions. This will reduce youth's exposure to cross border terrorism and radical ideology. This will reduce the number of over-ground workers in India.

Conclusion:

Cross-border terrorism thus imposes a heavy and multidimensional cost on India, affecting its economy, society, politics, security, and prospects for peace and development. A multi-pronged approach-combining

financial, diplomatic, security, intelligence, and socio-political strategies, supported by international cooperation and dialogue with local population-is essential to effectively counter and ultimately resolve cross-border terrorism.

Read More- The Hindu
UPSC Syllabus- GS 3 – Internal Security

Food vs Fuel (Food Security vs Energy Security) – Explained Pointwise

India's growing use of maize for ethanol production has triggered a major shift in its agricultural economy. Once a surplus producer and exporter, India is now importing maize to meet rising demand, putting pressure on domestic feed and food supplies. The diversion of maize for biofuel has disrupted supply chains, raised prices, and even impacted soybean growers through a ripple effect. As policymakers consider GM maize imports, the debate intensifies between ensuring energy security and safeguarding food and feed priorities.

What are Biofuels?

According to the **FAO**, biofuels are energy carriers that store the energy derived from biomass. A wide range of biomass sources can be used to produce bioenergy. These include – fibre and wood residues from the industrial sector, food and non-food crops, agricultural wastes, algae, etc.

Ethanol:

Ethanol-based biofuels are often considered a preferable alternative to fossil fuels due to their lower emissions due to less carbon dioxide emissions than conventional fuels.

It is produced from grains, their stalks, rotten potatoes, sugarcane juice, sugarcane molasses, and agricultural and industrial waste. When ethanol is produced directly from crops such as rice, maize, and sugarcane, the technology is referred to as **1G (1st Generation)**. When crop waste, non-food crops, industrial waste, and lignocellulosic (plant dry matter) feedstocks are used, the technology is **2G (2nd Generation)**.

What are some of the biofuel initiatives being undertaken by India?

National Biofuel Policy 2018:
Read about it **here**.

Ethanol Blending Programme: It involves producing bioethanol that would be blended with petrol. As per the policy, India was to achieve 10% blending rate (E10) by 2021-22 and 20% (E20) by 2025-26. It has led to the average ethanol blending in petrol rising from 1.6 to 11.8% between 2013-14 and 2022-23. Read a detailed article on **Ethanol Blending here**.

Pradhan Mantri JI-VAN Yojana, 2019: To create an ecosystem for setting up commercial projects and to boost Research and Development in 2G Ethanol sector.

GOBAR (Galvanizing Organic Bio-Agro Resources) DHAN scheme: It focuses on managing and converting cattle dung and solid waste in farms to useful compost, biogas and bio-CNG, thus keeping villages clean and increasing the income of rural households.

Why is India promoting Biofuel production?

Read about the **Significance of Biofuels** **here**.

1) **Enhancing India's energy security:** By diversifying its energy sources, India can build a more resilient energy infrastructure, lessening its reliance on a single energy type and promoting a mix of renewable resources.

2) **Import Substitution:** India heavily relies on imports to meet its energy requirements (around 80% of its oil requirement is imported). Biofuels can help strategically reduce the dependence on imported fossil fuels and conserve foreign exchange reserves.
For instance, India's crude oil import bill will fall annually by about **$4 billion** under E20 (**NITI Aayog**).

3) **Negate Crude Oil Price Hikes:** Can significantly offset negative economic impacts of moderate oil price hikes.

4) **Addressing Environmental concerns:** As per **NITI Aayog**, petrol blended with 20% ethanol would **reduce carbon monoxide emissions by 50%** in two-wheelers and **30%** in four-wheelers.

5) **Boosting the domestic agricultural industry:** Biofuel production can lead to investment and innovation in agricultural practices. This can help achieve the target of **'Doubling farmer's income'**.

6) **Job Creation:** It can generate about 18 million rural jobs (as per the **Asian Development Bank**).

However, the push for ethanol as a fuel in India is not without its challenges, particularly in the area of food security.

How can India's biofuel policies harm food security of India?

According to the **FAO**, **crop diversion to biofuels** and climate change are the most significant threats to long-term food security.

India's biofuel policies can impact food security in several ways:

1) **Diversion of Food Crops:** Most ethanol (for blending) in the country is produced using 1G as 2G remains commercially unviable in India. The diversion of food crops such as rice – to ethanol – will hamper India's nutritional security ambitions.
For instance, in 2022, close to 1 million metric tonnes of rice fit for human consumption from FCI's stocks was sold at subsidised prices to produce ethanol.

2) **Diversion of Agricultural Land:** It can lead to the conversion of agricultural land used for growing food crops to cultivating biofuel feedstocks like sugarcane, corn, or oilseeds. This reduces the land available for growing essential food crops, potentially decreasing overall food production.

3) **Adverse impact on small and marginal farmers:** Increased demand for biofuel crops might compete with food crops for resources such as water, fertilizers, and agricultural infrastructure. This competition can lead to price hikes for these resources, affecting small-scale farmers.

4) **Rise in Food Prices:** A decrease in land availability for growing food crops can lead to an increase in food prices (due to lesser production).
For instance, the Centre has capped the use of 'sugacane juice and sugar syrup' for ethanol production in the 2023-24 supply year due to concerns over sugar price rising.

5) **Disincentivises Crop Diversification:** Farmers may prefer to grow more sugarcane and rice due to price support schemes. This would push farmers away from crop diversification strategy of growing more pulses and oilseeds.

6) **Impact on Soil Health:** The practices of **monocropping** for biofuel feedstock crops (such as rice, sugarcane) will deplete the nutrients in the soil and make it infertile.

7) **Impact on Water Availability:** Incentives for ethanol blending might encourage increased sugarcane and rice cultivation — **water-gruzzling crops**.
Producing a kilogram of sugar requires 1,500-2,000 litres of water — making it an unsustainable option.

8) **Climate Change Induced Vulnerability:** Biofuel production might contribute to **monoculture farming**. This can increase vulnerability to climate change-related risks such as pests, diseases, and extreme weather events.

However, biofuel production may also have a positive impact on India's food security.

How can India's fuel policy enhance food security in the longer term?

1) **Raise Agricultural Income:** For instance, biodiesel could help raise farm income by providing an additional market for oilseed crops. Farmers can grow oilseed crops in rotation with food crops such as wheat.

2) **Nutritional Security:** Biofuel production can create new income streams, generate jobs and lead to infrastructural development in rural areas. The resultant improvement in socio-economic indicators can enhance nutrient absorption by individuals, promoting nutritional security.

3) **Increased Farm Productivity:** Investment in biofuel technology can stimulate R&D in the agricultural sector. This can lead to technological advancements and increased farm productivity.

4) **Raise Private Investment in Agriculture:** Assistance to farmers for growing biofuel feedstocks can also encourage private investment in the agriculture sector.

What should be the Way Forward?

1) **Investment in R&D:** Investment in R&D on **2G (Non-food sources)**, **3G (Non-food, non-plant sources such as algae) as well as 4G (Genetically engineered) Biofuels** could significantly enhance the future role of biofuels without compromising food security.

2) **Safety Nets:** Social security nets such as the National Food Security Act are needed to protect vulnerable people from high food prices and ensure access to adequate food.

3) **Focus on 2G sources such as molasses-based ethanol:** If cultivated on wastelands with judicious water usage, it would not have major adverse impacts on food security.

4) **Proper Land Use Management:** Land use mapping and allocation studies as well as provisions to make wasteland available for biodiesel production should be undertaken.

5) **Optimising Incentives:** It is necessary to design a combination of tax, subsidy, and regulatory measures to ensure that the incentives given to the biodiesel sector do not lead to expansion of biodiesel cultivation into arable lands.

6) **Exploring Alternatives:** To achieve the goal of energy security as well as emissions reduction, alternative mechanisms – EVs, other renewable sources (such as solar, wind), etc. – need to be explored.

India, like many countries, faces the challenge of balancing its energy needs with other priorities such as agriculture and food security. Policies aimed at sustainable energy advancement, optimizing resource use, and coordinated planning can reduce the conflict between clean energy objectives and food security priorities.

Read more– The Indian Express
UPSC Syllabus- GS 3-Food Security

Sustainable AI and India's Energy Future: The Role of Small Modular Nuclear Reactors (SMRs)

The global Artificial Intelligence (AI) revolution is not just a technological transformation — it is a **massive energy transition**. According to the **International Energy Agency (IEA)**, data centres already consume about **1.5% of global electricity (2024)**, are growing at 12% annually and this figure is expected to **double by 2030**, driven by the proliferation of **generative AI tools** like ChatGPT and Midjourney. While AI promises to increase productivity and economic growth, it also risks becoming an energy-intensive burden on national grids, raising serious sustainability concerns.
As the world grapples with the **climate crisis and net-zero commitments**, the integration of **nuclear energy**, particularly **Small Modular Reactors (SMRs)**, offers a cleaner, scalable, and reliable alternative to power the next generation of digital infrastructure.

Why AI Needs So Much Energy?

1. **High Computational Requirements**: AI models like **GPT-4** require massive computing during training and inference stages. Each training cycle can emit as much CO_2 as five cars running across their lifecycle. **Example:** MIT Technology Review estimates AI model lifecycle emissions rival some small nations' per capita CO_2.
2. **Continuous Power Use Post-Deployment**: Once deployed, AI models operate across global servers 24/7. Tools like ChatGPT or Midjourney continuously consume energy to serve millions of users daily**. Example:** Midjourney and DALL·E require high-resolution image synthesis, stressing data centres 24×7.
3. **Data Storage and Management**: AI relies on gigantic datasets stored in high-performance storage systems. These systems demand constant cooling and uninterrupted energy supply. Data centres need continuous cooling, consuming **additional 40-50%** of the total energy.
4. **Energy-Intensive GPUs**: AI depends on **power-hungry GPUs (Graphic Processing Units)**. **Example:** OpenAI's CEO tweeted **"our GPUs are melting,"** illustrating thermal and energy inefficiencies.
5. **Edge AI and Real-time Analytics**: As AI integrates with IoT and real-time applications, more decentralized processing (Edge AI) will further increase total power requirements. AI services demand **always-on global infrastructure**. **Example:** Amazon, Microsoft, and Google run **redundant global data hubs** powered by fossil-heavy grids.

What is an SMR and How It Can Support AI's Energy Needs?

Small Modular Reactors (SMRs) are compact, factory-fabricated nuclear reactors that generate **50-300 MW** of electricity. Their design enables scalability, faster deployment, and co-location with energy-intensive infrastructure like AI data centres.

1. **Economic Competitiveness:** As per NITI Aayog, SMR projected to lower electricity costs from ₹10.3 to ₹5/kWh in India post-deployment.
2. **24×7 Baseload Energy**: Unlike solar or wind, SMRs provide **continuous power**, ideal for AI uptime needs. **Example:** Google signed an agreement to power AI systems using nuclear energy (2023).
3. **Low Carbon Footprint**: SMRs offer **zero direct CO_2 emissions** during operation, supporting net-zero goals.

4. **Scalable and Modular**: Easy to expand as AI data demand grows. **Example:** U.S.-based NuScale Power's SMR design approved by NRC for modular construction.
5. **Space Efficient**: Require smaller land footprint compared to solar or wind farms per MW.
6. **Faster Deployment**: SMRs can be operational in **3–5 years**, compared to 10+ years for large nuclear plants.
7. **Enhanced Safety**: Passive safety systems reduce meltdown risks. **Example: Rolls Royce SMRs use natural convection for cooling.**
8. **On-site Integration**: Co-location with AI clusters reduces **transmission losses**. **Example: Microsoft to use SMR power at former Three Mile Island site.**
9. **Hydrogen and Heat Co-production**: SMRs can generate **industrial heat and hydrogen**, powering AI + green industries.
10. **Water Neutral Design:** Newer SMRs require **less or recycled water** for cooling—key in arid zones.
11. **Economic Viability**: Projected costs in India to fall to ₹5/kWh post-**operationalization (as per NITI Aayog projections).**

What is the Significance of SMRs Across Different Sectors?

1. **Climate Change Mitigation**: SMRs offer zero-carbon power, aligning with the IPCC and Paris Climate goals.
2. **Industrial Decarbonization**: SMRs can power steel, cement, and chemicals, where renewables struggle to provide steady baseload.
3. **Water Desalination**: Countries like UAE plan to use SMRs for producing clean drinking water.
4. **Space Exploration**: NASA is exploring SMRs for space colonies (**Project Kilopower**).
5. **Remote Power Supply**: Arctic and island communities' benefit from off-grid nuclear microreactors (e.g., Alaska).
6. **Hydrogen Production**: High-temperature SMRs are capable of producing clean hydrogen for fuel and industry.
7. **Disaster Resilience**: SMRs can supply power to critical infrastructure during emergencies (e.g., hospitals, telecom).
8. **Defense Sector**: Military bases could use SMRs for secure, self-sufficient power (used in U.S. naval submarines).
9. **Educational and Research Use**: Countries like Canada and the UK are investing in university-based SMRs for nuclear R&D.

What are the Various Indian & International Initiatives?

1. **IndiaAI Mission**: ₹10,300 crore mission to develop public compute for AI — needs sustainable power.
2. **NITI Aayog – SMR Roadmap (2022):** Identified SMRs as central to India's low-carbon strategy.
3. **BARC & NPCIL Research:** India's Bhabha Atomic Research Centre is working on 100 MW Indian-designed SMRs.
4. **International Atomic Energy Agency (IAEA) Collaboration**: India participates in SMR Safety Working Group for harmonized SMR regulations.
5. **India-U.S. Civil Nuclear Pact:** SMRs are being explored under technology cooperation mechanisms of the 2008 pact.
6. **Paris AI Action Summit**: India pledged to make AI development energy efficient and sustainable.
7. **Quad Clean Energy Program**: India, U.S., Japan, and Australia collaborate on SMR research and deployment.

8. **Act East & Arctic Engagement**: SMR as part of Arctic infrastructure diplomacy (Norway, Russia partnerships).
9. **India-France Nuclear Cooperation**: Potential synergy in deploying SMRs with AI-aligned renewable hubs.
10. **Public-Private Pilot Projects**: Talks are ongoing between Indian tech firms and nuclear energy startups. **E.g., NuScale Power, TerraPower.**

What are the Challenges?

1. **Policy and Regulatory Hurdles**: India lacks a comprehensive SMR-specific framework. Current laws like the Atomic Energy Act, 1962 need updating.
2. **Public Perception and Nuclear Anxiety**: Memories of Chernobyl and Fukushima remain strong. Even Microsoft's project at Three Mile Island faced scrutiny.
3. **High Upfront Investment**: Estimated costs for SMR units are ₹3,000-5,000 crore, which deters private sector investment.
4. **Long Approval Timelines**: Nuclear projects in India face delays from environmental and land acquisition bottlenecks.
5. **Skilled Workforce Gap**: India needs more nuclear engineers and AI-power integration specialists.
6. **Waste Management**: SMR waste, though smaller in volume, still lacks a tested, long-term solution in India.
7. **Security Concerns**: Smaller nuclear units are at higher risk of sabotage or theft if not well-guarded.
8. **Renewable Coordination**: Balancing SMRs with solar/wind in a hybrid grid requires smart policy integration.
9. **Land and Water Use**: Data centres consume massive land and water for cooling and operation. **Example:** Meta's new facility in Mesa, Arizona, will consume **1.5 billion liters of water annually**.
10. **Effluents and Electronic Waste**: AI hardware leads to toxic waste during chip and circuit board manufacturing.

What can be the Way Forward?

1. **Robust Nuclear Policy Update**: Amend Atomic Energy Act to allow private investment in SMRs with safeguards **(NITI Aayog 2021 draft suggested this).**
2. **Green Energy Mandates for AI**: Like privacy disclosures, energy audits should be mandated for AI firms (model: EU's Digital Services Act).
3. **Public Awareness Campaigns**: Use platforms like Vigyan Samagam (India's science expo) to demystify nuclear tech.
4. **Fast-track Pilot SMRs**: Launch pilot in Chennai AI cluster under PPP mode (model: Tamil Nadu's nuclear corridor).
5. **SMR-Renewable Hybrid Projects**: Pair SMRs with solar farms in regions like Rajasthan and Ladakh (high solar irradiance + remote locations).
6. **Global R&D Collaborations**: Partner with U.S. DoE, Canadian Nuclear Labs for tech transfer and safety training.
7. **Green Data Centre Policy**: Align with Energy Conservation (Amendment) Act, 2022 to certify green digital infrastructure.
8. **AI for SMR Grid Optimization**: Use AI itself to manage energy efficiency in SMRs and hybrid microgrids (as piloted in Finland and Japan).

Conclusion:

As Sam Altman aptly tweeted, "Our GPUs are melting." But what's also at stake is our climate future. Artificial

Intelligence promises to redefine productivity and knowledge, but it risks becoming a **carbon juggernaut** if powered by fossil fuels. SMRs offer a viable pathway to support AI's explosive growth without compromising climate commitments. For India, the convergence of **clean tech**, **AI leadership**, and **nuclear innovation** under Atmanirbhar Bharat could define a new global standard for **sustainable digital power** by 2047.

Question for Practice

Q. Examine the potential role of Small Modular Nuclear Reactors (SMNRs) in addressing the energy demands of Arctic development and the expansion of AI and data infrastructure. Discuss the benefits and challenges of deploying SMNRs, and evaluate their overall viability as a sustainable and environmentally sound energy solution in the Indian context.

Read More: The Hindu
UPSC Syllabus GS3: S&T – Developments & their applications & effects in everyday life

India-UK Free Trade Agreement 2025: A Strategic Leap in Bilateral and Global Trade Architecture

India and the United Kingdom, the **world's fifth and sixth largest economies** respectively, signed the **long-awaited Free Trade Agreement (FTA) on May 6, 2025,** after nearly three years of negotiation. This deal, hailed by Prime Minister Narendra Modi as an **"ambitious and mutually beneficial" agreement**, marks a historic milestone in India's trade diplomacy post-Brexit.

The FTA was initiated during former UK PM Boris Johnson's visit in April 2022, aiming for a "Diwali" deadline that year. Although delayed, the deal now signifies a bipartisan consensus in the UK and a continuity of economic vision across political transitions. **The agreement is expected to deepen bilateral trade, which stood at £42.6 billion in 2024, and unlock new opportunities for job creation, investment, and innovation.**

How the Evolution of the India–UK FTA takes place over the years?

- **Initial Political Will:** The idea gained traction during British PM Boris Johnson's visit to India in April 2022, where the "Diwali 2022" deadline was set.
- **Post-Brexit Dynamics:** UK's exit from the EU in January 2020 necessitated new trade partners; India offered a dynamic, growing market.
- **Multi-Governmental Support:** The FTA saw consistent support across UK administrations — from Boris Johnson to Rishi Sunak to Keir Starmer — indicating rare bipartisan continuity.
- **India's Global Engagement:** This deal follows India's FTAs with UAE, Australia, and Mauritius, reflecting a broader effort to become a "vibrant trade and commerce hub."
- **China-Plus-One Strategy:** Global firms and economies have increasingly diversified away from China, boosting India's strategic attractiveness.

What Has Been Agreed? – 7 Key Dimensions

1. **Tariff Reductions on Key Goods**: India agreed to halve tariffs on Scotch whisky and gin from 150% to 75%, and reduce them to 40% by the tenth year. Tariffs on British automobiles reduced from over 100% to 10% under a quota system.
2. **Broader Goods Access**: Lower tariffs for cosmetics, aerospace parts, medical devices, lamb, salmon, chocolate, soft drinks, and electrical machinery.
3. **Liberalisation of Services**: Increased mobility quotas: Around 100 new annual visas for Indian professionals in sectors like IT, healthcare, and engineering. Provision for mutual recognition of professional qualifications.
4. **Customs Cooperation and Regulatory Alignment**: Enhanced procedures to streamline customs and reduce non-tariff barriers, fostering smoother market access.
5. **Carbon Border Adjustments**: Delicate negotiations on the UK's carbon tax policies affecting Indian metal exports, with provisions to consider developing countries' concerns. An understanding on carbon taxation was reached to avoid penalizing Indian metal exports under the UK's carbon levy plan.
6. **Investment Facilitation and MSME Support**: Special provisions for promoting MSME engagement through reduced compliance costs and enhanced market access. Encouragement for cross-border investment, particularly in green and digital sectors.
7. **IPR and Digital Trade**: Provisions to safeguard intellectual property and enable data flows, essential for India's IT and pharmaceutical sectors.

What It Means for Both Nations?

1. **Post-Brexit Pivot**: The UK's largest and most economically significant deal since Brexit (2020), reflecting its shift towards Indo-Pacific markets.
2. **Geopolitical Signaling**: A subtle response to **"America First" tariff policies** and trade stagnation with China, enhancing India's role in global trade diversification.
3. **Boost to Domestic Industries**: Indian sectors such as pharmaceuticals, textiles, IT services, and auto components stand to gain from improved UK access.
4. **UK Economic Relief**: Amid its ongoing cost-of-living crisis, the UK benefits from more affordable imports and enhanced market competitiveness.
5. **Soft Power and Diaspora Diplomacy**: Enhanced mobility and recognition for Indian professionals improves soft power and diaspora engagement.
6. **Model for Future FTAs**: This FTA may serve as a template in India's negotiations with the US and the EU, especially in terms of services and regulatory standards.
7. **Global Trade Stability**: Reassures global investors and partners amid rising protectionism and volatile multilateralism.

What are the other Indian Initiatives, Collaborations & Global Trade Programmes?

1. **India-UK Joint Economic and Trade Committee (JETCO)**: Mechanism for periodic FTA review and coordination.
2. **Production Linked Incentive (PLI) Schemes** – To boost domestic manufacturing and exports.
3. **One District One Product (ODOP)** – Facilitating local products' access to global markets.
4. **India-UAE CEPA (2022)** – India's first major trade deal post-2010, providing duty-free access to 90% of Indian exports.
5. **India-Australia ECTA (2022)** – Focus on education, pharma, and agriculture exports.
6. **Digital India and Startup India Missions** – Empowering sectors that gain from FTAs.
7. **Supply Chain Resilience Initiative (SCRI)** – Collaboration with Japan and Australia to reduce dependence on China.

8. **India's G20 Presidency 2023** – Advocated "reformed multilateralism" and "inclusive globalization".

What are the Challenges in the India-UK FTA?

1. **Asymmetric Gains**: GTRI Report: Many Indian exports already enjoy zero/low tariffs in the UK; actual trade boost may be modest.
2. **Carbon Taxation Conflicts**: UK's carbon border tax may hit Indian metals, similar concerns exist in India-EU FTA.
3. **Immigration Politics in UK**: Brexit legacy restricts liberal migration policies; UK conceded only ~100 new visas/year. Visa quotas for Indian professionals were far fewer than originally demanded.
4. **Regulatory Compliance Costs**: Indian MSMEs may struggle to meet the UK's high technical and environmental standards. Compliance costs on Indian exporters increase due to lack of **mutual recognition agreements (MRAs).**
5. **Domestic Industry Resistance**: Concerns from India's auto and dairy sectors on tariff relaxations.
6. **Non-Tariff Barriers**: Stringent UK and EU regulations on food safety, environment, and IP can restrict Indian exports. Persistent issues like labelling requirements, phytosanitary measures, and intellectual property norms.
7. **Limited Stakeholder Consultations**: Criticism over lack of transparency and public scrutiny in FTA negotiations.
8. **Data Localization and Privacy Concerns**: UK and EU emphasize strong data protection frameworks; conflicts with India's draft Digital Personal Data Protection Act.

What can be the Way Forward?

1. **FTA as a Floor, Not Ceiling**: Use the India-UK FTA as a springboard for deeper integration in defence, education, climate cooperation. **NITI Aayog or an empowered committee** must monitor FTA implementation and sectoral impact.
2. **Diversify Trade Portfolio**: Focus on India-EU and India-US FTAs with renewed vigour. **MRA and SPS dialogue** must be expanded for mutual recognition in pharma, electronics, and agro-products.
3. **Sectoral Skill Development**: Equip Indian professionals with global competencies via initiatives like Skill India. Negotiate sector-specific visa quotas (e.g., digital nurses, fintech workers) in future updates.
4. **Streamline Compliance Support**: Provide technical and legal aid to MSMEs for meeting UK/EU standards.
5. **Green Trade Diplomacy**: Develop a strategy to navigate EU/UK climate-linked trade norms like CBAM (Carbon Border Adjustment Mechanism).
6. **Data and Digital Readiness**: Strengthen frameworks like the Digital Personal Data Protection Act 2023 to align with global standards.
7. **Public Engagement & Transparency**: Institutionalize stakeholder consultations for future trade negotiations. Improve India's certification and quality systems (BIS, FSSAI) to meet global benchmarks.
8. **Strengthen Dispute Resolution Mechanisms**: Build capacity in international trade arbitration and legal recourse. Include **anti-dumping, dispute resolution,** and review clauses to protect sensitive domestic sectors.

Conclusion:

The India-UK FTA 2025 is not just a bilateral trade pact — it is a strategic leap in India's vision of "Atmanirbhar Bharat" intertwined with globalization. It exemplifies India's shift from protectionism to proactive engagement, with the FTA serving as "the floor, not the ceiling." As India eyes deals with the EU and the US, the learnings from this pact will be instrumental in crafting a globally competitive, inclusive, and resilient trade regime.

Question for Practice

Q. Assess the potential benefits and key features of the UK-India Free Trade Agreement (FTA) in light of the claim that it prioritizes tariff elimination on many goods and service sector liberalization for mutual economic gain. Briefly mention important goods likely impacted by tariff changes and discuss the FTA's broader significance for UK-India economic and strategic ties.

Read More: The Indian Express
UPSC Syllabus GS-2: Bilateral relations

Human Development Report 2025 & India's Progress

Amid a disturbing rate of deceleration in global development and a growing divide between the rich and the poor, India has inched up on the Human Development Index.
In the backdrop of global developmental slowdown, India has marked a notable progress in the **2025 Human Development Report (HDR)** titled **"A Matter of Choice: People and Possibilities in the Age of AI",** published by the **United Nations Development Programme (UNDP)**. India climbed four ranks to **130 out of 193 countries**, with its **Human Development Index (HDI) value rising from 0.676 (2022) to 0.685 (2023)**, reflecting resilience in the aftermath of the pandemic. However, the progress is tempered by significant challenges such as **rising inequality**, **gender disparities**, and the **risk of technological divides in the AI era**.

What is the Human Development Index (HDI) and Human Development Report (HDR)?

The **HDI**, introduced in the **UNDP's 1990 Human Development Report**, is a composite index measuring average achievement in three key dimensions:

1. **Health** – measured by life expectancy at birth.
2. **Education** – measured by mean years of schooling and expected years of schooling.
3. **Standard of Living** – measured by Gross National Income (GNI) per capita (PPP $).

The HDI serves as a **multi-dimensional alternative to GDP**, emphasizing "human well-being" over mere economic output. The **HDR** is an annual flagship publication by **UNDP** that evaluates progress on HDI and related indices like the **Gender Inequality Index (GII) and Multidimensional Poverty Index (MPI).** It offers an analytical snapshot of development progress and inequality, and in 2025, focuses on the transformative power and risks of Artificial Intelligence (AI) in shaping human progress.

Changes in HDI values & indicators between 2022-23:

Key Data (Human Development Index)	2022	2023
Rank	133	130
HDI value	0.676	0.685
Life Expectancy (years)	71.70	72.00
Expected Years of Schooling (years)	12.96	12.95
Mean Years of Schooling (years)	6.57	6.88
Gross National Income Per Capita (S 2021 PPP)	8475.68	9046.76

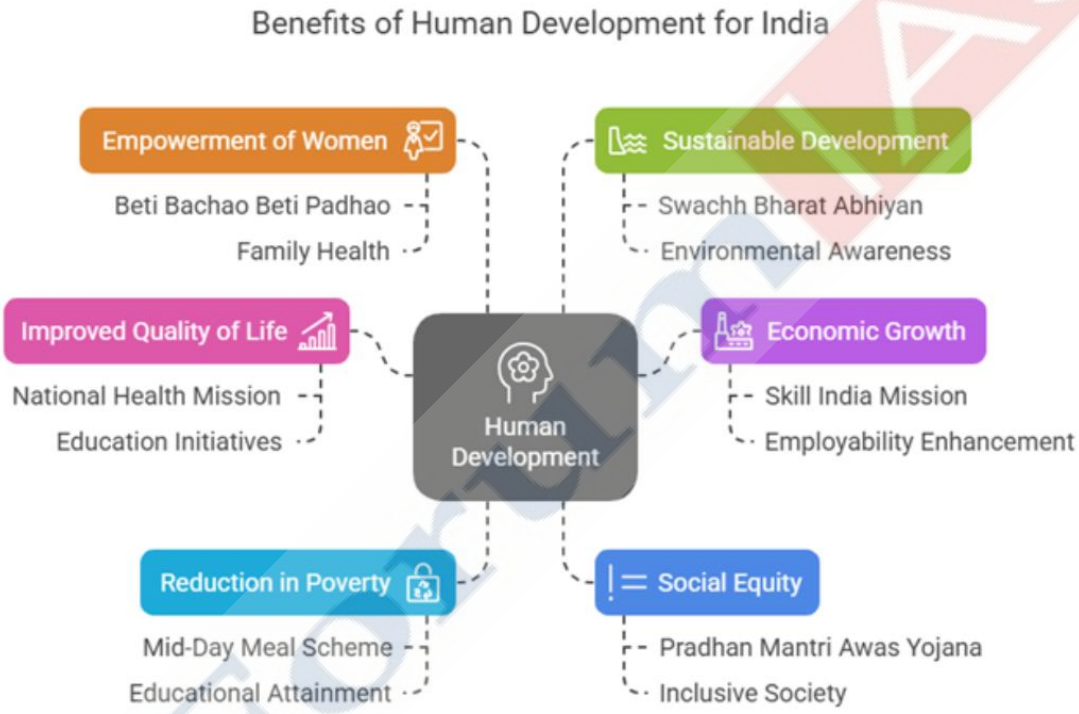
What are the Key Findings of the 2025 HDR?

1. **India's Rank and HDI Value Improves:** India's HDI rank improved from **133 (2022)** to **130 (2023)** out of 193 countries. HDI value increased from **0.676 to 0.685**, nearing the **High Human Development threshold (0.700)**.
2. **Life Expectancy at Record High:** Life expectancy rose to **72 years** in 2023, up from **67.7 years in 2022**. This is India's highest life expectancy since HDI began in 1990 (then: 58.6 years).
3. **Education Progress: Expected years of schooling**: increased to **13 years** (from 12.6). **Mean years of schooling**: rose to **6.9 years** (from 6.57). Reflects impact of **RTE Act**, **NEP 2020**, and **Samagra Shiksha Abhiyan**.
4. **Income Growth: GNI per capita** rose to **$9,046 (PPP, 2021)** from $6,951. Since 1990, income has increased more than fourfold ($2,167 → $9,046).
5. **Multidimensional Poverty Reduction: 135 million Indians escaped multidimensional poverty** between **2015-16 and 2019-21** (NITI Aayog MPI data).
6. **Gender Inequality:** Gender Development Index (GDI): **0.874** (female HDI = 0.631, male = 0.722). India ranks **102nd on Gender Inequality Index (GII)** with a score of **0.403**.
7. **AI and Development:** India retains **20% of AI researchers** (up from nearly 0% in 2019). Highest **self-reported AI skill prevalence** globally.
8. **Inequality-Adjusted HDI (IHDI):** India's HDI falls to **0.475** when adjusted for inequality – a **30.7% drop**, one of the **highest regional losses**.

What Does the 2025 HDR Highlighting About India's Growth and Development?

1. **Health Improvements:** Initiatives like **Ayushman Bharat**, **NRHM**, **JSY**, and **POSHAN Abhiyaan** have expanded access and outcomes.
2. **Social Sector Investments:** Health missions like **Ayushman Bharat**, **Poshan Abhiyaan**, and **Janani Suraksha Yojana** improved health outcomes.
3. **Educational Access**: RTE Act and NEP 2020 have improved school access; average expected schooling up to 13 years.
4. **Economic Resilience**: GNI per capita quadrupled since 1990; economic recovery post-COVID aided by schemes like Jan Dhan Yojana and MGNREGA.
5. **Poverty Reduction**: "135 million exited multidimensional poverty" — UNDP.

6. **AI as a Growth Multiplier:** AI tools being used for **crop advisories**, **insurance access**, and **local-language governance services**.
7. **Digital Inclusion**: India leads in self-reported AI skills; "AI used in farmer insurance and advisory services in regional languages."
8. **Youth-Centric Development:** With the **average age of India at 28**, harnessing AI and education can unlock a demographic dividend.
9. **Digital Infrastructure and Inclusion:** National plans for **AI compute facilities** and **digital public goods** are enabling digital equity.
10. **Human Capital Upgradation:** Skill development in emerging technologies is being prioritized across states like **Tamil Nadu and Telangana** (in collaboration with UNDP).



What is the Significance of HDI for India?

1. **Benchmarking Progress:** HDI provides a multidimensional lens beyond GDP – essential for India's **$5 trillion economy** vision.
2. **Tracking Progress Towards SDGs**: HDI aligns with Sustainable Development Goals. HDI overlaps with **SDGs (Goal 1, 3, 4, 5, 10)** – pivotal for achieving **Agenda 2030**.
3. **Policy Targeting:** Use of Multidimensional Poverty Index (MPI) aligns with HDI insights for focused anti-poverty interventions. It identifies **sectoral inequalities** (e.g., education vs. income) to design **evidence-based policies**.
4. **Poverty Reduction Monitoring:** Tracks India's **multidimensional poverty** dynamics, aiding **MPI-linked schemes**.
5. **Gender Equity Agenda:** Supports tracking gendered development outcomes under **Women-Led Development**, a **G20 India Presidency theme**.

6. **Human Capital Strategy:** Facilitates tracking of **labour force quality**, education, health – key to **productivity and innovation**.
7. **Federal-State Development Competition:** Promotes **state-wise HDI ranking** (NITI Aayog's Human Development Dashboard), encouraging cooperative federalism.
8. **International Image Building:** HDI performance impacts India's **global investment climate**, **creditworthiness**, and **soft power**.
9. **AI as a Development Lever:** Highlights the critical role of **AI in achieving inclusive growth**, a new frontier for HDI discourse. As AI reshapes sectors, HDI-adjusted indicators ensure technology is harnessed inclusively.
10. **Inequality Correction Framework:** Aids in policy discussions around **wealth redistribution, taxation reforms**, and **social safety nets**.

What are the Major Indian Initiatives to Achieve the Human Development?

1. **Ayushman Bharat & Poshan Abhiyaan:** Key in improving life expectancy and health outcomes.
2. **NEP 2020 & RTE Act:** Focused on universal and inclusive education.
3. **MGNREGA & Jan Dhan Yojana:** Enabled livelihood security and financial access for the poor. Joint efforts on AI deployment for governance and development, e.g., AI for skill development in Tamil Nadu and Telangana.
4. **AI Collaborations:** UNDP is working with Indian states on **inclusive AI skill programmes**.
5. **India-AI Mission:** A forthcoming initiative to democratize AI via shared compute infrastructure.
6. **Digital Public Infrastructure (DPI):** Initiatives like **Aadhaar, UPI, DigiLocker** are being scaled globally.
7. **SDG India Index by NITI Aayog:** Tracks progress across HDI-linked SDGs, promoting **state-level accountability**.
8. **AI for Good Initiatives**: India's proposed National Compute Facility to democratize AI research; aligned with Global Partnership on Artificial Intelligence (GPAI).

What are the Challenges to Human Development in India?

1. **High Inequality Impact:** HDI loss of **30.7% due to inequality** is among the highest in South Asia.
2. **Gender Disparity Remains a Concern:** Despite rising **FLFPR to 41.7% (2023-24, Economic Survey),** women score lower on HDI components; no timeline for women's legislative reservation implementation. India ranks 102nd on GII; political reservation for women remains **unimplemented**.
3. **Education Quality Concerns: ASER reports** highlight poor learning outcomes despite high enrolments.
4. **Jobless Growth & Informality:** Rising GDP not translating into formal job creation – **90% workforce in informal sector** (PLFS).
5. **Urban-Rural Divide:** Basic services like health, education still lag in rural areas.
6. **Digital Divide:** Unequal access to digital tools may worsen AI-driven development inequality.
7. **Health Infrastructure Gaps:** Doctor-population ratio still below WHO norms; stark inter-state disparities.
8. **Stagnant HDI Progress Pace:** Global and Indian HDI progress **slowest since 1990**, risking SDG 2030 delays.
9. **Global Comparison**: India lags BRICS peers—Brazil (89), China (75), Russia (59)—suggesting the need for sustained human capital investment.

What can be the Way Forward?

1. **Implement Women's Reservation Act Promptly:** A game-changer for political inclusion.
2. **Universalize Quality Education:** Implement NEP 2020 goals with a focus on **learning outcomes**, not just enrolment.
3. **Expand Social Security Net:** Formalize informal jobs through **ESIC/EPFO access and gig worker welfare**.
4. **Invest in AI for Public Good:** Scale up AI for governance, agriculture, and health with open-source, multilingual tools.
5. **Bridge the Digital Divide:** Expand **PM-WANI**, **BharatNet** to enhance digital infrastructure in remote areas.
6. **State-Level HDI Targets:** Encourage state competitiveness on HDI parameters via **rankings, grants, and incentives**.
7. **Boost Fiscal Allocation for Social Sector:** Increase public spending on **health (currently ~2.1% of GDP)** and **education (~2.9%)**, below global averages.
8. **Strengthen Data Systems:** Robust district-level HDI tracking is needed using **real-time dashboards, AI-powered analytics**.

Conclusion:

India's performance in the 2025 HDR reflects both **commendable progress and enduring structural challenges**. As Achim Steiner of UNDP aptly noted, **"AI is no panacea, but the choices we make can reignite human development."** For India@2047, human development must be central to its growth story—leveraging technology, deepening inclusion, and investing in its people. As global HDI progress decelerates, India must stay the course with "purpose-driven policies," "inclusive governance," and "AI for good" strategies. It is not just about **moving up the HDI ranks**, but ensuring that development is **sustainable, equitable, and empowering for all**.

Read More: The Hindu
UPSC Syllabus GS 2: Issues related to development & management of social sectors

India's Air Defence Systems: Shielding the Skies and Enabling Strategic Superiority

In modern warfare, **air superiority** is critical for operational dominance. The recent **Indian-Pakistani aerial exchanges** along the western border underscore the importance of a robust **Air Defence (AD) system**. India's thwarting of Pakistani attacks and its neutralization of enemy AD systems—especially around **Lahore**—illustrate how advanced, multi-layered air defence capabilities are key to national security. These events spotlight the **strategic relevance** of air defence systems as **both defensive and offensive tools in securing airspace and asserting military superiority.** Modern air combat is no longer just about **fighter jets; it is an integrated ecosystem** where ***detection, tracking, and interception*** **work in unison.** Effective air defence systems are indispensable in contemporary warfare, offering a **credible deterrent against enemy aircraft, missiles, and drones, and forming the backbone of national security architecture.**

What are Air Defence Systems?

Air defence systems are **multi-layered and multi-domain military framework** designed to **detect, track, and intercept aerial threats**, such as enemy aircraft, UAV's/drones, and ballistic missiles. Their goal is to **deny adversaries access to friendly airspace** while enabling **safe operations for own forces**. They combine **radar, control centres, interceptor aircraft, surface-to-air missiles (SAMs), anti-aircraft artillery (AAA), and electronic warfare (EW)** systems. These systems rely on the "**C3 model**":

- **Command** – decision-making structures.
- **Control** – operations and resource allocation.
- **Communication** – coordination between subsystems.

How Air Defence Systems Work: The Three-Tier Operational Framework?

1. **Detection: The Radar systems** emit electromagnetic waves to identify objects. Capable of identifying **type, location, speed**, and **altitude** of threats. **Satellites** assist in detecting high-altitude threats like ICBMs. **Example: India's Rohini and Arudhra radars, DRDO-developed, are vital components.**
2. **Tracking:** Tracks multiple threats in real time using **radar, IR sensors, and laser rangefinders**. It can easily differentiate between hostile, friendly, and civilian aircraft. Tracking accuracy is crucial to avoid false positives and collateral damage. It enables prioritization of targets in **multi-threat scenarios**, while avoiding friendly fire.
3. **Interception:** Neutralizes the threat using **fighter aircraft, surface-to-air missiles (SAMs), anti-aircraft artillery (AAA), or electronic warfare (EW)**. Requires **split-second decision-making** and seamless C3 integration. Choice of interception method depends on, threat range, altitude, speed and trajectory. Requires seamless coordination across sensors and shooters through C3 systems.

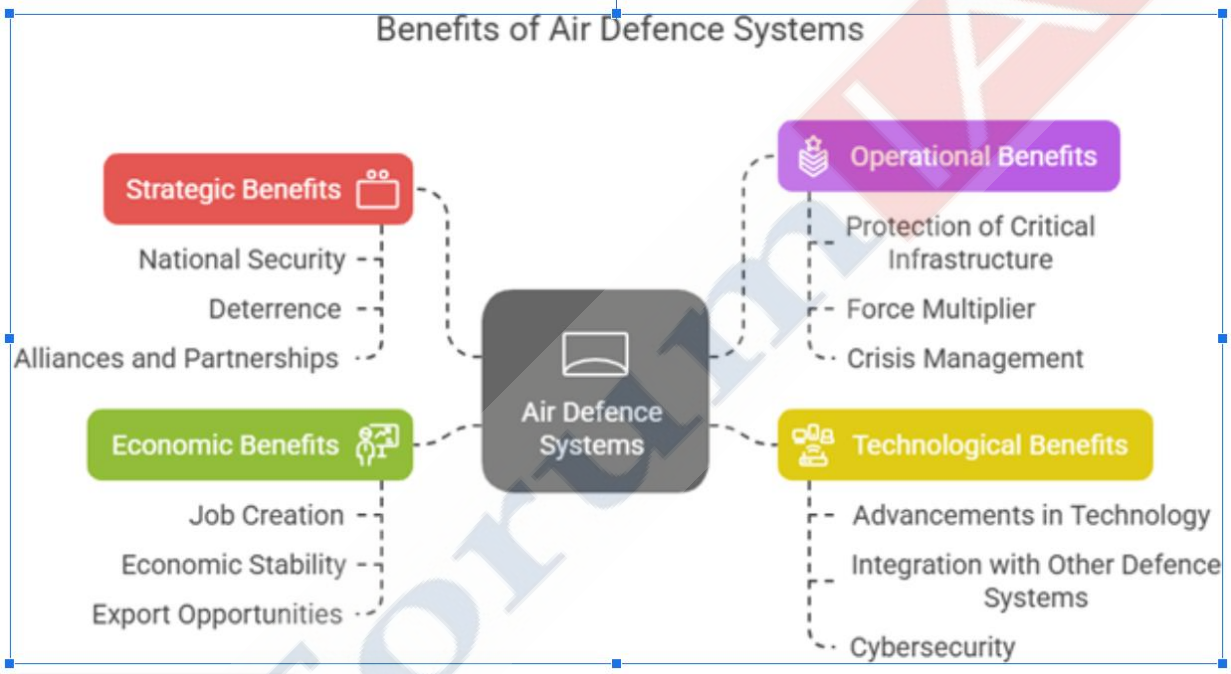
What are the Weapons Used in Air Defence Systems?

1. **Interceptor Fighter Aircraft:** Rapid-response jets equipped with **air-to-air missiles** and EW systems. India employs **MiG-21 Bison, Rafale, Su-30MKI, MiG-29**, and **Tejas Mk-1** in interception roles. Interceptors are ideal for engaging **high-speed or evasive targets**.
2. **Surface-to-Air Missiles (SAMs):** The **backbone of air defence** due to range, accuracy, and lower risk. India operates a mix of:
    - **Long-range SAMs** (e.g., S-400): Counter aircraft/missiles hundreds of km away.
    - **Medium-range** (e.g., Akash, Barak): Mobile, launch-on-move.
    - **Short-range MANPADS**: Hand-held, used against helicopters, drones.
3. **Anti-Aircraft Artillery (AAA):** Legacy systems, still used in **low-altitude or last-ditch defence**. Fire explosive shells at high rates (~1,000 rounds/min). Often integrated with **automated fire-control systems**. India uses **L-70 and ZU-23-2** systems. Effective against **slow or low-flying threats** like UAVs.
4. **Electronic Warfare (EW):** Non-kinetic means to **jam, deceive, or disrupt** enemy targeting. India employs EW from both **ground stations** and **airborne platforms** (e.g., **Netra AEW&CS**). Critical in blinding enemy radar and preventing missile guidance.

What is India's Multi-Layered Air Defence Structure?

Layer	Key Systems	Role
Long-range	**S-400 Triumf**	Neutralizes enemy aircraft/missiles up to 400 km
Medium-range	**Akash, Barak 8**	Protects strategic assets, mobile field units

Short-range	**MANPADS, SPYDER**	Protects forward bases, vulnerable areas
EW Systems	**DRDO's Samyukta, Himshakti**	Jamming and deception
Interceptors	**Rafale, Su-30MKI, MiG-29, Tejas**	Rapid threat response
C3I	**Integrated Air Command and Control System (IACCS)**	Networked radar, sensors, communication



What is the Significance for India's National Security and Strategic Posture?

1. **Suppression of Enemy Air Defenses (SEAD) and Enabling Air Superiority:** India's recent strike on Pakistani air defence systems near Lahore highlights the use of SEAD operations to proactively neutralize **enemy radars and surface-to-air missile (SAM) sites**. By employing **electronic warfare (EW), precision-guided missiles, and drone swarms, SEAD ensures** India can dominate contested airspace with minimal attrition. This **offensive capability enables safe execution** of deeper aerial operations, such as reconnaissance and **tactical air support, especially in high-threat environments.**
2. **Denial of Enemy Air Dominance:** India's air defence system acts as a protective barrier that deters and intercepts **enemy aircraft and missiles**, thereby denying adversaries any chance of achieving air superiority. During the latest **Indo-Pak tensions, India effectively prevented Pakistani fighter jets** from inflicting damage on critical infrastructure. By ensuring control over its airspace, India can protect its military operations and deter further escalations, reinforcing strategic stability.
3. **Surveillance, Deterrence, and Pre-emption:** Effective air defence enables India to control and monitor its airspace, **preventing hostile aerial reconnaissance, drone incursions, and missile**

attacks. In crisis situations like the **2020 LAC standoff with China, enhanced radar coverage and quick-deploy AD systems** helped enforce deterrence. Airspace control strengthens national security by ensuring readiness and responsiveness, and by complicating adversarial planning through constant surveillance.

4. **Strategic Autonomy and Deterrence Posture:** Air defence systems are essential to protecting strategic assets such as **nuclear facilities, command centres, and major cities**, thereby strengthening India's deterrence posture. The deployment of **S-400 systems to shield high-value targets,** such as Delhi and key military installations, raises the cost of any enemy attack. This protection underpins India's second-strike capability, enhances its **No First Use (NFU) doctrine, and upholds strategic autonomy** in decision-making during conflicts.
5. **War Preparedness Against a Two-Front Threat:** Given India's unique vulnerability to a two-front war involving China and Pakistan, a robust air defence infrastructure is vital to national preparedness. Systems like the **Integrated Air Command and Control System (IACCS), Akash, and QRSAM e**nsure India can simultaneously defend multiple theatres. The ability to quickly respond to aerial threats across frontlines **in Ladakh, the Northeast, and the Western border** supports integrated warfighting strategies and joint force operations.
6. **Civilian and Infrastructure Protection During Escalation:** Air defence systems play a crucial humanitarian and strategic role in protecting civilian populations, critical infrastructure, and urban centres during conflict. This is particularly significant **under India's NFU nuclear doctrine, where survival of cities and command centres is essential to second-strike credibility**. Deployments near **Mumbai, Delhi, and other metros—**using systems like **Akash, MANPADS, and EW suites—** ensure that population centres are shielded from enemy air raids and missile attacks.

What are the Challenges in India's Air Defence Framework?

1. **Obsolescence of Legacy Platforms:** India continues to rely on outdated systems such as **MiG-21 interceptors** and older radar technologies. Traditional radar systems also struggle to detect **UAV swarms** or low-observable threats, creating serious vulnerabilities in India's airspace defence. Example, MiG-21s, inducted in the 1960s, have had a high accident rate and are ill-equipped to respond to modern, high-speed threats like stealth drones or cruise missiles.
2. **High Resource and Logistical Requirements:** Establishing a **layered, all-weather, full-spectrum air defence** is capital-intensive and operationally complex. Balancing between high-end deterrents and cost-effective, mobile, indigenous systems is crucial but unresolved. **Example**: The procurement of **5 S-400 Triumf units from Russia cost approx. ₹35,000 crore**, highlighting the financial burden. The operational deployment and maintenance over vast borders further stretch logistical capacity.
3. **Coordination and Command Gaps:** India's three services operate independent air defence systems, resulting in **siloed operations and delayed response**. The push for **Integrated Theatre Commands** and a **Joint Air Defence Command** is ongoing but yet to be fully implemented. **Example**: The lack of real-time coordination between the **Army and Air Force** can lead to response delays in scenarios like drone intrusions.
4. **Vulnerability to Electronic and Cyber Warfare:** Increasing reliance on digital communication makes systems vulnerable to **cyberattacks, GPS jamming, and radar spoofing**. Hardened cyber-defence protocols and quantum-secure communication channels are required for future readiness. **Example**: **Modern stealth drones and cyber tools** can bypass conventional radar by using low-signature technologies or disabling systems via malware.
5. **Technological Lag in Emerging Threats:** India lags in countering **hypersonic missiles, loitering munitions, and ultra-short-range attacks**. India's indigenous R&D must accelerate in niche domains like directed-energy weapons and AI-based real-time threat analysis. **Example**: **China has tested**

hypersonic glide vehicles and AI-integrated radar, giving it a technological edge in early warning and interception.

6. **Inadequate Low-Altitude and UAV Coverage:** Many radar systems are not optimized for **low-flying objects**, particularly mini and micro drones. Incorporation of **counter-UAV systems, passive radars, and acoustic sensors** needs prioritization. **Example**: The **2021 drone attack on Jammu Air Force Station** went undetected, demonstrating major operational gaps in **low-altitude threat detection**.
7. **Delays in Indigenous Capability Development:** India's defence R&D ecosystem faces delays and reliability issues in key indigenous projects. This prolongs dependence on costly imports and hampers long-term self-reliance under **Atmanirbhar Bharat**. **Example**: Systems like **Akash-NG, XRSAM, and QRSAM** are still under testing and have not yet achieved full operational capability.
8. **Terrain and Border Deployment Challenges**: India's varied terrain — from high-altitude Ladakh to coastal zones — complicates **uniform air defence deployment**. Terrain-agnostic systems like **balloon-mounted radars** or **satellite-aided early warning** must be integrated. **Example**: In **mountainous terrain**, radar coverage is patchy due to line-of-sight limitations, and missile performance is affected by altitude and temperature.

What can be the Way Forward?

1. **Accelerate Indigenous Development:** Support DRDO and private firms to develop advanced radars and SAMs like Akash-NG, QRSAM, and XRSAM.
   Example: *India's **Akash missile system**, now being exported to Vietnam and the Philippines, shows potential for self-reliance. South Korea's **Cheongung-II** medium-range SAM is an indigenous success adapted from global tech.*
2. **Integrate AI and Machine Learning:** Adopt AI/ML for radar recognition, threat prioritization, and electronic warfare automation.
   Example: DRDO's **Air Defence Fire Control Radar (ADFCR)** already integrates basic AI features. The **US NORAD** and **NATO's Integrated Air & Missile Defence (IAMD)** increasingly use AI for target classification and coordination.
3. **Develop Directed Energy Weapons (DEWs):** Invest in laser and microwave-based weapons to counter drones and low-flying projectiles.
   Example: *DRDO's **ADITYA laser system** is under development for UAV defence. The **US Army's HEL-MD** and Israel's **Iron Beam** use laser tech for neutralizing aerial threats.*
4. **Strengthen SEAD Capabilities:** Enhance Suppression of Enemy Air Defenses via stealth UAVs, anti-radiation missiles, and cruise strikes.
   Example: *India's **Rudram-1** anti-radiation missile is tailored for SEAD roles. The **US AGM-88 HARM** missile was widely used in Iraq and Yugoslavia to suppress hostile radars.*
5. **Enhance IACCS (Integrated Air Command & Control System):** Ensure real-time tri-service integration for dynamic and rapid air threat responses.
   Example: *India's **IACCS** network is operational and should be expanded to cover civilian radar inputs. **NATO's ACCS** enables member nations to operate air defenses cohesively across borders.*
6. **Deploy Layered Urban Shields:** Create multi-tier defence grids over strategic cities using S-400, Akash-NG, and VSHORADS.
   ***Example: Delhi and Mumbai** are to be protected under the S-400 coverage deployed in the western sector. Israel's **Iron Dome (short-range) + David's Sling (mid-range) + Arrow (long-range)** model offers a benchmark in layered protection.*
7. **Foster International Defence Cooperation:** Deepen collaborations with Israel, US, and Quad countries for tech transfer and joint development.

Example: India-Israel Barak-8 *missile system is a successful co-development.* ***AUKUS and QUAD*** *platforms share AI-based surveillance and missile defence advancements.*

Conclusion:
India's successful neutralization of Pakistani air attacks underscores the vital role of air defence in 21st-century warfare. **Detection, tracking, and interception capabilities**—integrated through superior C3 systems—form the bedrock of India's strategic deterrence. As **threats evolve into AI-empowered, drone-based warfare**, India's air defence posture must remain dynamic, indigenous, and tech-driven to ensure **security, sovereignty, and strategic superiority**.

Read More: The Hindu
UPSC Syllabus GS 3: Internal Security

It's time India frame a National Security Doctrine

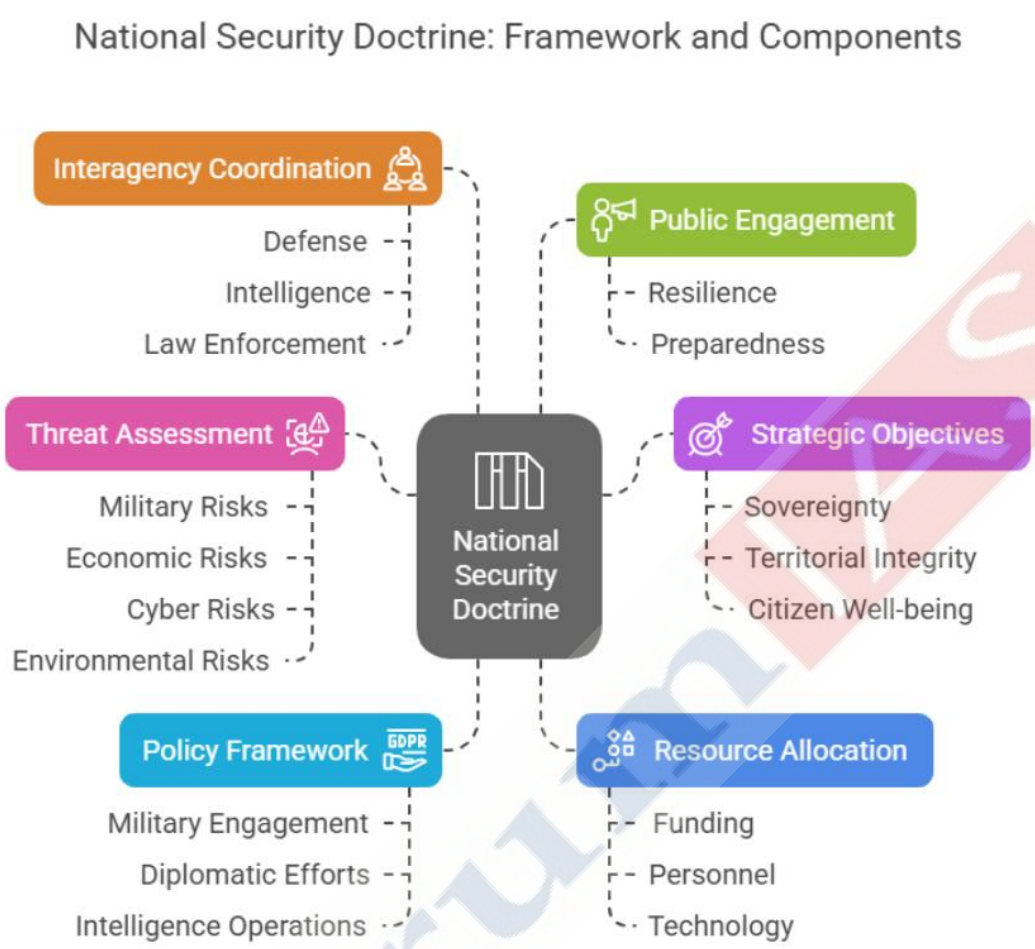
In an era marked by multidimensional threats ranging from state-sponsored terrorism to cyber warfare, and from border incursions to grey-zone tactics, the need for a coherent and codified **National Security Doctrine (NSD)** has never been more urgent for India. Despite being a nuclear power and having one of the world's largest militaries, India lacks a formal national security doctrine. As **K. Subrahmanyam**, the architect of India's nuclear doctrine, had once asserted**, "No nation can pursue effective security policy without doctrinal clarity."**
India, situated between two nuclear-armed adversaries—China and Pakistan—faces continuous threats. The **Kargil War (1999)**, **Uri Attack (2016)**, **Pulwama-Balakot Crisis (2019)**, and the **Galwan Valley clash (2020)** highlight the recurring security threats. While India's response has been measured and increasingly assertive, the absence of a formally articulated doctrine limits strategic foresight and long-term planning.

What is a National Security Doctrine?

A National Security Doctrine is a comprehensive framework of **guiding principles**, strategic beliefs, and operational postures that shape a nation's military, diplomatic, and internal security responses. It goes beyond reactive tactics, providing **predictability, strategic clarity**, and **inter-agency coordination**. It serves as:

- **A blueprint for defense and foreign policy.**
- **A guide to modern warfare readiness.**
- **A communication tool for deterrence.**
- **A confidence-building measure for both citizens and allies.**

India's only formal doctrinal articulation is the **2003 Nuclear Doctrine**, which emphasizes **"credible minimum deterrence"** and a **"No First Use"** policy. However, in the absence of a broader doctrine, India's responses to terrorism, cyber threats, or asymmetric warfare lack cohesive strategy.



Why Does India Require a Formal National Security Doctrine?

1. **Complex Geopolitical Neighborhood**: India is flanked by two nuclear-armed adversaries—China and Pakistan—with a history of war and incursions. As **per Kautilya's *Mandala Theory*, "the immediate neighbor will be your enemy." Doklam (2017) and Galwan (2020)** underscore the volatility of India's borders.
2. **Reactive vs. Proactive Posture:** Most Indian responses have been post-incident. A doctrine would help in shifting from **reactionary to preventive security**, as in the case of China's preemptive planning under the doctrine of "Active Defence".
3. **Inadequate Civil-Military Integration:** India lacks a unified command structure. While **Integrated Theatre Commands** are being developed, a doctrine would guide **civil-military synergy**, as seen in the U.S. with its **National Security Strategy (NSS)**.
4. **Institutional Coordination**: Multiple agencies **(defense, home, intelligence, MEA)** operate in silos. A doctrine provides the **Command, Control and Communication (C3) structure** vital for **"inter-agency coordination".**
5. **Ambiguity in Nuclear Posture:** Although the 2003 nuclear doctrine exists, ambiguity persists. Manohar Parrikar's 2016 remarks questioning **'No First Use'** led to controversy. A revised doctrine would clarify India's nuclear red lines and strengthen deterrence.

6. **Asymmetry in Strategic Signaling:** China's actions are informed by a **Sun Tzu-inspired doctrine**—"**subdue the enemy without fighting**." India lacks equivalent psychological and strategic messaging, which hampers geopolitical signaling.
7. **Terrorism and Unconventional Warfare:** Despite Balakot and surgical strikes, cross-border terror persists. India needs a doctrine that allows **proportionate and preemptive retaliation**, in line with the concept of **"massive but non-escalatory response."**
8. **Lack of Comprehensive Internal Security Vision:** Issues like Left-wing extremism, communal violence, and insurgencies are addressed ad hoc. A doctrine could integrate these concerns under **comprehensive internal security architecture**.
9. **Alignment of Foreign and Defence Policy:** Diplomacy and defence often operate in silos. A doctrine could ensure **foreign policy synergy**, akin to the **Nixon-Kissinger model**, where diplomacy was guided by a realist security doctrine.
10. **Persistent Multidimensional Threats:** India faces hybrid threats from China and Pakistan, including **cross-border terrorism**, **cyber-attacks**, **information warfare**, and **territorial aggression** (e.g., China's salami-slicing tactics in Ladakh). A doctrine provides **pre-emptive clarity.**

What is the Significance and Potential Impact of a National Security Doctrine?

1. **Strategic Clarity:** A doctrine institutionalizes India's long-term national security vision, enabling **structured threat assessment and resource allocation**.
2. **Inter-agency Coordination:** By delineating responsibilities, it fosters synergy between the **armed forces, Air Force, Strategic Forces Command, and space/cyber domains intelligence, home ministry, MEA, and scientific establishments** like DRDO.
3. **Strengthens Deterrence and Diplomatic Leverage**: It sends a **clear message** to adversaries regarding red lines and probable response thresholds—enhancing deterrence, especially in nuclear posturing. Helps create red lines. **For example, the U.S. "Pivot to Asia" doctrine gave coherence to its Indo-Pacific strategy, influencing allies like Japan and Australia.**
4. **Boosts Defence Reforms:** It helps prioritize reforms in line with strategic objectives—e.g., pushing **theatre commands, indigenization via Atmanirbhar Bharat**, and cyber defence.
5. **Improved Defence Budgeting:** The doctrine helps align defence allocations (~₹6.2 lakh crore in Union Budget 2024-25) with strategic priorities—e.g., cybersecurity, drone warfare, mountain warfare readiness.
6. **Counter-Terrorism Coherence:** A doctrine can embed **principles for counter-insurgency (COIN), intelligence-led policing, and technology deployment** in areas like J&K and the Northeast.
7. **Predictable Global Partnerships:** It enables partners like the **U.S., France, Japan, Australia** to understand India's strategic thinking—bolstering frameworks like **QUAD** and **IAF joint exercises**.
8. **Better Crisis Management:** Codified escalation ladders and decision matrices enhance India's ability to respond swiftly in crises—e.g., post-26/11 confusion could have been averted.
9. **Informed Public Debate:** A published doctrine strengthens democratic accountability and **informed citizenry**, countering misinformation and war hysteria.
10. **Security Beyond Borders:** It allows strategic outreach through **defence diplomacy**, maritime domain awareness (e.g., SAGAR policy), and regional leadership.

Indian Initiatives and Global Collaborations:

1. **2003 Nuclear Doctrine** – The only formal doctrine, emphasizing NFU and massive retaliation.
2. **Defence Planning Committee (DPC)** – Set up in 2018 to draft national security strategy.
3. **Theatre Command Model** – India is transitioning to integrated theatre commands, aligning with doctrinal frameworks.

4. **National Cyber Security Strategy (NCSS)** – Drafted but pending clearance; would fit within an NSD.
5. **QUAD Cooperation** – Enhances Indo-Pacific security matrix; doctrinal clarity will improve engagement.
6. **India-France Roadmap on Defence** – Includes joint doctrine planning, naval cooperation.
7. **U.S. Basic Exchange and Cooperation Agreement (BECA)** – Real-time geospatial intel sharing for targeted operations.
8. **Strategic Partnerships in Indo-Pacific**: QUAD, I2U2, Indo-Pacific Oceans Initiative (IPOI) signal intent to build strategic depth.

Challenges in Framing a National Security Doctrine:

1. **Political Reluctance and Lack of Consensus:** Doctrinal clarity may bind political options or be misread as aggression. Inter-ministerial coordination is weak; lack of **NSC (National Security Council) empowerment.**
2. **Civil-Military Divide**: Unlike the U.S. or Israel, India has historically maintained a separation between political and military decision-making.
3. **Siloed Institutions**: Ministries, armed forces, and intelligence often operate without unified planning.
4. **Doctrinal Rigidity vs Flexibility**: Balancing permanence of core principles with changing tactical needs is difficult.
5. **Technological Lag and Dependence:** Rapid tech advancements (AI, drones, hypersonic) make doctrines quickly outdated. Overdependence on imports for key defense technologies **(e.g., jet engines, high-end semiconductors)** undermines doctrinal self-sufficiency.
6. **Absence of a National Security Strategy Document**: India has no declassified strategy akin to the **U.S. National Security Strategy (updated every 4 years)**.
7. **Hybrid and Gray-Zone Warfare**: Blurred lines between war and peace (e.g., standoff without shots at LAC) challenge doctrinal responses.
8. **Lack of Strategic Culture** – As observed by **George Tanham (RAND),** India lacks long-term strategic thinking.

Way Forward:

1. **Institutionalize a Periodic National Security Strategy (NSS):** A periodic National Security Strategy (NSS) ensures a **regular assessment of threats**, evolving strategic priorities, and coordinated responses. Such a document provides **strategic continuity**, even amid changing governments, and strengthens **civil-military coherence**. **Example:** The **Kargil Review Committee Report (1999)** recommended such a strategy for India. However, India has yet to adopt a formal, institutionalized periodic NSS.
2. **Adopt a Tiered Doctrine Model:** A tiered model enables the development of sub-doctrines under a unified framework — covering **military defense**, **internal security**, **cybersecurity**, **intelligence**, and **diplomacy**. This structure promotes **inter-agency alignment**, efficient crisis management, and clarity of roles. **Example:** The **UK's Integrated Review (2021)** integrates military, diplomatic, development, and tech security into one overarching policy.
3. **Publish an Unclassified Summary for Strategic Communication:** A publicly available summary of the national security doctrine ensures **transparency**, shapes **strategic communication**, and acts as a tool for **international signaling**. It also builds public and global awareness of India's red lines and policy priorities. **Example: NATO's Strategic Concept (2022)** is an open document identifying adversaries (like Russia and China) and guiding collective defense.
4. **Legislate the NSD through Parliament:** Legislating the National Security Doctrine through Parliament will provide it with **democratic legitimacy**, **institutional permanence**, and ensure

continuity across governments. It would also formalize the roles of agencies and improve oversight. **Example:** The **Goldwater-Nichols Act (1986)** in the U.S. reformed military command structure and legislated national defense planning, enhancing inter-service cooperation.

5. **Institutionalize Strategic Education:** Embedding **strategic studies** and **national security thinking** in civil services, foreign services, police academies, and military training is vital. It fosters a shared understanding of India's national interests across institutions. **Example: Israel's National Security College** trains senior officials in integrated security and foreign policy thinking.
6. **Integrate NSD with Budgeting and R&D Prioritization:** The NSD must guide **defense budgeting**, capital procurement, and R&D efforts (e.g., DRDO, iDEX, DPSUs). This ensures funding supports doctrinal priorities like space, cyber, or missile defense, avoiding ad hoc resource allocation. **Example:** The **U.S. Quadrennial Defense Review (QDR)** aligns strategy with defense budgets and capability development cycles.
7. **Embed Cyber and AI Security in the Doctrine:** Next-generation threats like **cyber warfare**, **AI-driven disinformation**, and **digital infrastructure sabotage** must be explicitly addressed in the doctrine. This prepares India for hybrid warfare and emerging asymmetric threats. **Example: NATO's Cyber Defence Centre**.
8. **Link Foreign Policy with National Security Doctrine:** Foreign policy must support national security aims — through **strategic partnerships**, **economic corridors**, and **global influence operations**. A doctrinal linkage ensures India's diplomatic efforts reinforce its security architecture. **Example:** India's **Indo-Pacific Oceans Initiative (IPOI)**, **QUAD**, and **India-Middle East-Europe Corridor (IMEC)** are natural fits for alignment with a national security doctrine.

Conclusion:

India's rising economic and geopolitical profile demands **strategic maturity** anchored in a clear national security doctrine. As Chanakya warned, **"A kingdom is only as safe as its farthest borders."** Security today is not just about weapons but about **resilience, perception, and preemption**. A National Security Doctrine is not a war plan; it is a peace architecture rooted in strength, vision, and strategic foresight. As Sun Tzu said, **"The acme of skill is to win without fighting."** For India, framing a doctrine is the first step in **ensuring that there are no wars to win in the first place.**

Read More: The Indian Express
UPSC Syllabus GS-3: Internal Security

India-Pakistan Relations: Complexity, Conflict & Cooperation

India and Pakistan, two South Asian nuclear-armed neighbors, share a fraught relationship rooted in the Partition of 1947. While the two nuclear-armed neighbors have **fought four wars and multiple skirmishes**, their relations are also shaped by deep historical grievances, strategic rivalries, and sporadic peace efforts. In the latest tragic reminder of the enduring security threat, the **2025 Pahalgam terror attack** resulted in the deaths of civilians and injuries. The incident, allegedly perpetrated by Pakistan-backed groups like **The Resistance Front (TRF)**, has once again spotlighted the volatile dynamics between the two countries, particularly on the issue of **cross-border terrorism**.

Key Issues in India-Pakistan Relations: Evolution:

1. **Cross-Border Terrorism:** From the 1989 Kashmir insurgency to the 2001 Parliament attack, 2008 Mumbai attacks, Uri (2016), Pulwama (2019), and now Pahalgam (2025), terrorism remains the biggest concern. **ORF classifies Pakistan's** terror infrastructure as **"state-enabled non-state**

actors.". Pakistan has long been providing safe havens to terror groups like **LeT, JeM, and Hizbul Mujahideen**. The **2001 Indian Parliament attack**, **2008 Mumbai attacks**, **2016 Uri attack**, and **2019 Pulwama attack** are all linked to Pakistani-based terror outfits. **E.g. A 2023 report** by **Brookings Institution** identified Pakistan's **"proxy war" strategy in Kashmir** as a major destabilizing factor in South Asia.

2. **Kashmir Dispute:** The core territorial dispute stems from Pakistan's claim over J&K, while India asserts its legal accession. Post-2019 abrogation of Article 370, Pakistan downgraded diplomatic ties and internationalized the issue at various forums. While India asserts it as a domestic issue, the **UN Human Rights Council** has occasionally flagged concerns over human rights in the region**. Shyam Saran (ex-Foreign Secretary), "Pakistan treats Kashmir as the keystone of its identity" and C. Raja Mohan calls it Pakistan's Kashmir fixation "strategic inertia rooted in ideological rigidity."**
3. **Border and LoC Ceasefire Violations:** Over **5,000 ceasefire violations in 2020** alone, according to MEA. While the 2021 reaffirmation brought temporary calm, violations resumed in 2023.
4. **Water Disputes under the Indus Waters Treaty (IWT): Treaty Signed in 1960** under World Bank auspices. India has raised concerns post-Uri attack (2016) about revisiting the treaty. Pakistan raised objections to **India's Kishanganga and Ratle Hydropower Projects**. India invoked Article XII of the treaty to renegotiate terms in 2023. **World Bank's** urged both sides to resolve differences via neutral expert arbitration.
5. **Trade and Economic Relations:** Post-2019, Pakistan suspended bilateral trade. A report by **CUTS International** (2021) estimates potential trade loss of billion annually due to non-cooperation.
6. **Religious Radicalization: Export of extremism** through LeT, JeM, and D-Company operate from Pakistani soil. **UNSCR Reports**, highlight proliferation of madrassas and extremist hubs.
7. **Nuclear Brinkmanship and Arms Race:** Both nations maintain nuclear arsenals and credible deterrents. Post-Balakot (2019), India and Pakistan came dangerously close to conflict escalation, as noted in **RAND Corporation**'s 2021 assessment.
8. **Afghanistan, Narcotics and Drone Warfare:** India supports democratic stability, while Pakistan has been accused of covertly aiding Taliban factions. **USIP Report** (2023) said India fears increased terror influx via Afghanistan post-Taliban resurgence. India has close proximity to **Death Triangle (Formally Golden Triangle)** which increases the threat of narcotics and terrorism as seen in drone-based narcotics and arms drops in Punjab.
9. **Cyber Warfare and Disinformation:** Cyber espionage by Pakistani actors like **APT36** targeting Indian defense and research. CERT-IN reports several Pakistan-origin intrusions.
10. **Prisoners and Fishermen:** 300+ fishermen from both sides remain jailed. Cases of spies (e.g., Kulbhushan Jadhav) worsen mutual distrust. **International Court of Justice (ICJ)** ruled in Jadhav's favor in 2019.

Multilateral Groupings Involving India and Pakistan

1. **SAARC (South Asian Association for Regional Cooperation):** India and Pakistan are founding members. SAARC summits are often stalled due to bilateral tensions. Paralysed since 2016 after the Uri attack. **C. Raja Mohan** observed that "SAARC has been held hostage to bilateral tensions.
2. **Shanghai Cooperation Organisation (SCO):** Both are full members since 2017. Pakistan has blocked Indian proposals and boycotted certain events. India skipped SCO meetings in 2024 due to provocations.
3. **UN and Related Agencies:** Pakistan raises Kashmir issue frequently; India counters by stressing non-interference. **India's Stand**: Consistently maintains Kashmir is a bilateral issue under the **Shimla Agreement (1972)**.

4. **World Trade Organization (WTO):** Ongoing disputes over MFN status. India also withdrew Pakistan's MFN status in 2019.

Present Dynamics and Shifts:

1. **Union Government** follows a **"terror and talks cannot go together" doctrine**.
2. **Operation Sindoor and Balakot airstrike (2019)** marked a shift towards pre-emptive action and direct response to the terrorist attack.
3. Pakistan's internal economic crisis (USD reserves at critical levels as per IMF 2024 report) restricts its military adventurism.
4. **US withdrawal from Afghanistan** has left Pakistan more regionally isolated.
5. Think tank **Carnegie India** argues that the India-Pakistan equation is now less central to global diplomacy.

What are the Threats and Challenges Posed by Pakistan?

1. **State-Sponsored Terrorism:** ISI's deep links with groups like LeT and JeM are documented by the **FATF**, which kept Pakistan on the grey list until 2022.
2. **Cyber Espionage and Propaganda: CERT-In** flagged multiple attempts of phishing and propaganda campaigns from Pakistani IPs targeting Indian defence personnel.
3. **Smuggling and Narco-Terrorism:** Punjab Police has reported a surge in **drone-based smuggling** of arms and heroin from across the border.
4. **Border Infiltration:** IB and LoC infiltration attempts remain persistent. BSF recorded **over 200 infiltration attempts** in 2023 alone.
5. **Strategic Alliance with China:** The **China-Pakistan Economic Corridor (CPEC)** runs through PoK, challenging India's sovereignty. **Brookings** warns of a **"two-front" security risk** for India from the **Sino-Pak axis**.
6. **Propaganda Warfare**: Pakistan's ISPR targets international narratives (via social media).
7. **Nuclear Posturing**: Tactical nukes threaten escalation.

What are the Global Powers Policies Toward India-Pakistan?

1. **United States:** Views India as a strategic partner under **Indo-Pacific Strategy**. Maintains defence ties with Pakistan (e.g., 2022 F-16 upgrade aid) to keep leverage. **Carnegie Endowment** noted U.S. "wants to prevent escalation while balancing both ties." **Ashley Tellis** calls, US policy aims to **"contain chaos in Pakistan while investing in India."**
2. **China:** Strong strategic partner of Pakistan. China is **all-weather ally of Pakistan (CPEC, military aid) and supports Pakistan on Kashmir in UNSC.** Uses Pakistan to counterbalance India's regional influence. Engaged in infrastructure and military cooperation via **CPEC**, which India opposes.
3. **Russia:** Traditionally close to India, but now engages both countries, increasing ties with Pakistan in defense **(Mi-35, joint drills).** Supports **anti-terrorism under SCO; has recently conducted trilateral exercises** with both India and Pakistan separately.
4. **OIC (Organisation of Islamic Cooperation):** Supports Pakistan's stance on Kashmir, though many Gulf nations now have improved ties with India (e.g., UAE, Saudi Arabia).
5. **Gulf Countries (UAE, Saudi Arabia):** Brokered 2021 ceasefire. UAE plays economic neutral; strong trade with both. **Brookings Doha Center** noted UAE's role in Indo-Pak thaw.
6. **European Union:** Concerned with human rights in Kashmir, supports bilateral dialogue and is a major trade partner for both countries.

Way Forward: "A Unique Blend of Light and Tight Approach":

1. Hard Strategy: Asserting Deterrence and National Security: Hard strategies are coercive tools used to safeguard sovereignty and deter hostile actions by Pakistan, especially in light of state-sponsored terrorism and cross-border aggression.

- **Surgical and Cyber Strikes:** Precision military operations across the border and digital warfare targeting enemy infrastructure. **Examples**: **2016 Surgical, 2019 Balakot Air Strikes.** Lt. Gen. D.S. Hooda (Retd.), who oversaw the 2016 strikes, has emphasized integrating military and digital tools for **"surgical precision and strategic messaging."**
- **Financial Warfare and Strategic Messaging**: Deterrence through visible action. Economically isolate Pakistan to choke terror funding and impose global accountability. **Example**, India lobbied successfully for Pakistan to be placed on the **Grey List** (2018–2022), tightening scrutiny on terror financing. **IMF and World Bank Conditionalities**, India uses diplomatic influence to condition economic aid to Pakistan on counter-terror reforms. **C. Raja Mohan and Brahma Chellaney argues for**, **"Diplomatic strangulation through financial multilateralism has long-term strategic impact", and "cost imposition" strategy respectively.**
- **Defence Modernization:** Acquisition of Rafale jets, S-400 systems, and indigenous missile development (e.g., Agni-V, BrahMos). Focus on **theatre commands** and **artificial intelligence in warfare**. A strong military posture deters adventurism and gives India strategic superiority along the LoC and international border. Late Gen. Bipin Rawat advocated for **"technologically enabled integrated response systems to handle conventional and hybrid threats."**
- **Doctrine of Proportional Response**: Balakot (2019) set a precedent. **Former Army Chief Gen. Bipin Rawat**: "Talks can follow only after complete dismantling of terror infrastructure." Strengthen Border Security Force (BSF) and tech surveillance. Conduct **surgical and cyber-strikes** on credible threats.
- **Global Model:** Israel's **hard deterrence model** cited as an example. Also amend **IWT** terms and limit water flows as leverage.

2. Soft Strategy: Building Bridges and Quiet Diplomacy: Soft strategies focus on dialogue, diplomacy, and cultural engagement to reduce hostility and build long-term peace foundations.

- **Backchannel Talks:** Quiet negotiations on contentious issues like terrorism, water-sharing (Indus Waters Treaty), and trade. **Example**, UAE-brokered talks (2021) led to reaffirmation of the **2003 LoC ceasefire**. **Sharat Sabharwal (Former Indian High Commissioner to Pakistan)** stresses **"silent diplomacy often succeeds where loud declarations fail."**
- **People-to-People Ties:** Sports (e.g., cricket diplomacy), cultural exchanges, pilgrimages (Kartarpur Corridor). **Examples**: **Kartarpur Sahib Corridor (2019)**: A rare success in India-Pakistan relations facilitating Sikh pilgrimage. Artists and intellectual exchanges—though currently suspended—help humanise relations.
- **Third-Party Mediation:** Using neutral players like **UAE** or **Saudi Arabia** to open informal channels. **Example**: UAE-brokered backchannel led to the 2021 LoC ceasefire renewal. UAE Ambassador to India termed it a **"silent bridge between turbulent neighbours."**

3. Integrated Strategy: Combining Carrot and Stick: India increasingly favours a hybrid approach blending hard deterrence with calibrated engagement.

- **Israel's "Iron Fist with Silk Glove" Model:** A doctrine where strong military responses are paired with soft outreach (technology, diplomacy). **Application to India**:
    - **Military deterrence (Balakot) + Kartarpur diplomacy.**
    - **Strategic signaling: India uses restraint but also retaliates when red lines are crossed.**

- **Expert Commentary: Gen. Bipin Rawat,** "Hybrid response to hybrid threats." **Example**: Simultaneously downgrading diplomatic ties post-Article 370 revocation (2019) while maintaining backchannels and trade through third parties like the UAE. **ORF**: Suggests that India's calibrated use of power and peace is aligned with the regional power doctrine. **Brookings India**: Advocates "controlled engagement" to avoid prolonged hostility while neutralising tactical threats.

Hybrid Threats = Terrorism, cyberattacks, propaganda warfare, economic sabotage.
Hybrid Response = Integrated use of military, cyber, economic, diplomatic, and social tools.

Conclusion: From Conflict to Constructive Engagement:
India-Pakistan relations are a complex blend of history, hostility, and hope. While structural issues remain deeply entrenched, evolving geopolitics, changing domestic priorities, and increasing global pressure on state-sponsored terrorism may open windows for cautious engagement. As **Shivshankar Menon**, former NSA, aptly put it — ***"Peace with Pakistan is desirable, but it must be on terms that ensure security and stability for India."*** The path forward requires realism, resilience, and a calibrated strategy that combines deterrence with dialogue.

Read More: The Hindu
UPSC Syllabus GS-2: Bilateral relations

Boom in Foreign University Branch Campuses in India: Can They Deliver Quality Education?

India is currently witnessing a pivotal moment in its higher education landscape, with foreign universities entering the domestic space to establish physical campuses. India, with a youth population of over **500 million aged 5–24 years**, stands at the cusp of a demographic dividend. Yet, its **Gross Enrollment Ratio (GER)** in higher education remains at a modest **27.3% (AISHE 2020–21),** significantly lower than global peers like the **USA (88.2%) or China (51.7%).** To bridge this gap, the **National Education Policy (NEP) 2020** envisions raising **GER to 50% by 2035**, an ambitious target that necessitates substantial expansion in infrastructure, diversity in course offerings, and internationalization of Indian higher education**.**

What is the University Grants Commission (UGC) 2023 regulatory framework for Foreign Higher Educational Institutions (FHEIs)?

Amid this backdrop, the **University Grants Commission (UGC)** in 2023 rolled out a regulatory framework allowing **FHEIs** to set up campuses in India. From **Deakin University and University of Wollongong** in GIFT City to **University of Southampton** in Gurugram, the movement has seen rapid momentum. The **Illinois Institute of Technology (IIT), USA**, recently became the first American university to gain UGC approval for a Mumbai campus—signaling both opportunity and the need for caution.

How Foreign University Branches opening and Expansion has taken place in India?

- **Pre-Liberalization Restrictions:** Prior to 1991, India's education sector was almost entirely public and protectionist. Foreign academic collaboration was limited to student exchanges and research MoUs.
- **Post-Liberalization (1991–2005):** The liberalization of the Indian economy saw a modest increase in global academic engagements. However, there were no formal policies to allow FHEIs to open campuses.

- **2005 Foreign Education Providers Bill**: This bill aimed to regulate foreign institutions in India but lapsed in 2010 due to opposition over commercialization concerns.
- **2005–2010 Attempts:** The **Foreign Educational Institutions Bill, 2010**, proposed under the UPA-II government, aimed to regulate and allow foreign universities to enter India. However, it lapsed due to lack of consensus in Parliament.
- **Rise of Joint Programs:** In absence of full-fledged branches, Indian institutions partnered with foreign universities for **dual degrees**, **credit transfers**, and **twinning programs**. For example, **IIT Bombay–Monash University** Research Academy, and **OP Jindal Global University's** extensive global collaborations.
- **NEP 2020 Shift:** The NEP laid the foundation for institutional autonomy, internationalization, and "global standards" in Indian education, recommending the entry of **Top 100 global universities** to set up Indian campuses.
- **UGC Regulations (2023):** For the first time, a legal and regulatory framework was instituted, giving formal entry routes to FHEIs, underpinned by quality assurance and local relevance.

What are the UGC Guidelines for Foreign University Campuses in India?

- **Objective and Legal Framework:** The 2023 UGC Regulations aim to allow Foreign Higher Educational Institutions (FHEIs) to establish campuses in India, aligning with the National Education Policy (NEP) 2020. The goal is to internationalize Indian higher education while ensuring academic parity with the foreign institution's main campus.
- **Eligibility of Foreign Institutions:** FHEIs must be ranked among the **top 500 globally** in overall or subject-specific rankings or possess **demonstrated excellence** in a specialized area. These rankings are determined by the UGC from time to time.
- **Programmes and Degrees Offered:** FHEIs can offer **certificates, diplomas, degrees, and research programmes** at undergraduate, postgraduate, doctoral, and post-doctoral levels. Degrees awarded in India will bear the **name and seal of the parent institution** and are considered **equivalent to both the home and Indian qualifications**.
- **Admission, Fee Collection, and Scholarships:** FHEIs may admit students and collect fees **only after UGC's final operational approval**. They are encouraged to offer **need-based scholarships and fee concessions** to Indian students.
- **Campus Infrastructure and Staffing:** Campuses must be built using the FHEI's **own infrastructure**—sharing with Indian institutions is not allowed. They have full **autonomy over faculty recruitment**, but faculty qualifications must match the standards of the home campus.
- **Mode of Delivery:** Courses **must be delivered in-person**; online or distance learning is not allowed. However, **up to 10%** of programme content may be delivered online.
- **Governance and Approval Mechanism:** The UGC handles a **single-window application** process. After evaluation by a **Standing Committee**, a Letter of Intent (LoI) is issued. Final operational approval must follow within **2 years** (extensions possible), after which the FHEI can begin academic operations.
- **Student Protection and Grievances:** FHEIs must maintain **grievance redressal mechanisms**. In the event of **programme disruption or campus closure**, they must provide **alternative arrangements** to safeguard students' interests.
- **Regulatory Restrictions and Legal Compliance:** FHEIs must comply with **FEMA and FCRA regulations** for funding, property acquisition, and collaborations. They are **not allowed** to set up franchises, study centres, or representative offices outside of the approved campuses. Indian courts will have **exclusive jurisdiction** in disputes.

What is the Significance and Importance of Foreign University Campuses?

1. **Access and Capacity Building:** According to the **Economic Survey 2022-23**, India needs **800–900 universities** and **40,000–45,000 colleges** in the next decade to meet projected demand from **43 million new students**. FHEIs can ease this pressure.
2. **International Exposure and Competitiveness:** Students gain access to **global pedagogy** and **research culture** without bearing the costs of overseas education. As per **QS Global Student Survey**, 73% of Indian students consider international exposure critical to career success.
3. **Curbing Brain Drain:** Over **7.5 lakh Indian students studied abroad in 2022**, according to MEA. With quality education at home, FHEIs could help **retain talent** and **foreign exchange**.
4. **Research and Innovation Boost:** Collaborations like **IIT Delhi–University of Queensland** and **IIT Bombay–Monash University** show the potential for joint research. Branch campuses could institutionalize these efforts.
5. **Diplomacy and Soft Power:** Education partnerships strengthen **bilateral ties**, aligning with India's **Act East Policy**, **India-U.K. Roadmap 2030**, and **India-Australia Comprehensive Strategic Partnership**.
6. **Local Economy & Employment:** Campuses can catalyze regional development, provide local employment, and foster innovation hubs akin to **Silicon Valley–Stanford** or **Oxford–Thames Valley** clusters. As per NITI Aayog, retaining students could save **$15-20 billion annually**. Campuses like **NYU Abu Dhabi** created **5,000+ local jobs**—a model India can emulate.
7. **Judicial Backing**: The **Supreme Court in TMA Pai Foundation v. State of Karnataka (2002)** upheld **institutional autonomy**, supporting foreign universities' entry.

What are the Indian Initiatives, Collaborations, Schemes, and Programs for Promotion of FEHIs?

1. **National Education Policy (NEP) 2020**: Advocates for **"internationalization at home,"** encouraging foreign collaborations and overseas campuses of Indian institutions.
2. **Study in India Programme**: Targets foreign students to study in India, aiming to enhance **India's global educational footprint.**
3. **UGC's Dual Degree Framework**: Allows students to earn degrees from Indian and foreign universities concurrently.
4. **National Institutional Ranking Framework (NIRF)**: Promotes transparency and benchmarking to attract credible international institutions.
5. **GIFT City Model**: Offers foreign universities **100% tax exemption**, **no exchange control**, and **regulatory flexibility**, making it India's own **education SEZ**.
6. **Research Collaborations**: IIT-Queensland, IITB-Monash, and Ashoka-Sciences Po reflect India's intent to embed global best practices through joint research.
7. **New Education Policy Budgetary Provisions**: ₹1.12 lakh crore was allocated in Budget 2023-24 for the education sector, with a focus on higher education and digital expansion.
8. **National Digital University (NDU)**: Though not foreign, it exemplifies India's effort to scale higher education digitally, providing a model for hybrid collaboration with foreign universities.
9. **SPARC (Scheme for Promotion of Academic and Research Collaboration):** Facilitates joint research and academic exchanges.
10. **GIAN (Global Initiative of Academic Networks):** Brings global faculty to Indian classrooms.

Challenges Facing Foreign University Campuses in India:

1. **Brand Perception Gap**: Many FHEIs entering India are not **"Ivy League" equivalents**. In India's competitive landscape (IITs, IIMs, Ashoka, ISB), these branches risk being perceived as "**diploma mills**". This could impact their ability to attract top-tier students.

2. **Academic Narrowness**: Most foreign campuses focus on market-driven fields like **Business and Computer Science**, lacking the **interdisciplinary approach** or **research diversity** seen in traditional Indian universities. This limits their appeal to students seeking a broader academic experience.
3. **Infrastructure Deficits**: Foreign campuses often operate out of **rented vertical buildings**, lacking the traditional **campus amenities** like green spaces, sports facilities, and libraries, affecting the overall student experience and institutional identity.
4. **Regulatory Compliance Complexity**: Navigating Indian regulations, such as **FCRA**, **FEMA**, and **land acquisition norms**, remains complex. These bureaucratic hurdles can be a significant barrier for foreign universities seeking smooth entry into the Indian market.
5. **Marketing Over Academic Substance**: Heavy investment in **marketing campaigns** sometimes overshadows the **academic quality** of these campuses. Without **strong faculty, curriculum depth, or student support**, flashy marketing can damage credibility and long-term trust.
6. **Limited Research Capacity**: Most foreign campuses focus on **teaching** rather than **research**, lacking **doctoral programs** or research facilities. This reduces their ability to contribute to global academic discussions and innovations.
7. **Student Skepticism**: Indian students are value-conscious. A foreign degree must offer **clear returns on investment** in terms of **employability** and **recognition**. High fees and unclear benefits may deter students.
8. **Global Headwinds**: The international higher education sector faces **financial challenges** and **geopolitical uncertainties**. Many foreign universities may reassess their expansion strategies due to post-COVID financial strains and political instability.

What can be the Way Forward?

1. **Focus on Quality, Not Quantity**: Only top-tier institutions with academic depth should be allowed. **Australia's Tertiary Education Quality and Standards Agency (TEQSA)** model can offer guidance.
2. **Tailor to Indian Needs**: Programs must align with India's **skill gaps**, regional priorities (e.g., Agri-tech in Punjab, AI in Bengaluru), and **local language and culture**.
3. **Long-Term Infrastructure Investment**: Real campuses with research centers, hostels, and sports facilities are essential. **ISB Hyderabad** can serve as a model.
4. **Balanced Curriculum**: Move beyond just STEM. Encourage **liberal arts, humanities, and interdisciplinary courses**, critical for holistic education.
5. **Regulatory Autonomy with Accountability**: Like **Singapore's EduTrust Scheme**, India can offer autonomy with regular audits to ensure quality.
6. **Collaboration with Indian Institutions**: Encourage joint degrees, research hubs (e.g., **IIT Madras-Zurich ETH**) to combine global and local strengths.
7. **Incentives for Tier-II Cities**: To decongest metros and ensure equitable growth, promote campuses in underserved regions with sops (e.g., land grants, PPPs).
8. **Feedback Loop Mechanisms**: Empower NAAC/NIRF to evaluate foreign campuses regularly and create a public dashboard for transparency.

Conclusion:

Critics like Prof. Amartya Sen argue that **"education must not be purely market-driven"**, while **Nandan Nilekani** supports **"competitive disruption"** in higher education. As India's decision to open its doors to foreign universities represents a **historic shift in higher education policy**. But as **Philip Altbach**, renowned higher education scholar, warns, "Without depth, internationalization becomes branding." For India to truly benefit, the process must be **strategic, inclusive, and quality-driven**. If executed well, this initiative could redefine India as not just a **consumer** but also a **global provider** of world-class education.

Read More: The Hindu
UPSC Syllabus GS-2: Education

Urban Mobility in India- Challenges and Way Forward

Indian cities are characterized by increasing levels of congestion, pollution, road accidents and inequality in access to mobility. The need for better urban mobility in order to build inclusive, safer and more sustainable cities cannot be underestimated.

Status of Urban Transport in India:

Major Modes of Public Urban Transport:

- Buses are the prime mover for both inter-city and intra-city travels in most urban centres. However, in recent times there has been a loss in ridership. Other modes include metro rail, trams, and local trains.
- Intermediate public transport system (IPT): All Indian cities feature large numbers of auto rickshaws, taxis, cycle rickshaws and forms of informal car pooling.
- The range of public transport services vary considerably across cities. For example: Only Mumbai, Kolkata, and Chennai have extensive suburban rail services whereas Delhi has limited suburban rail services.
- Currently, 17 Indian cities have operational metro rail (**Kolkata, Delhi, Chennai, Bengaluru, Hyderabad, Jaipur, Gurgaon, Mumbai, Kochi, Lucknow, Ahmadabad, Nagpur, Pune, NOIDA, Navi Mumbai, Kanpur, and Agra**), with Delhi having the largest metro rail system.
- Kolkata has India's only remaining tram system

Problems faced by Urban Transport in India:

1. **Unprecedented Transport Growth:** According to NITI Aayog, the number of registered motor vehicles has increased from 5.4 million in 1981, to 210 million in 2015 . This rapid growth in demand in the absence of widespread public transport system has caused a rapid increase of private car ownership in India.
2. **Inadequate Public Transport:** Only 63 out of 458 cities with populations over 1 lakh have formal bus services, and India has just 1.2 buses per 1,000 people, far below global benchmarks (China has about six buses for 1,000 people). Public transport is often overcrowded, unreliable, and poorly maintained, deterring commuters – 37% avoid it due to overcrowding, and 28% cite delays and irregular schedules. Lack of integration between different modes (metro, buses, suburban rail, auto-rickshaws) leads to inefficient transfers and inconvenience. Further, a CSE study points out that the share of public transport is expected to decrease from 75.5% in 2000-01, to 44.7 per cent in 2030-31, while the share of personal transport will be more than 50%.
3. **Urban Pollution:** According to a WHO study 14 out of the top 15 most polluted cities in the world belong to India. Vehicular pollution has been one of the major contributors to rising urban air pollution in Indian cities along with other factors such as construction activity, road dust and industrial activity.
4. **Urban Congestion:** Major Indian cities like Delhi, Mumbai, Kolkata and Bengaluru are ranked among world's most congested cities. For example: Average speed for vehicles in Bengaluru is reported as 17 km/h. These high levels of congestion have huge economic implications in the form of reduced productivity, fuel waste, and accidents. Further, there is an **acute shortage of parking spaces** both on and off the streets in the urban centres.

5. **Road safety- Traffic injuries and fatality:** India faces a severe road safety crisis, with over 172,000 deaths reported in 2023-averaging 474 fatalities daily-making its roads among the world's deadliest. The major reasons for traffic crashes include poor quality of roads, poor traffic management, unsafe and overcrowded vehicles and unsafe driving behaviour.
6. **Equity Issues:** Unplanned urbanization in India has led to gentrification (as per upper and middle socio-economic class) of city centres and lower income groups are forced to live in peripheral suburbs which have increased their cost and time they allocate to commute. Most of the lower income groups and urban poor fail to afford private transport and even public transport are high for them. For example, a CSE study ranks Delhi Metro as the second most unaffordable metro (after Hanoi in Vietnam) with lower income group people spending nearly 22% of their monthly transport on Delhi Metro fares.
7. **Mobility for women:** Safety or the lack thereof, is the single biggest factor constraining women's mobility. According to Action Aid UK, 79% of women in major Indian cities reported being harassed on streets. Overcrowding in public transport adds to insecurity and safety issues with a large number of women complaining about harassment in public transport across major Indian cities like Delhi and Mumbai.

Government Initiatives to address Urban Transport issues:

1. **Jawaharlal Nehru National Urban Renewal Mission JNNURM, 2005**: JNNURM was launched in 2005 and closed in 2014 (now succeeded by **Atal AMRUT Mission**). It attempted to improve the public transport system in larger cities through funding of public transport buses, development of comprehensive city mobility plans and supporting city transport infrastructure projects.
2. **National Urban Transport Policy, 2006**: The policy envisages safe, affordable, quick, comfortable, reliable and sustainable urban transport through establishment of quality focused multi-modal public transport systems.
3. **Green Urban Transport Scheme, 2016:**. The scheme aims to improve non-motorised transport infrastructure such as dedicated lanes for cycling, pedestrians, increasing access to public transport, use of clean technologies and adoption of intelligent transport systems (ITS).
4. **Mass Rapid Transit/ Transport Systems (MRTS)**: The metro rail has come up as a favoured alternative of mass transport in Indian cities. In 2017, the government introduced new Metro Policy which aims to improve collaborations, standardising norms, financing and creating a procurement mechanism so that the projects can be implemented effectively.
5. **Bus Rapid Transport System (BRTS):** BRTS segregates the movement of buses from all other transport modes, and introduces other changes in the road infrastructure that are associated with safety. BRTS is an important component of AMRUT (Atal Mission for Rejuvenation and Urban Transformation)
6. **National Transit Oriented Development Policy, 2017:** The policy framework aims to promote living close to mass urban transit corridors like the Metros, monorail and bus rapid transit (BRT) corridors.
7. **Sustainable Urban Transport Project (SUTP):** The project in partnership with Ministry of Urban Development and UNDP aims to promote environmentally sustainable urban transport in India.
8. **Personal Rapid Transit System (PRT):** It is a transport mode combining small automated vehicles, known as **pods**, operating on a network of specially built guideways. In 2017, the National Highway Authority of India (NHAI) had called the expression of interest (EOI) for launching India's first driverless pod taxi systems on a 70 km stretch from Dhaula Kuan in Delhi to Manesar in Haryana.
9. **National Public Bicycle Scheme (NPBS):** In 2011, NPBS was launched to build capacity for the implementation and operation of cycle sharing systems across the country. The first public bicycle sharing (PBS) initiative — Trin Trin was launched in Mysuru.

10. **Promotion of Electric Vehicles:** Indian Government plans to have an all-electric fleet of vehicles by 2030. For promotion of electric vehicles **FAME (Faster Adoption and Manufacturing of (hybrid &) Electric vehicles.** Under FAME – the government provides subsidies and incentives for electric buses, two-wheelers, and charging infrastructure, making clean mobility more affordable and accessible.

Institutional Challenges:

1. **Gaps in Laws and regulations:** There is no central, state or local level that comprehensively covers urban transport requirements and issues in Indian cities. Further, the weak enforcement and lacunae in existing laws such as the Motor Vehicles Act, 1988 fail to manage fast motorization in Indian cities.
2. **Poor Institutional Framework:** Functions of Urban transport system are performed by multiple agencies under the central, state and city governments which lack coordination and makes accountability difficult.
3. **Land as a Barrier to development of Transport Infrastructure**: High cost of land acquisition and time-consuming processes has been a major hindrance to integrated urban transport infrastructure. For example, land acquisition issues have delayed the East-West metro Corridor Project in Kolkata over years.
4. **Human Resource Challenges:** Lack of urban transport skills amongst city and state officials is a major challenge in effectively implementing transport projects.
5. **Absence of Reliable Transport Data:** The lack of standardised, systematized data and scientific analysis of urban transport statistics is a major barrier in assessing impact of various ongoing government initiatives and formulate a robust urban transport plan.
6. **Lack and Delay in release of funds**: The urban infrastructure projects have a long gestation period which requires locking of huge amount of funds for a longer period of time. This creates problems in accessing the required funds, thereby impacting timely completion and maintenance of projects.

NITI Aayog Recommendations:

It calls for a **3C Framework (Clean, Convenient and Congestion free)** for transforming mobility in India. To achieve this, it lays down the following action-agenda:

1. Connect Bharat: NITI Aayog calls for a **Safe, Adequate and Holistic Infrastructure (SAHI)** for the Indian population including women, elderly and the disabled. Major recommendations for achieving this:

- Increased emphasis on safety and accessibility.
- Leveraging multiple modes of transport – road, rail, coastal and inland waterways, small regional airports, ropeways etc.
- Higher usage of data for holistic mobility needs.

2. Optimize Travel footprint: It calls for increased emphasis to reduce congestion caused by passenger and goods flow in urban areas. Major recommendations include:

- Integrated land use– Planning residential and commercial complexes in an integrated manner so that travel time is reduced.
- Focused policy based measures for optimizing travel.
- Data-based measures such as intelligent transport systems.

3. Promote Seamless Public Transport: It calls for an efficient and convenient public transport to address the issue of air pollution and congestion in Indian cities. Major recommendations include:

- Data-driven planning and urban transport, with a clear hierarchy amongst different modes- from non-motorized (pedestrians, cycles) to public and lastly private transport.
- Focus on multi-modal systems.
- Make public transport affordable, comfortable and accessible for urban India, to ensure better adoption.

4. Adopting Green Modes and Technologies: It calls for rapid adoption of electric vehicles and non-motorized transport (NMT). Major recommendations include:

- To improve adoption of non-motorized transport, the routes and paths should be planned so that they integrate seamlessly with public transport.
- To ensure safety for NMT users by outlining norms & dedicated traffic signals should be a key priority.
- There should be a clear push towards clean technologies. This has to be enabled through ecosystem development which includes domestic manufacturing, deployment of charging infrastructure etc.

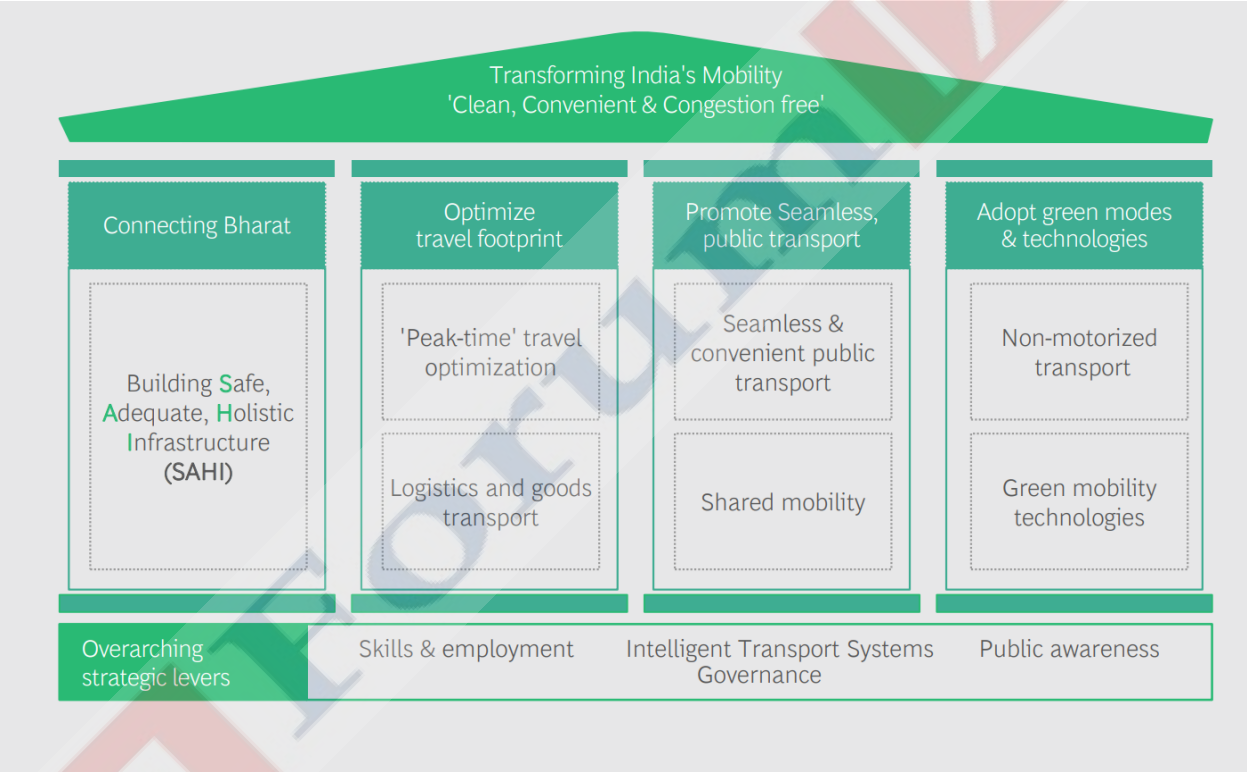


Fig 2

For effective execution of these actions-agenda, the NITI Aayog recommends to optimise the following **strategic enablers:**

1. **Skill development** which will ensure high employability and address the issue of human resource demand.
2. **Intelligent Transport systems** based on ongoing technological developments.
3. Well-defined **Governance** mechanism involving different stakeholders.
4. A strong **public awareness** and communication campaign.

International Best Practices:

SINGAPORE:

- According to McKinsey report titled "**Elements of success: Urban transportation systems of 24 global cities"** (2018), Singapore's public transport system is the best and most affordable system in the world.
- Nearly 80% of trips in Singapore are performed on Public Transport comprising of bus, MRT, LRT, Taxis.
- Singapore has one of the highest supplies of public transport per capita in the world. A well planned and extensive public transport system coupled with travel demand restraint measures, like area licensing system, vehicle quota system, congestion pricing etc. has resulted in decreasing registration of private cars and high usage of public transport. Singapore has also introduced "Incentives for Singapore's Commuters" – a scheme which incentivises commuters to shift their travel time to an earlier or later time belt to avoid the peak travel period on trains and thus avoid overcrowding.

MEXICO CITY- Right to Mobility: In 2014, Mexico City passed a new law which explicitly guarantees the right to mobility and aims at expanding urban mobility through sustainable transportation. The law also created a new mobility hierarchy, placing pedestrians and cyclists above motorists and prioritizing active transport.

Best Practice in India:

Ahmedabad BRTS Corridor: Features that stand out:

- For the first three months, the Ahmedabad Municipal Corporation (AMC) ran BRTS free and then made design changes based on commuter feedback.
- It provides affordable Smart cards for commuters.
- Integrated Transportation Management System (IMTS) which includes Advanced Vehicle Tracking System (AVLS), Fleet Management System (FMS), Automatic Fare Collection System (AFCS), Passenger Information System (PIS), Passenger announcement (PA), and Vehicle Scheduling and Dispatching (VSD).
- CNG Buses.
- Safe and secure BRT bus stops with a standard attractive form for presenting passengers information such as signages, route details and graphics.

Way Forward:

1. To address the **institutional challenges** there is a need for better cooperation among different transport agencies, departments, and ministries as well as better coordination of transport and land-use policies. Further, there should be adequate funding to address various issues plaguing public transport infrastructure.
2. To address the issues of **urban congestion and urban air pollution**, it is important to augment mass and share transit capacity and discourage use of private cars by enforcing restraint measures through parking policy, low emissions zones approach, tax measures and congestion pricing.
3. **Well engineered, safe infrastructure** for travel should be ensured. Further, there is an urgent need to address the issue of low woman mobility by ensuring **women safety** through gender-sensitive transport policies, dedicated seats/ coaches and emergency helplines.
4. There should be focus on **enhancing non-motorised transport**. Focus should be to encourage use of non-motorised transport for short distances. Further, Pedestrian zones, bike lanes should be made to ensure safety to commuters. For example, well designated Bike-lanes and bike-sharing solutions have promoted use of bicycles as a mean of transport in cities like Amsterdam and Paris.

5. Commuters should be provided with **multiple modes of connectivity**. To ease out travelling, a single smart card can be provided. For example, London's Oyster "smart" card enables a commuter to change from one mode to another with minimal loss of time or effort.

Conclusion:

Urban transportation in India is undergoing significant transformation, with expanding metro and BRT networks, modernization of stations, and a push for multimodal integration. However, challenges like congestion, insufficient public transport, and environmental impact remain. Addressing these requires continued investment, policy innovation, and a focus on inclusive, sustainable mobility solutions.

UPSC Syllabus GS-3: Transportation

Urban Mobility in India- Challenges and Way Forward

Indian cities are characterized by increasing levels of congestion, pollution, road accidents and inequality in access to mobility. The need for better urban mobility in order to build inclusive, safer and more sustainable cities cannot be underestimated.

Status of Urban Transport in India:

Major Modes of Public Urban Transport:

- Buses are the prime mover for both inter-city and intra-city travels in most urban centres. However, in recent times there has been a loss in ridership. Other modes include metro rail, trams, and local trains.
- Intermediate public transport system (IPT): All Indian cities feature large numbers of auto rickshaws, taxis, cycle rickshaws and forms of informal car pooling.
- The range of public transport services vary considerably across cities. For example: Only Mumbai, Kolkata, and Chennai have extensive suburban rail services whereas Delhi has limited suburban rail services.
- Currently, 17 Indian cities have operational metro rail (**Kolkata, Delhi, Chennai, Bengaluru, Hyderabad, Jaipur, Gurgaon, Mumbai, Kochi, Lucknow, Ahmadabad, Nagpur, Pune, NOIDA, Navi Mumbai, Kanpur, and Agra**), with Delhi having the largest metro rail system.
- Kolkata has India's only remaining tram system

Problems faced by Urban Transport in India:

1. **Unprecedented Transport Growth:** According to NITI Aayog, the number of registered motor vehicles has increased from 5.4 million in 1981, to 210 million in 2015 . This rapid growth in demand in the absence of widespread public transport system has caused a rapid increase of private car ownership in India.
2. **Inadequate Public Transport:** Only 63 out of 458 cities with populations over 1 lakh have formal bus services, and India has just 1.2 buses per 1,000 people, far below global benchmarks (China has about six buses for 1,000 people). Public transport is often overcrowded, unreliable, and poorly maintained, deterring commuters – 37% avoid it due to overcrowding, and 28% cite delays and irregular schedules. Lack of integration between different modes (metro, buses, suburban rail, auto-rickshaws) leads to inefficient transfers and inconvenience. Further, a CSE study points out that the share of public transport is expected to decrease from 75.5% in 2000-01, to 44.7 per cent in 2030-31, while the share of personal transport will be more than 50%.

3. **Urban Pollution:** According to a WHO study 14 out of the top 15 most polluted cities in the world belong to India. Vehicular pollution has been one of the major contributors to rising urban air pollution in Indian cities along with other factors such as construction activity, road dust and industrial activity.
4. **Urban Congestion:** Major Indian cities like Delhi, Mumbai, Kolkata and Bengaluru are ranked among world's most congested cities. For example: Average speed for vehicles in Bengaluru is reported as 17 km/h. These high levels of congestion have huge economic implications in the form of reduced productivity, fuel waste, and accidents. Further, there is an **acute shortage of parking spaces** both on and off the streets in the urban centres.
5. **Road safety- Traffic injuries and fatality:** India faces a severe road safety crisis, with over 172,000 deaths reported in 2023-averaging 474 fatalities daily-making its roads among the world's deadliest. The major reasons for traffic crashes include poor quality of roads, poor traffic management, unsafe and overcrowded vehicles and unsafe driving behaviour.
6. **Equity Issues:** Unplanned urbanization in India has led to gentrification (as per upper and middle socio-economic class) of city centres and lower income groups are forced to live in peripheral suburbs which have increased their cost and time they allocate to commute. Most of the lower income groups and urban poor fail to afford private transport and even public transport are high for them. For example, a CSE study ranks Delhi Metro as the second most unaffordable metro (after Hanoi in Vietnam) with lower income group people spending nearly 22% of their monthly transport on Delhi Metro fares.
7. **Mobility for women:** Safety or the lack thereof, is the single biggest factor constraining women's mobility. According to Action Aid UK, 79% of women in major Indian cities reported being harassed on streets. Overcrowding in public transport adds to insecurity and safety issues with a large number of women complaining about harassment in public transport across major Indian cities like Delhi and Mumbai.

Government Initiatives to address Urban Transport issues:

1. **Jawaharlal Nehru National Urban Renewal Mission JNNURM, 2005**: JNNURM was launched in 2005 and closed in 2014 (now succeeded by **Atal AMRUT Mission**). It attempted to improve the public transport system in larger cities through funding of public transport buses, development of comprehensive city mobility plans and supporting city transport infrastructure projects.
2. **National Urban Transport Policy, 2006**: The policy envisages safe, affordable, quick, comfortable, reliable and sustainable urban transport through establishment of quality focused multi-modal public transport systems.
3. **Green Urban Transport Scheme, 2016:**. The scheme aims to improve non-motorised transport infrastructure such as dedicated lanes for cycling, pedestrians, increasing access to public transport, use of clean technologies and adoption of intelligent transport systems (ITS).
4. **Mass Rapid Transit/ Transport Systems (MRTS)**: The metro rail has come up as a favoured alternative of mass transport in Indian cities. In 2017, the government introduced new Metro Policy which aims to improve collaborations, standardising norms, financing and creating a procurement mechanism so that the projects can be implemented effectively.
5. **Bus Rapid Transport System (BRTS):** BRTS segregates the movement of buses from all other transport modes, and introduces other changes in the road infrastructure that are associated with safety. BRTS is an important component of AMRUT (Atal Mission for Rejuvenation and Urban Transformation)
6. **National Transit Oriented Development Policy, 2017:** The policy framework aims to promote living close to mass urban transit corridors like the Metros, monorail and bus rapid transit (BRT) corridors.

7. **Sustainable Urban Transport Project (SUTP):** The project in partnership with Ministry of Urban Development and UNDP aims to promote environmentally sustainable urban transport in India.
8. **Personal Rapid Transit System (PRT):** It is a transport mode combining small automated vehicles, known as **pods**, operating on a network of specially built guideways. In 2017, the National Highway Authority of India (NHAI) had called the expression of interest (EOI) for launching India's first driverless pod taxi systems on a 70 km stretch from Dhaula Kuan in Delhi to Manesar in Haryana.
9. **National Public Bicycle Scheme (NPBS):** In 2011, NPBS was launched to build capacity for the implementation and operation of cycle sharing systems across the country. The first public bicycle sharing (PBS) initiative — Trin Trin was launched in Mysuru.
10. **Promotion of Electric Vehicles:** Indian Government plans to have an all-electric fleet of vehicles by 2030. For promotion of electric vehicles **FAME (Faster Adoption and Manufacturing of (hybrid &) Electric vehicles.** Under FAME – the government provides subsidies and incentives for electric buses, two-wheelers, and charging infrastructure, making clean mobility more affordable and accessible.

Institutional Challenges:

1. **Gaps in Laws and regulations:** There is no central, state or local level that comprehensively covers urban transport requirements and issues in Indian cities. Further, the weak enforcement and lacunae in existing laws such as the Motor Vehicles Act, 1988 fail to manage fast motorization in Indian cities.
2. **Poor Institutional Framework:** Functions of Urban transport system are performed by multiple agencies under the central, state and city governments which lack coordination and makes accountability difficult.
3. **Land as a Barrier to development of Transport Infrastructure**: High cost of land acquisition and time-consuming processes has been a major hindrance to integrated urban transport infrastructure. For example, land acquisition issues have delayed the East-West metro Corridor Project in Kolkata over years.
4. **Human Resource Challenges:** Lack of urban transport skills amongst city and state officials is a major challenge in effectively implementing transport projects.
5. **Absence of Reliable Transport Data:** The lack of standardised, systematized data and scientific analysis of urban transport statistics is a major barrier in assessing impact of various ongoing government initiatives and formulate a robust urban transport plan.
6. **Lack and Delay in release of funds**: The urban infrastructure projects have a long gestation period which requires locking of huge amount of funds for a longer period of time. This creates problems in accessing the required funds, thereby impacting timely completion and maintenance of projects.

NITI Aayog Recommendations:

It calls for a **3C Framework (Clean, Convenient and Congestion free)** for transforming mobility in India. To achieve this, it lays down the following action-agenda:

1. Connect Bharat: NITI Aayog calls for a **Safe, Adequate and Holistic Infrastructure (SAHI)** for the Indian population including women, elderly and the disabled. Major recommendations for achieving this:

- Increased emphasis on safety and accessibility.
- Leveraging multiple modes of transport – road, rail, coastal and inland waterways, small regional airports, ropeways etc.
- Higher usage of data for holistic mobility needs.

2. Optimize Travel footprint: It calls for increased emphasis to reduce congestion caused by passenger and goods flow in urban areas. Major recommendations include:

- Integrated land use– Planning residential and commercial complexes in an integrated manner so that travel time is reduced.
- Focused policy based measures for optimizing travel.
- Data-based measures such as intelligent transport systems.

3. Promote Seamless Public Transport: It calls for an efficient and convenient public transport to address the issue of air pollution and congestion in Indian cities. Major recommendations include:

- Data-driven planning and urban transport, with a clear hierarchy amongst different modes- from non-motorized (pedestrians, cycles) to public and lastly private transport.
- Focus on multi-modal systems.
- Make public transport affordable, comfortable and accessible for urban India, to ensure better adoption.

4. Adopting Green Modes and Technologies: It calls for rapid adoption of electric vehicles and non-motorized transport (NMT). Major recommendations include:

- To improve adoption of non-motorized transport, the routes and paths should be planned so that they integrate seamlessly with public transport.
- To ensure safety for NMT users by outlining norms & dedicated traffic signals should be a key priority.
- There should be a clear push towards clean technologies. This has to be enabled through ecosystem development which includes domestic manufacturing, deployment of charging infrastructure etc.

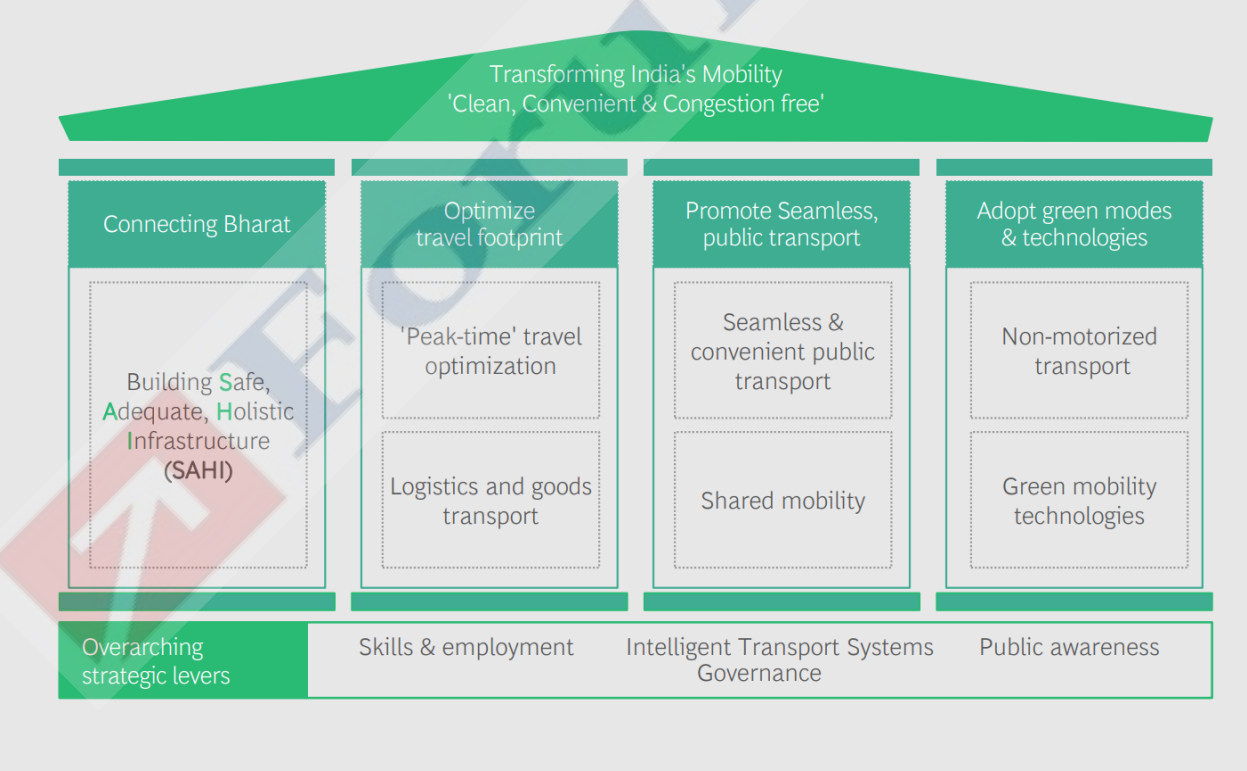


Fig 2

For effective execution of these actions-agenda, the NITI Aayog recommends to optimise the following **strategic enablers:**

1. **Skill development** which will ensure high employability and address the issue of human resource demand.
2. **Intelligent Transport systems** based on ongoing technological developments.
3. Well-defined **Governance** mechanism involving different stakeholders.
4. A strong **public awareness** and communication campaign.

International Best Practices:

SINGAPORE:

- According to McKinsey report titled "**Elements of success: Urban transportation systems of 24 global cities"** (2018), Singapore's public transport system is the best and most affordable system in the world.
- Nearly 80% of trips in Singapore are performed on Public Transport comprising of bus, MRT, LRT, Taxis.
- Singapore has one of the highest supplies of public transport per capita in the world. A well planned and extensive public transport system coupled with travel demand restraint measures, like area licensing system, vehicle quota system, congestion pricing etc. has resulted in decreasing registration of private cars and high usage of public transport. Singapore has also introduced "Incentives for Singapore's Commuters" – a scheme which incentivises commuters to shift their travel time to an earlier or later time belt to avoid the peak travel period on trains and thus avoid overcrowding.

MEXICO CITY- Right to Mobility: In 2014, Mexico City passed a new law which explicitly guarantees the right to mobility and aims at expanding urban mobility through sustainable transportation. The law also created a new mobility hierarchy, placing pedestrians and cyclists above motorists and prioritizing active transport.

Best Practice in India:

Ahmedabad BRTS Corridor: Features that stand out:

- For the first three months, the Ahmedabad Municipal Corporation (AMC) ran BRTS free and then made design changes based on commuter feedback.
- It provides affordable Smart cards for commuters.
- Integrated Transportation Management System (IMTS) which includes Advanced Vehicle Tracking System (AVLS), Fleet Management System (FMS), Automatic Fare Collection System (AFCS), Passenger Information System (PIS), Passenger announcement (PA), and Vehicle Scheduling and Dispatching (VSD).
- CNG Buses.
- Safe and secure BRT bus stops with a standard attractive form for presenting passengers information such as signages, route details and graphics.

Way Forward:

1. To address the **institutional challenges** there is a need for better cooperation among different transport agencies, departments, and ministries as well as better coordination of transport and land-use policies. Further, there should be adequate funding to address various issues plaguing public transport infrastructure.

2. To address the issues of **urban congestion and urban air pollution**, it is important to augment mass and share transit capacity and discourage use of private cars by enforcing restraint measures through parking policy, low emissions zones approach, tax measures and congestion pricing.
3. **Well engineered, safe infrastructure** for travel should be ensured. Further, there is an urgent need to address the issue of low woman mobility by ensuring **women safety** through gender-sensitive transport policies, dedicated seats/ coaches and emergency helplines.
4. There should be focus on **enhancing non-motorised transport**. Focus should be to encourage use of non-motorised transport for short distances. Further, Pedestrian zones, bike lanes should be made to ensure safety to commuters. For example, well designated Bike-lanes and bike-sharing solutions have promoted use of bicycles as a mean of transport in cities like Amsterdam and Paris.
5. Commuters should be provided with **multiple modes of connectivity**. To ease out travelling, a single smart card can be provided. For example, London's Oyster "smart" card enables a commuter to change from one mode to another with minimal loss of time or effort.

Conclusion:

Urban transportation in India is undergoing significant transformation, with expanding metro and BRT networks, modernization of stations, and a push for multimodal integration. However, challenges like congestion, insufficient public transport, and environmental impact remain. Addressing these requires continued investment, policy innovation, and a focus on inclusive, sustainable mobility solutions.

UPSC Syllabus GS-3: Transportation

Presidential Reference under Article 143: An Instrument of Constitutional Dialogue

The Indian Constitution is not merely a legal document but a **living framework for governance**, evolving through judicial pronouncements and legislative responses. According to the **Law Commission of India (Report No. 272),** India has seen **the judiciary emerge as a co-equal branch of governance**, particularly in interpreting **ambiguous constitutional provisions.** One unique feature of India's constitutional system is **Article 143**, which empowers the President to seek the **Supreme Court's advisory opinion** on questions of law or fact of public importance. Justice Fali S. Nariman has often stressed that such mechanisms reflect **"mature constitutional statesmanship."**

What is the Issue?

As of May 2025, **President Droupadi Murmu** invoked Article 143 to refer questions concerning **Articles 200 and 201** regarding the powers of the Governor and President in assenting to state legislation. This follows the Supreme Court's judgment imposing **timelines** for action on State Bills, igniting a crucial federal debate. With **15 Presidential references** made since 1950, underlining the rare **and exceptional nature of this constitutional mechanism.** This provision is pivotal in promoting constitutional clarity without triggering adversarial litigation.

What is The Concept of Presidential Reference under Article 143?

1. **Article 143 of the Indian Constitution** empowers the President to refer to the **Supreme Court any** question of law or fact that is of public importance. This provision stems from **Section 213 of the Government of India Act, 1935**, which granted similar powers to the British-appointed Governor-General.

2. **Article 143(1) enables** the President to seek the Court's opinion on any matter of public importance. **Article 143(2) relates to matters pending before any court**, particularly those involving treaties or agreements. Importantly**, Article 145 mandates** that a bench of at least five judges should hear such references.
3. While the opinion given under **Article 143 is not binding on the President or other courts,** it holds immense persuasive value. As **Justice V.R. Krishna Iyer observed,** such references **offer "a solemn judicial discourse on national questions." Notable examples include:**
    - **Delhi Laws Act Case (1951):** Defined limits of delegated legislation.
    - **Kerala Education Bill (1958):** Harmonized Fundamental Rights and Directive Principles.
    - **Berubari Case (1960):** Ceding Indian territory requires constitutional amendment.
    - **Presidential Poll Case (1974):** Polls valid despite vacancies in electoral colleges.
    - **Third Judges Case (1998):** Strengthened the Collegium system.
    - **Keshav Singh Case (1965)**: Balanced judicial review and legislative privilege.

What are the Comparative Perspective and Other Nations' Mechanisms?

India is among the few democracies where the executive can formally consult the judiciary. In contrast, other countries follow diverse models:

1. **Canada:** The Supreme Court of Canada has an advisory jurisdiction under **the Supreme Court Act** (s. 53), and opinions are regularly sought on constitutional and legal questions. For instance, the 2014 reference on Senate reform and the **1998 Quebec secession reference** have had long-lasting legal and political consequences.
2. **United States:** The **U.S. Constitution maintains a strict separation of powers**. Article III does not allow the Supreme Court to issue advisory opinions.
3. **United Kingdom:** Although it **does not have a written constitution, the UK's judicial system allows** opinions from **the Law Lords (now the Supreme Court) via declaratory judgments** in matters of significant legal uncertainty.
4. **Australia:** The High Court cannot provide advisory opinions due to constitutional constraints (Section 76).
5. **France:** The **Conseil Constitutional** reviews laws pre-promulgation, effectively offering **binding advisory review** on constitutional compliance.

Thus, India's mechanism is more aligned with Canada's model, blending judicial authority with executive consultative processes. India's model is more flexible than the U.S., yet more limited in scope and enforceability compared to France and Canada.

What is the Significance and Importance of Article 143?

1. **Strengthening Democratic Functioning**: Presidential references help clarify ambiguous constitutional provisions that directly impact governance. For instance, the current reference regarding **Articles 200 and 201** aims to resolve confusion over **the President and Governor's timelines in assenting to State Bills**, ensuring smooth legislative functioning.
2. **Reinforcing Federalism through Constitutional Adjudication:** The mechanism serves as a peaceful constitutional tool to mediate Centre-State disputes. The **Cauvery Water Dispute Reference (1992)** clarified the court's jurisdiction, preventing executive overreach and protecting federal balance—an essential feature of India's constitutional architecture.

3. **Promoting Constitutional Morality and Accountability**: These references ensure that the executive remains within constitutional limits. **The Kerala Education Bill (1958)** reference helped delineate the harmony between Fundamental Rights and Directive Principles, guiding future governance within moral constitutional boundaries.
4. **Facilitating Judicial Innovation and Development**: The **Third Judges Case (1998**) through an Article 143 reference led to the evolution of the Collegium system, reinforcing judicial independence. Such proactive interpretations highlight how Article 143 enables the judiciary to play a creative constitutional role.
5. **Providing Legal Certainty on Contentious Issues:** In the **Berubari Union case (1960),** the Court clarified that ceding Indian territory required a constitutional amendment, resolving a critical ambiguity that could have led to constitutional chaos in foreign policy decisions.
6. **Preventive Adjudication Reduces Future Litigation:** By offering early clarification on complex constitutional questions, **Article 143** prevents avoidable future litigation. This is crucial, considering the Supreme Court's pending case load stood at over 71,000 cases in 2023 **(as per the Supreme Court Annual Report).**
7. **Upholding the Rule of Law without Political Bias**: Presidential references ensure legal interpretations are provided without direct adjudication between contesting parties. This aligns with the spirit of **Keshavananda Bharati v. State of Kerala (1973),** which emphasized the importance of maintaining constitutional supremacy and the basic structure doctrine.
8. **Enhancing India's International Democratic Standing**: The structured use of constitutional tools like Article 143 reflects India's maturity as a democratic polity. According to **the Global Democracy Index 2023**, India ranks 46th globally, and such institutional practices reinforce its commitment to rule of law and constitutionalism, gaining international credibility.

What are the Challenges in the Use of Article 143?

1. **Vagueness and Political Overtones in Questions**: Often, the questions referred are excessively broad, vague, or politically sensitive—such as the current **14-point reference on gubernatorial powers—**which risks dragging the judiciary into the political arena, as seen in the Ram Janmabhoomi case (1993), where the Court declined to respond.
2. **Non-Binding Nature Limits Impact**: While the Supreme Court's opinion carries persuasive value, it is not legally binding. In the **Berubari Union case (1960),** despite the Court's opinion requiring a constitutional amendment to cede territory, the government initially overlooked it, leading to constitutional ambiguity.
3. **Possibility of Political Misuse**: The executive may invoke Article 143 to defer difficult decisions or shift responsibility to the judiciary. For example, references during politically sensitive periods may be used to dilute public accountability or delay contentious policy action.
4. **Lack of Public and Civil Society Engagement**: The advisory process under **Article 143** is highly insular, with no structured mechanism for participation from civil society, academia, or affected stakeholders, which undermines democratic transparency and inclusive deliberation.
5. **Additional Burden on Judicial Resources**: The already overburdened **Supreme Court, with over 80,000** pending cases (as of 2024), has to divert time and judicial attention for non-binding advisory matters, potentially delaying decisions in regular constitutional and statutory cases.
6. **Centre-State Federal Strain**: References arising from politically contentious issues—such as gubernatorial assent or **Article 200 disputes—can intensify federal tensions**, especially when Opposition-ruled States perceive the process as biased or centralizing in intent.

7. **Absence of Detailed Procedural Norms**: Unlike regular constitutional litigation, the process under **Article 143 lacks** codified procedural guidelines or timelines, leading to discretionary delays and inconsistent hearings, reducing the efficacy of the advisory mechanism.
8. **Ambiguity in Implementation and Follow-Up**: The government may cherry-pick aspects of the Court's opinion or delay implementation, reducing clarity and accountability—as seen in selective adoption of observations in past references like the **Special Courts Bill case (1978).**

What can be the way forward?

1. **Codify Advisory Procedures with Clear Guidelines:** The Supreme Court should frame structured norms for the admissibility, timeline, and nature of questions under **Article 143**. Canada's Supreme Court Reference mechanism offers a model—where questions are precisely formulated, with public hearings and timelines ensured by law.
2. **Restrict Scope to Constitutional and Legal Matters**: The reference mechanism should be used strictly for constitutional interpretation, not political or administrative matters. For instance, vague references like in the **Ram Janmabhoomi case (1993)** should be filtered out to preserve judicial neutrality.
3. **Enhance Transparency through Public Participation**: The process must allow for amicus curiae briefs and participation by experts, think tanks, and civil society—similar to how the Indian Supreme Court permitted public submissions during **the Right to Privacy and Section 377 hearings.**
4. **Clarify Legal Status of Advisory Opinions**: A constitutional amendment or authoritative judicial interpretation can clarify whether such opinions are binding or persuasive. This would prevent selective implementation by the executive, as was observed post the **Berubari opinion (1960).**
5. **Institutional Judicial Accountability**: The Supreme Court can include an annual report section on **Article 143 references—highlighting the number of references received**, opinions rendered, and implementation status—ensuring transparency and institutional introspection.
6. **Federal Consultation for Relevant Matters**: For references impacting federal subjects, a structured mechanism for consultation with States should be developed. This would reduce Centre-State mistrust and enhance cooperative federalism, aligning with recommendations of the **Punchhi Commission (2010).**
7. **Establish a Constitutional Review Committee**: A standing committee (similar to the **UK's Joint Committee on Human Rights)** could vet the content and relevance of proposed references before they reach the judiciary, ensuring quality control and constitutional propriety.

Conclusion:

The Presidential Reference under Article 143 symbolizes India's constitutional maturity—an effort to ensure **"dialogue over diktat"** between arms of the state. It reflects the **spirit of cooperative constitutionalism**, fostering clarity over confrontation. As former Chief Justice M.N. Venkatachaliah observed, "Democracy is about constitutional trust, and this trust is rooted in institutions like the judiciary that rise above politics." The current reference before the Supreme Court is a test not just of constitutional interpretation, but of our democratic ethos. The balance it seeks to strike between **judicial activism** and **executive discretion** will define the contours of Indian federalism for years to come.

Read More: The Indian Express
UPSC Syllabus GS-2: Polity

Supreme Court Verdict on Post-Facto Environmental Clearances

India, the **fifth-largest economy globally, is also home to 14 of the 20 most polluted cities** in the **world (IQAir Report, 2023). Delhi's Air Quality Index (AQI) often exceeds 400 in winter months,** leading to severe public health crises. According to the **Economic Survey 2022-23, pollution-linked ailments impose a 1.3% burden on India's GDP annually**, while the **World Bank (2021)** estimated that environmental degradation costs India **$80 billion per year.**

In this context, the Supreme Court's landmark ruling on **May 16, 2025, striking down the Ministry of Environment, Forest and Climate Change's (MoEF&CC) 2017 notification and the 2021 Office Memorandum (OM)** allowing **post-facto environmental clearances**, emerges as a judicial reaffirmation of India's environmental conscience. The apex court declared such clearances "illegal," reinforcing that sustainable development cannot be built on legal loopholes or institutional apathy.

Why the Supreme Court Struck Down the Centre's Orders on Retrospective Environmental Clearances?

The **Environmental Impact Assessment (EIA) Notification, 2006**, mandates that projects must receive prior environmental clearance before any activity commences. However, **the 2017 notification and the 2021 OM permitted ex-post facto clearances**—a move the Court has now **deemed contrary to law and constitutional morality.**

Key Judicial and Legal Grounds:

1. **Violation of EIA 2006:** The EIA process involves four critical stages—screening, scoping, public consultation, and appraisal. Allowing clearances after project initiation defeats this purpose.
2. **Alembic Pharmaceuticals v. Rohit Prajapati (2020):** The Supreme Court unequivocally held that post-facto clearances are an "anathema" to environmental law and a derogation of the precautionary principle.
3. **Common Cause v. Union of India (2017):** The Court ruled that environmental clearance is not a mere formality and must precede any industrial activity.
4. **Article 21 Violation:** The verdict noted that ex-post facto clearances violated citizens' right to a pollution-free environment and health, both recognized under Article 21.
5. **Centre's Contradictions:** Despite promising in the Madras High Court that the 2017 notification was a one-time measure, the Centre extended this through the 2021 OM, approving over 100 violations, including coal, bauxite, and limestone mines.
   This series of evasive tactics led the Court to remark that the Centre "went out of its way to protect those causing environmental harm."

What are the Constitutional Imperatives and Court's Rationale?

India's constitutional vision for environmental protection is robust and wide-ranging:

1. **Article 21: Right to Life:** Expanded through judicial interpretation, it includes the right to clean air, safe water, and a healthy environment. The Court reiterated, "We cannot allow environmental protection to become a post-facto penalty system."
2. **Article 48A and 51A(g): Environmental Duties:** Directive Principles and Fundamental Duties impose both governmental and citizen obligations to "protect and improve the environment." The judgment observed, "Even the Central Government has a duty to protect and improve the natural environment."
3. **Article 14: Equality Before Law:** By offering amnesty to knowing violators, the government violated the principle of equality. Law-abiding project proponents were effectively penalized.

4. **Pragmatic Constitutionalism and Judicial Responsibility under Article 142:** While prior cases like Alembic and Electrosteel Steels allowed exceptions under Article 142, the Court clarified that such extraordinary powers cannot become the norm. While striking down the regime, the Court preserved clearances already granted under the 2017 and 2021 provisions, showing **pragmatic restraint under Article 142**, ensuring that ongoing operations are not disrupted overnight.
5. **Environmental Jurisprudence Embraced:** Citing its own precedents, including **Vellore Citizens' Welfare Forum v. Union of India (1996)** and **M.C. Mehta cases**, the Court emphasized the **Precautionary Principle** and **Polluter Pays Principle** as foundational tenets of environmental law.

What is the Significance of the Verdict Across Sectors?

1. **Restoration of Environmental Rule of Law**: The Supreme Court reinforced the **precautionary principle**, **public trust doctrine**, and **inter-generational equity**, pillars of environmental jurisprudence. It invalidated post-facto clearances, restoring the legal authority of the EIA 2006 Notification—e.g., Sterlite and Goa mining cases.
2. **Judicial Reinvigoration of the EIA Regime**: By mandating prior environmental clearance, the Court strengthened public consultation and due diligence in project approvals. This empowers communities through **mandatory public hearings**, restoring transparency in decisions affecting local ecology.
3. **Strengthening Institutional Accountability**: The Court criticized the Centre for going "out of its way" to protect violators, calling it a breach of constitutional duties. This upholds Article 48A and 51A(g) of the Constitution, holding regulatory agencies like MoEFCC accountable to the rule of law.
4. **Sectoral Impact and Economic Rationale**: Industries such as mining, cement, steel, and real estate—beneficiaries of post-facto approvals—must now undergo stringent scrutiny. Over **100 illegal projects**, including coal and iron ore mines, were regularized under the 2017–21 amnesty.
5. **Public Health and Social Justice**: The ruling acknowledges that **1.6 million deaths in 2019** were linked to air pollution (Lancet), affecting vulnerable groups. It integrates environmental protection with **Article 21 (Right to Life)**, recognizing clean air and water as essential rights.
6. **Reaffirming Economic and Ecological Sustainability**: With **5.7% of India's GDP lost annually** to environmental degradation (World Bank, 2021), the judgment aligns economic planning with long-term ecological viability. It supports green growth over extractive, short-term gains.
7. **Global Resonance and Climate Commitments**: India's EPI rank (180/180 in 2022) exposed governance gaps, but this verdict helps align with the **Rio Declaration** and **Paris Agreement** goals (SDG 13 & 15). It boosts India's credibility in global climate forums like COP and G20.
8. **Civil Society and Judicial Synergy**: Praised by Sunita Narain, CSE, and PRS Legislative Research, the ruling echoes warnings by the **2021 Parliamentary Standing Committee** against legalizing violations. It reflects a convergence of civil society vigilance and judicial activism.

What are the Challenges in Implementing the Ruling?

1. **Weak Regulatory Capacity and Capture**: Pollution Control Boards lack autonomy, funding, and expertise, making them vulnerable to industrial influence (Parliamentary Standing Committee, 2021). For instance, the **CAG Report (2022)** found that 40% of environmental clearance (EC) conditions were not monitored.
2. **Legal and Institutional Fragmentation**: Delays in updating the EIA Notification (pending since 2020) and overlapping mandates between MoEF&CC, NGT, and SPCBs create confusion. This fragmented regime undermines cohesive implementation—e.g., in the **Vizag LG Polymers gas leak case**.

3. **Ineffective Penalties and Enforcement**: Under the **Environment Protection Act, 1986**, maximum penalties often do not exceed ₹1 lakh, inadequate to deter corporate violators. Between 2017–2021, over **55 projects received approvals without due diligence**, violating SC directives.
4. **Public Consultation Erosion**: Public hearings are often bypassed or manipulated, especially in tribal and rural areas, weakening democratic oversight. For example, **draft EIA 2020** proposed exempting several projects from public consultation, triggering widespread protests.
5. **Data Deficiency and Lack of Transparency**: Environmental impact data is often inaccessible or outdated, undermining community and expert oversight. The absence of **real-time monitoring systems** impedes compliance audits and early-warning mechanisms.
6. **Political-Economic Conflict**: The push for "Ease of Doing Business" often clashes with environmental safeguards, leading to policy dilution. The **EIA 2020 draft** was widely seen as favoring industrial interests over ecological sustainability.
7. **State-Centre Federal Tensions**: States may invoke autonomy to dilute central norms, citing development imperatives. For instance, **Andhra Pradesh and Odisha** have bypassed MoEF&CC clearances for infrastructure and mining projects.
8. **Judicial and Administrative Delays**: Environmental litigation often suffers from protracted delays, weakening deterrence and eroding public trust. Many NGT orders face slow implementation, as seen in the **Bellandur Lake pollution case in Bengaluru**.

What can be the Way Forward?

1. **Revamp and Codify the EIA Process**: Finalize a transparent, participatory EIA framework that mandates early community engagement and prohibits post-facto clearances. For instance, **Canada's Impact Assessment Act** ensures inclusive decision-making from project inception.
2. **Strengthen Institutional Capacity**: Reform and autonomise Pollution Control Boards by hiring experts in ecology, health, and economics, and increasing budgetary allocations. The ₹900 crore proposed in **Budget 2023–24** is inadequate given the scale of enforcement needs.
3. **Real-Time Digital Monitoring**: Mandate Continuous Emission Monitoring Systems (CEMS), satellite surveillance, and platforms like **PARIVESH** to track compliance in real time. The upcoming **NASA-ISRO NISAR mission** can aid in detecting land-use and deforestation violations.
4. **Citizen-Centric Participation**: Make public hearings binding, accessible in local languages, and integrate mobile-based grievance redressal systems. This mirrors global best practices like **the Aarhus Convention** on environmental rights and public access.
5. **Higher Penalties and Legal Deterrence**: Amend the **Environment Protection Act, 1986** to impose stiff financial penalties and criminal liability on repeat offenders. The UK's **Environmental Liability Directive** serves as a model, making polluters pay for full restoration.
6. **Judicial and Administrative Reform**: Set up judicial monitoring cells and environmental benches as proposed by the **Law Commission**, and include ecological jurisprudence in NJA training. This ensures faster resolution of cases like the **Bellandur Lake pollution case**.
7. **Fiscal and Green Budgeting Incentives**: Integrate environmental performance into Union Budget allocations, and promote eco-friendly investments via green bonds and **ESG-based tax incentives**. Example: The EU Green Deal's funding model promotes circular and low-carbon economies.
8. **Learn from Global Frameworks**: Align with international frameworks like **UNEP's Environmental Rule of Law** and emulate models such as the US **NEPA** and **EPA Superfund** programs for preventive regulation and swift remediation of environmental damage.

Conclusion:

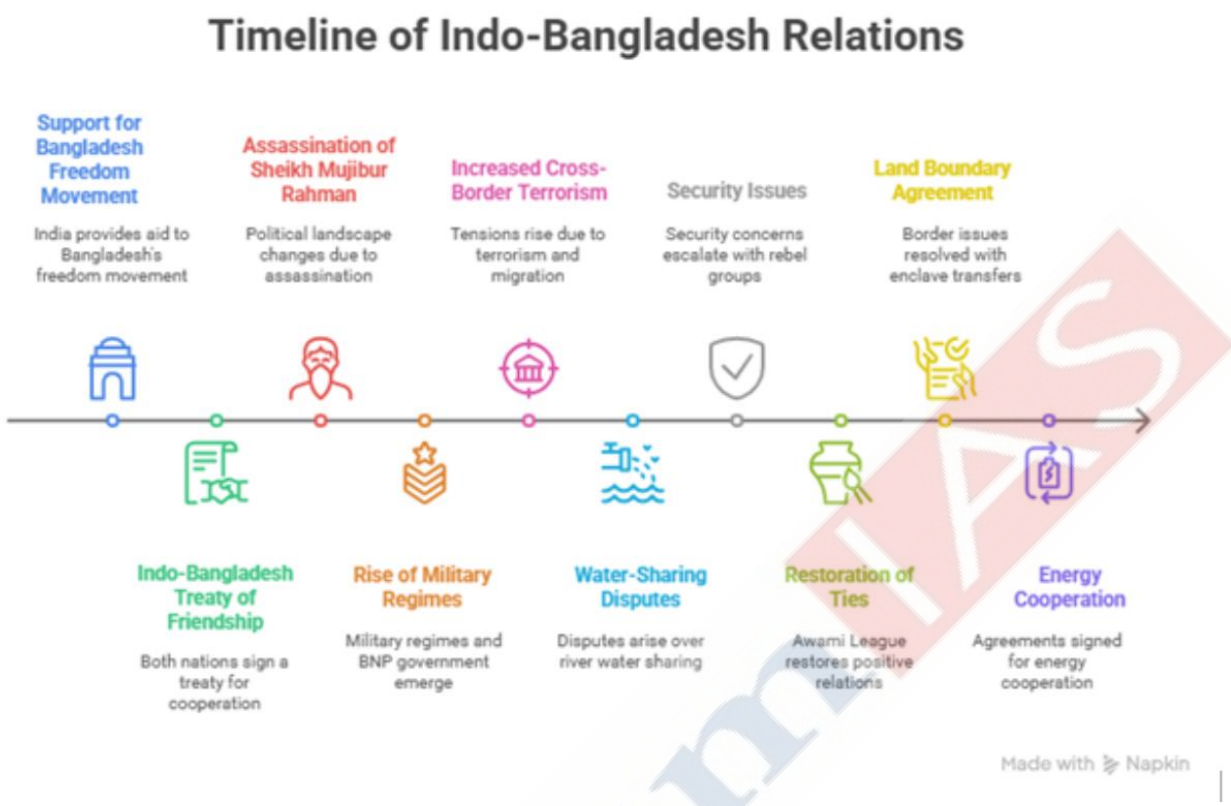
As the Supreme Court decisively declared: **"Conservation of environment and its improvement is an essential part of the concept of development."** This landmark judgment restores the balance between environmental sustainability and industrial growth, reiterating that environmental protection cannot be post-script—it must be the prologue. In the words of Rachel Carson, whose **Silent Spring inspired global environmental consciousness**: "The more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction." India must now walk the path of development with caution, integrity, and foresight. Anything less would be a betrayal of both nature and future generations.

Read More: The Indian Express
UPSC Syllabus GS-3: Environment

Trade diplomacy: on India-Bangladesh trade-related tensions

India and Bangladesh share a complex yet deeply intertwined relationship marked by shared history, geography, culture, and commerce. As per the **Ministry of Commerce and Industry**, bilateral trade between India and Bangladesh stood at over **$18 billion in FY 2022–23**, making **Bangladesh India's largest trading partner in South Asia**. India exported goods worth **$13.8 billion** to Bangladesh and imported about **$4.9 billion**.

However, the recently escalating trade tensions — highlighted by India's **May 17, 2025 trade restrictions**, and Bangladesh's earlier curbs on Indian goods — signify a troubling shift. According to the **Global Trade Research Initiative (GTRI)**, India's restrictions will affect **42% of bilateral imports**, amounting to **$770 million**, including **$618 million worth of garments**.



What is the Recent issue Unfolding Trade Issue?

Recently escalating trade tensions — highlighted by India's **May 17, 2025 trade restrictions**, and Bangladesh's earlier curbs on Indian goods — signify a troubling shift. According to the **Global Trade Research Initiative (GTRI)**, India's restrictions will affect **42% of bilateral imports**, amounting to **$770 million**, including **$618 million worth of garments**. These changes have flared, largely due to internal political changes in Bangladesh:

1. **Regime Change in Bangladesh**: The new interim government led by **Mohammad Yunus**, which replaced the Awami League-led administration, has taken a visibly different political and diplomatic stance.
2. **Trade Restrictions by Bangladesh**: In April 2025, Dhaka **banned Indian yarn imports** through five key land ports and introduced curbs on **rice, fish, dairy, and tobacco**. It also imposed a **transit fee of 1.8 taka per ton per kilometer** on Indian cargo. It further imposed a **transit fee of 1.8 taka per ton per kilometer** on Indian cargo — a move that disrupted Indian logistics and supply chains.
3. **Geopolitical Flashpoint**: Yunus's March 2025 visit to China and his remarks describing **India's northeast as "landlocked" and offering Chinese access** via Bangladesh further irked New Delhi, raising sovereignty and security alarms.

In retaliation, India:

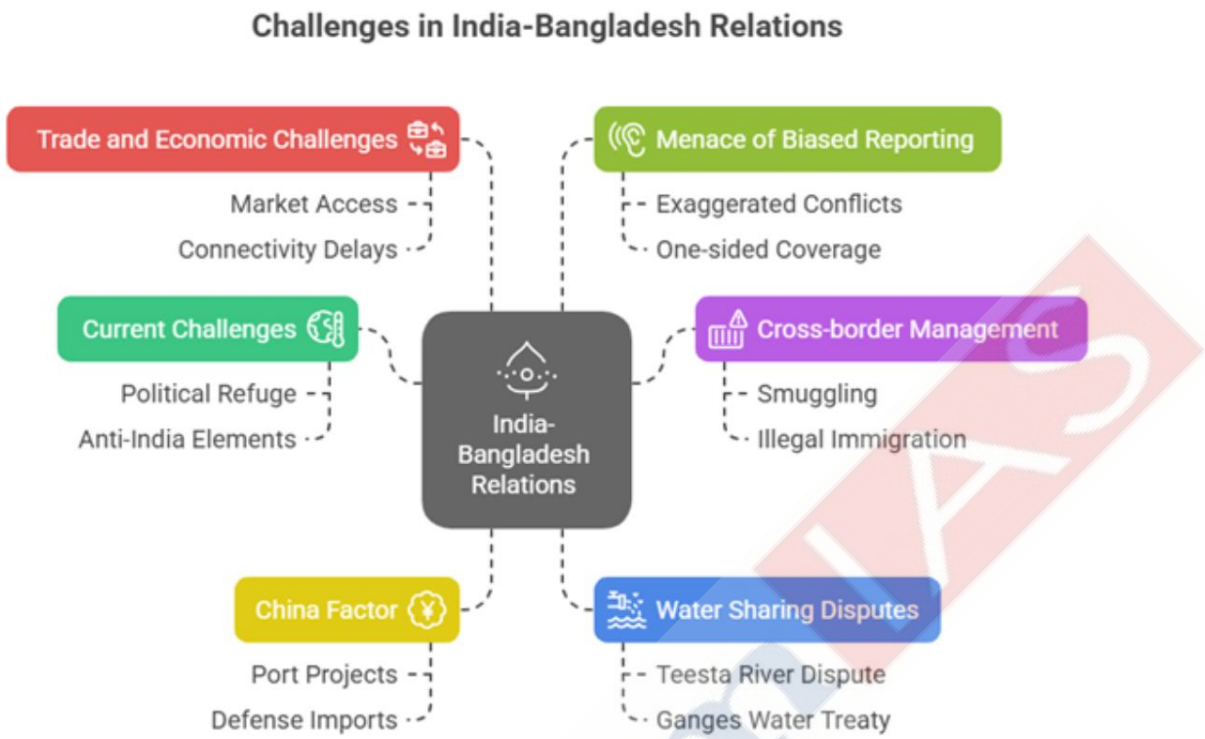
1. **Revoked a key transshipment facility** on April 9, 2025, which allowed Bangladesh to export via Indian airports, especially to Europe and the Middle East.

2. Announced **curbs on Bangladeshi imports**, particularly garments, plastic products, and processed food, restricting their entry only through the **Kolkata and Nhava Sheva seaports**, thus cutting off key land corridors.

According to the **DGFT**, this is a "calculated response" to Bangladesh's restrictions and diplomatic alignment with China. Thus, the trade standoff is less an economic disagreement and more a **manifestation of broader strategic recalibrations** in South Asia.

What is the Significance of India-Bangladesh Relations?

1. **Economic and Trade Partnership: Bangladesh is India's 6th largest export destination** globally. Cross-border trade supports millions of livelihoods, especially in border states like **West Bengal, Assam, and Tripura**. Over **350 Indian companies** have invested in Bangladesh, including **Tata Motors**, **Marico**, and **Aditya Birla Group**.
2. **Geostrategic Importance:** Bangladesh is the gateway to India's **northeast**, with ports like **Chattogram** being crucial for Indian transshipment. The **India-Bangladesh Protocol on Inland Water Transit and Trade (PIWTT)** enables Indian cargo to pass through Bangladeshi rivers. Bangladesh is also a major beneficiary of India's **Neighborhood First Policy** and **Act East Policy**, and enjoys duty-free access under the **South Asian Free Trade Area (SAFTA)** framework.
3. **Security Cooperation:** Counter-terrorism cooperation and joint border patrols have improved regional security. The return of **ULFA and JMB militants** by Bangladesh in past years reflects deep security trust.
4. **Connectivity and Infrastructure:** Projects like **BBIN Motor Vehicle Agreement**, **Maitree Express**, and **Kolkata-Dhaka-Agartala bus services** have fostered people-to-people and commercial links. The **India-Bangladesh Friendship Pipeline (2023)** enhances energy cooperation.
5. **Environmental and Water Diplomacy:** The **Teesta water-sharing agreement** remains unresolved, causing discontent in Dhaka. Collaboration on river management (e.g., Ganga and Brahmaputra) is vital for both countries, especially with growing climate risks.
6. **Cultural and Educational Exchanges:** Bangladesh students constitute a major chunk of foreign students in Indian universities. Shared cultural icons like Rabindranath Tagore and common linguistic heritage deepen ties.
7. **Global and Regional Multilateralism:** Both nations are part of **SAARC, BIMSTEC, IORA**, and **SASEC**, platforms that offer avenues for economic integration and joint climate action.



What are the Challenges in India-Bangladesh Relations?

1. **Trade Protectionism**: Port restrictions, non-tariff barriers, and transit fees (1.8 taka/km/tonne) disrupt supply chains. GTRI reports show a **42% impact on bilateral imports** due to India's latest restrictions.
2. **Political Instability in Bangladesh**: The **Yunus regime lacks popular mandate**, with bans on major parties like **Awami League**, raising international alarm.
3. **China's Expanding Influence**: Over **$40 billion in Chinese investments** and alignment under **Belt and Road Initiative (BRI)** threaten India's strategic space. The offer of **land-sea access to China via Bangladesh** undermines India's Northeast security.
4. **Border Management Issues**: **Over 1,200 border deaths** due to cross-border crimes since 2000 (as per Human Rights Watch). Issues of **illegal migration and cattle smuggling** fuel tensions.
5. **Water Disputes**: Stalled **Teesta agreement** affects irrigation in both countries. Projects like **Tipaimukh Dam** remain contentious.
6. **Perception of Indian Hegemony**: India is often viewed as **the 'Big Brother' in Bangladesh**, affecting grassroots diplomacy and public sentiment.
7. **Rising Anti-India Sentiment**: Media narratives and political groups in Bangladesh leverage nationalism to target Indian policies.
8. **Lack of People-Centric Diplomacy**: Absence of robust civil society, academic, and cultural engagement limits long-term trust-building.

What can be the Way Forward?

1. **Institutionalize Trade and Economic Dialogue**: Set up a **Permanent Joint Trade Commission** with business chambers and technical experts to resolve trade irritants swiftly.

2. **Diversify Political Engagement**: Go beyond ruling regimes. Engage with **civil society, academia, youth leaders, and opposition parties**, as advocated by the **Observer Research Foundation (ORF)**.
3. **Finalize the Teesta Agreement**: Use **expert panels and independent mediation** models like the **Indus Waters Treaty** to resolve water-sharing disputes.
4. **Counterbalance China's Influence**: Accelerate projects under **India's Development Partnership Administration (DPA)** and offer **low-interest credit lines** and **capacity-building initiatives**.
5. **Enhance Connectivity Infrastructure**: Fast-track completion of the **Akhaura-Agartala rail link**, expand **PIWTT**, and develop **joint SEZs** for bilateral production.
6. **Launch a 'People First' Policy**: Expand **student scholarships**, ease **visa regimes**, support **media exchanges**, and hold **cultural festivals** in both countries.
7. **Leverage Subregional Frameworks**: Activate **BBIN**, **BIMSTEC**, and **SASEC** for joint logistics, trade corridors, and disaster management.
8. **Ensure Democratic Support**: As per **MEA's parliamentary standing committee (2023)**, sustained diplomacy must encourage free and fair elections and constitutional order in Bangladesh.

Conclusion: Navigating the Future with Prudence:

India-Bangladesh ties are too strategically vital to be derailed by short-term trade disputes or political frictions. As noted by columnist **Suhasini Haidar**, "Diplomacy, not economic coercion, is the enduring currency of regional leadership." India must strike a balance between safeguarding strategic interests and fostering goodwill in the neighbourhood. As South Asia enters a phase of geopolitical churn with China's assertiveness and internal political transitions, India must remember that **"stable, democratic, and economically integrated neighbours are the best guarantee of national security."** The roadmap ahead lies not in ports and prohibitions, but in principled diplomacy rooted in mutual respect, trust, and cooperation.

Read More: The Hindu
UPSC Syllabus GS-2: Bilateral Relations

Overfishing and Urban Ecological Resilience: Safeguarding India's Blue and Green Wealth

India stands at an environmental crossroads. According to the **UNEP's Global Environment Outlook 6**, marine biodiversity faces a steep decline, with 33% of global fish stocks overexploited. The **IPBES Global Assessment Report (2019)** warned that over 1 million species face extinction, many within decades, if no action is taken. The **IPCC Sixth Assessment Report** adds that climate change exacerbates ecosystem vulnerabilities through sea-level rise, coastal erosion, and marine heatwaves. The **International Day for Biological Diversity 2025** urges nations to align with the theme — "Harmony with Nature and Sustainable Development", derived from the **Kunming-Montreal Global Biodiversity Framework (GBF)**. India's challenge is clear: reconciling ecological resilience in oceans and cities with sustainable development.

How's the India's Fishing is Doing?

In India, marine fish production has stabilized at around 3.7 million tons per annum, as per the **Ministry of Fisheries, Animal Husbandry and Dairying (2023)**. Despite this, widespread poverty, ecological degradation, and regulatory fragmentation persist. Urban biodiversity is equally imperiled: the **Forest Survey of India (2023)** pegs average green cover in major Indian cities at just 10.26%, with Chennai and Hyderabad losing over 4 square kilometers of forest cover in just two years.

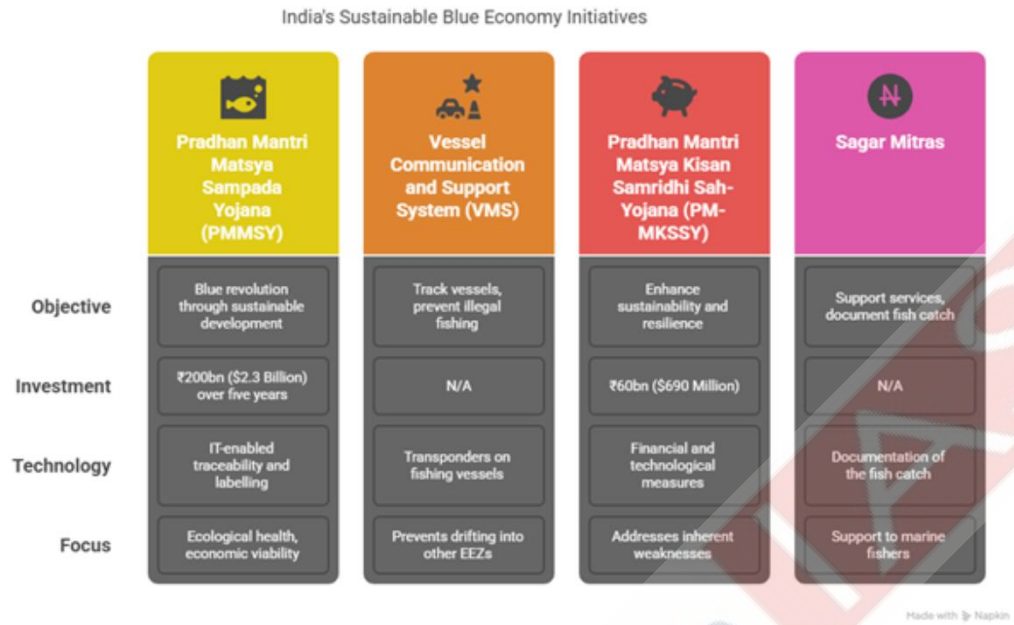
India's fisheries sector is a vital economic and nutritional pillar:

1. **Contribution to Economy**: It contributes 1.1% to national GDP and over 7% to agricultural GDP (MoF, 2024–25).
2. **Production**: India is the second-largest fish producer globally and the fourth-largest exporter (FAO 2022), producing ~14.1 million tons annually (marine and inland combined). **Marine fisheries**, contribute approximately 4.12 million metric tons (MMT) to the total fish production. **Inland fisheries and aquaculture**, account for about 12.12 MMT, making up over 75% of the total fish production.
3. **Employment**: Provides livelihoods to over 28 million people, directly and indirectly, of which ~16 million are in the marine sector (NITI Aayog, 2023).
4. **Coastline**: India's coastline stretches 11,098 km, housing 3,688 marine fishing villages and 1,914 landing centres.
5. **Exports**: Marine product exports were worth ₹63,969 crore in 2023–24, with frozen shrimp alone contributing 40% **(MPEDA data).** The sector has witnessed significant growth, with seafood exports valued at ₹60,000 crore in 2023–24. Schemes like **PM Matsya Sampada Yojana (PMMSY)** (budget ₹20,050 crore) aim to double exports, enhance fish production to 22 million tonnes by 2024–25, and create 55 lakh jobs.

What is the current issue of Overfishing?

Overfishing poses a significant threat to India's marine ecosystems and the livelihoods dependent on them. **The Central Marine Fisheries Research Institute (CMFRI) reported** in 2022 that **over 4% of India's fish stocks** are currently facing overfishing, while **8.2% have already been overfished.**

1. **Overcapitalization**: Mechanized vessels dominate the catch—90% of fishers are small-scale, but they capture just 10% of the harvest.
2. **Juvenile Fishing**: Widespread use of small mesh (<25mm) nets results in juvenile fish mortality; e.g., over 10 kg of bycatch for every 1 kg of shrimp in trawlers (Arabian Sea study, 2024).
3. **Biodiversity Loss**: Multi-species bycatch harms reef systems and trophic balance, making recovery from stock collapses difficult or irreversible.
4. **Historical Collapses**: Canada's cod fishery crash (1992) and the Pacific sardine collapse (1967–86) show how mismanagement can destroy entire economies.
5. **Fishmeal Industry Distortion**: The **FMFO sector**, feeding on juvenile bycatch, converts edible protein into export-based aquafeed, creating perverse market incentives. Fragmented regulation further exacerbates the crisis. Each coastal state has its own **Marine Fisheries Regulation Act (MFRA)**, leading to inconsistent enforcement and fish laundering across borders.



What is the Significance of the Fishing Sector for India?

1. **Livelihood Security:** The fisheries sector provides direct employment to over **4 million marine fishers**, primarily from **marginalized coastal communities**. Overall, it supports **28 million livelihoods** across fishing, processing, and marketing (NITI Aayog, PMF IAS). **Example: In Odisha, the Chilika Lake fishing community depends almost entirely on estuarine fisheries for daily income.**
2. **Food and Nutritional Security:** Fish is a key source of **affordable protein and omega-3 fatty acids**, vital for states with **low animal protein intake**. It is often referred to as **"Rich Food for Poor People"** for its accessibility and nutrition (PMF IAS). **Example: In West Bengal, fish forms a dietary staple, especially among rural populations with limited protein options.**
3. **Export Revenue and Foreign Exchange:** Seafood exports were valued at **₹60,000 crore (~$8 billion) in 2023–24**, making fisheries a crucial contributor to India's **foreign exchange reserves** (MPEDA, PIB).
   Example: India is the world's largest exporter of frozen shrimp, with the USA and China being top importers.
4. **Regional Development:** Coastal states like **Kerala, Andhra Pradesh, and Gujarat** rely heavily on fisheries-based **microeconomies** that sustain local employment and trade. Fisheries infrastructure boosts regional GDP and livelihoods. **Example: The port city of Veraval in Gujarat thrives as a hub for marine exports and fish processing units.**
5. **Gender Role:** Women constitute around **56% of the post-harvest fisheries workforce**, playing key roles in **drying, processing, and marketing** of fish (PMF IAS). Empowering them boosts family incomes and local entrepreneurship. **Example: In Tamil Nadu, women-run self-help groups manage fish drying yards and retail networks in coastal villages.**
6. **Climate Mitigation:** Sustainable marine ecosystems like **mangroves and seagrasses** act as major **carbon sinks**, capable of **sequestering 10 times more carbon** than terrestrial forests (ResearchGate).

Example: The Sundarbans mangroves not only support biodiversity but also offset significant carbon emissions.

7. **Blue Economy Potential:** According to NITI Aayog and the Ministry of Earth Sciences, India's **Blue Economy** could contribute **$1 trillion to GDP by 2030**, with fisheries being a core pillar. **Example: The Sagarmala project integrates fisheries into port-led development for coastal economic upliftment.**
8. **Cultural and Indigenous Identity:** Fishing sustains **traditional knowledge systems**, indigenous livelihoods, and **community-based conservation practices** that preserve biodiversity. **Example: The 'Sasi' fishing method in Kerala, passed down generations, emphasizes harmony with nature and selective harvesting.**

What are the Challenges to Sustainable Fishing in India?

1. **Overfishing and Stock Depletion:** Around **30% of India's marine fish stocks are overexploited** (CMFRI, 2022), driven by **indiscriminate trawling, juvenile fishing**, and weak monitoring. This threatens long-term sustainability and biodiversity.
   Example: Sardine and mackerel stocks along the southwest coast have shown sharp declines due to excessive harvest pressure.
2. **Climate Change Impacts: Rising sea surface temperatures, ocean acidification, and changing currents** are disrupting fish breeding patterns, altering migratory routes, and intensifying cyclonic events (IPCC AR6, WMO).
   Example: Cyclone Amphan in 2020 displaced thousands of fishers in West Bengal and Odisha, impacting fishing seasons.
3. **Pollution and Habitat Destruction: Marine plastic, oil spills, untreated sewage**, and coastal construction degrade coral reefs, mangroves, and estuaries—critical breeding grounds for fish.
   Example: The Ennore Creek in Chennai has suffered massive ecological damage due to industrial effluents and fly ash dumping.
4. **Socio-economic Disparities:** Though **90% of the fishing population comprises small-scale fishers**, they land less than 10% of the total catch and suffer from **market exclusion, debt, and poverty**.
   Example: In Maharashtra's Raigad district, mechanised boats dominate markets, leaving artisanal fishers with minimal income.
5. **Illegal, Unreported, and Unregulated (IUU) Fishing: IUU fishing** causes massive ecological and economic loss, estimated to reduce global catches by **11–26 million tonnes annually** (FAO, 2022), and undermines regulatory efforts.
   Example: In India's east coast, foreign vessels are often found trawling in Indian waters without permits, flouting marine laws.
6. **Inadequate Infrastructure:** Deficits in **cold storage, processing units, landing centres, and transport networks** result in post-harvest losses of up to **20-25%** in marine fish (MoFPI, 2023).
   Example: In Kerala, small harbours without ice plants force fishers to sell fresh catch at reduced rates to middlemen.
7. **Policy and Regulatory Gaps:** The **Marine Fishing Regulation Acts (MFRAs)** differ across coastal states, enabling regulatory evasion; fish banned in one state can be legally landed in another.
   Example: Juvenile threadfin bream protected in Kerala is frequently sold legally in Tamil Nadu, undermining conservation gains.
8. **Data Deficiencies and Scientific Gaps:** Decisions on catch limits and fishing licenses are often based on **historical rights or vessel size**, not robust stock assessments, leading to unsustainable practices.

Example: India lacks a nationwide real-time fishery database, unlike New Zealand's QMS-based management system.

What can be the Way Forward?

1. **National Fisheries Framework Law:** Harmonising state-level **Marine Fishing Regulation Acts (MFRAs)** into a unified law will standardise **Minimum Legal Size (MLS)**, gear restrictions, and closed seasons nationwide. *Example: Kerala–Tamil Nadu overlap.*
2. **Quota Management System (QMS):** Pilot **science-based catch quotas and tradable fishing rights** starting with high-value species, inspired by **New Zealand's QMS. *Example: Hoki quota model.***
3. **Ban Destructive Fishing Gear:** Mandate **Turtle Excluder Devices (TEDs)**, LED deterrents, and selective gear to reduce bycatch and protect vulnerable species. *Example: Odisha TED success.*
4. **Reform FMFO Industry:** Cap bycatch quotas, redirect low-value catch to **local nutrition schemes**, and promote **alternative aquafeeds**. *Example: Kerala bycatch program.*
5. **Community Co-Management:** Empower **fisher cooperatives** and local councils as co-managers of **Marine Protected Areas (MPAs)** for better conservation. *Example: Chilika Lake model.*
6. **Technology and Infrastructure:** Deploy **FISHNET**, AI-based monitoring, and e-permitting; improve cold chains under **PMMSY** for better value retention. *Example: Tamil Nadu FISHNET.*
7. **Urban Green-Blue Integration:** Implement **UN-Habitat's 3-30-300 Rule** to enhance ecological resilience in marine cities through nature-based urban design. *Example: Kochi wetland buffer.*
8. **Ecological Restoration:** Support projects like **Pallikaranai wetland** and **Koyambedu greening** to revive coastal biodiversity and climate resilience. *Example: Chennai marshland revival.*

Conclusion:

India's "marine wealth is vast, but not infinite". The **UNEP Blue Economy Report 2021** warns that ocean ecosystems can collapse if overfishing, pollution, and coastal degradation go unchecked. Nobel laureate Elinor Ostrom stressed that "commons must be governed by collective, polycentric systems"—a principle that holds true for both oceans and cities. On this **International Day for Biological Diversity**, India must seize the opportunity to weave a new narrative—of scientific quotas, equitable access, green cities, and blue prosperity. The ocean is not a bottomless larder. Sustainability is not just a choice—it is our obligation to future generations.

Read More: The Hindu
UPSC Syllabus GS-3: Fisheries Sector

Tariff Wars and the Reshaping of AI's Global Landscape: Implications for India and the World

The **global artificial intelligence (AI) landscape** is undergoing a significant transformation, influenced by geopolitical tensions and evolving trade policies. The United States' recent imposition of substantial tariffs, particularly on **AI-related hardware, has disrupted global supply chains**, leading to increased costs and strategic realignments. This shift presents both challenges and opportunities, especially for emerging economies like India.

What has Happened so far?

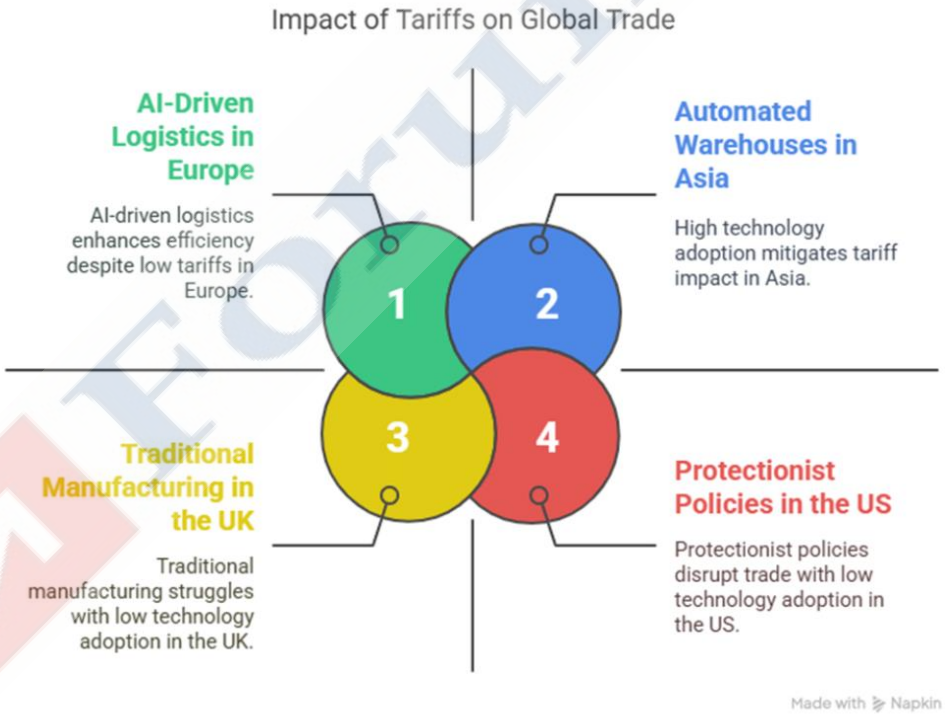
1. In 2024, **the U.S. imported approximately $486 billion worth of electronics**, with data processing machine imports costing around **$200 billion,** primarily from tariff-affected countries such as **Mexico, Taiwan, China, and Vietnam.**

2. Tariffs on critical **AI hardware components** have reached as high as **27% in 2025**, particularly affecting specialized AI accelerators and advanced logic chips.
3. Empirical studies indicate that a **one standard deviation increase in tariffs can reduce output growth by 0.4% over five years.**

What are the Different Tariffs and Their Types?

Tariffs are taxes imposed by a government on imported goods. They serve various purposes, including protecting domestic industries, generating revenue, and addressing trade imbalances. The primary types of tariffs include:

1. **Protective Tariffs**: Designed to shield domestic industries from foreign competition by making imported goods more expensive.
2. **Revenue Tariffs**: Aimed at generating income for the government without necessarily protecting domestic industries.
3. **Anti-Dumping Tariffs**: Imposed to prevent foreign companies from selling goods below market value to undermine domestic producers.
4. **Countervailing Duties**: Levied to counteract subsidies provided by foreign governments to their exporters.
5. **Retaliatory Tariffs**: Applied in response to tariffs imposed by other countries, often as a means of negotiation or protest.



What are the Current Issues Arising from U.S. Tariff Policies?

1. **Increased Costs**: Tariffs have raised the costs of imported components critical to AI infrastructure, making the U.S. a more expensive location for AI development.

2. **Supply Chain Disruptions**: Global supply chains, especially those involving semiconductors and AI hardware, have been disrupted, leading to delays and increased complexity.
3. **Reduced Innovation**: Protectionist policies can reduce competition, leading to decreased incentives for domestic firms to innovate.
4. **Global Inefficiencies**: Artificial segmentation of supply chains can lead to economic inefficiencies, as highlighted by classical Ricardian trade theory.

What are Challenges and Impacts of U.S. Tariffs?

1. **Economic Inefficiencies and Higher Costs**: Tariffs disrupt integrated global supply chains, raising input costs and decreasing overall productivity. This hampers global economic growth and AI infrastructure expansion. **Example: AI chip cost surged post-2018 tariffs.**
2. **Innovation and Competitiveness Slowdown**: Protectionist barriers reduce competitive pressures and access to advanced tech, slowing innovation cycles. Domestic firms may grow complacent without external challenges. **Example: U.S. AI firms lagged in 2023 patents**
3. **Supply Chain Vulnerabilities and Realignment**: Dependence on specific countries exposes strategic supply weaknesses; relocation is costly and time-intensive. Firms struggle with capacity gaps and logistics. **Example: Nvidia diversified away from Taiwan.**
4. **Investment and Policy Uncertainty**: Volatile trade regimes discourage long-term investment in technology and manufacturing sectors. Capital shifts to more stable regulatory environments. **Example: Intel delayed U.S. chip expansion**
5. **Rising Consumer Prices and Inflationary Pressure**: Tariff-driven production cost hikes translate into price increases for end consumers, reducing affordability. Essential digital tools may become inaccessible. **Example: Laptop prices rose in U.S. retail.**
6. **Global Technological Inequality**: Developing nations face restricted access to high-end AI tech due to elevated costs, worsening digital divides. This deepens global capacity gaps. **Example: Africa lags in AI research tools.**
7. **Environmental and Diplomatic Externalities**: Manufacturing shifts for tariff avoidance often burden countries with weaker environmental standards; diplomatic tensions also escalate. **Example: Vietnam factories emit more pollutants.**
8. **Strategic and Security Risks**: Relying solely on domestic production without full capacity development weakens tech resilience and national security. It risks AI self-sufficiency. **Example: U.S. lagged in rare earth access.**

What can be the Way Forward?

1. **Diversify Global Supply Chains**: Adopt the "China Plus One" strategy to spread risk and enhance resilience against geopolitical or trade shocks. Strategic diversification ensures uninterrupted AI hardware flow. **Example: Apple shifts suppliers to Vietnam**
2. **Strengthen Domestic Manufacturing Capabilities**: Leverage schemes like the Production Linked Incentive (PLI) to boost local production in key sectors like semiconductors and electronics. Reduces foreign dependence. **Example: Micron fab investment under PLI.**
3. **Boost Research and Development (R&D)**: Increase public and private R&D spending to drive innovation and reduce reliance on foreign technologies. Supports cutting-edge AI solutions. **Example: ₹1,000 Cr budget for PM-STIAC.**

4. **Promote Workforce Skill Development**: Expand skilling initiatives aligned with Industry 4.0 through programs like PMKVY and Skill India to meet AI demands. Talent is AI's backbone. **Example: AI-ML courses launched under NASSCOM.**
5. **Modernize Digital and Physical Infrastructure**: Invest in robust digital infrastructure—data centers, 5G, and power capacity—to accommodate AI's growing energy and processing needs. **Example: Hiranandani Group's 250 MW data park.**
6. **Encourage Strategic International Partnerships**: Engage in bilateral and multilateral tech alliances to facilitate knowledge exchange, co-development, and resilient supply networks. **Example: India-U.S. iCET tech partnership**
7. **Implement Flexible, Pro-innovation Trade Policies**: Balance strategic protectionism with open-market policies that stimulate innovation, encourage FDI, and reduce barriers. **Example: Tariff cuts on AI chip imports.**
8. **Explore Decentralized Infrastructure Technologies (DePIN)**: Adopt decentralized AI frameworks like DePIN to reduce reliance on centralised data centers and improve tech access in rural regions. **Example: Helium Network for IoT connectivity.**

Conclusion:

The evolving landscape of global trade, marked by tariff wars and strategic realignments, presents both challenges and opportunities. For countries like India, this is a pivotal moment to strengthen **domestic capabilities, engage in strategic collaborations, and position** themselves as key players in the global AI ecosystem. By adopting proactive policies and fostering innovation, India can not only mitigate the adverse effects of protectionist measures but also emerge as a global leader in technology and innovation.

Read More: The Hindu
UPSC Syllabus GS-2: International relations – Policies affecting India

A new vision for the Northeast

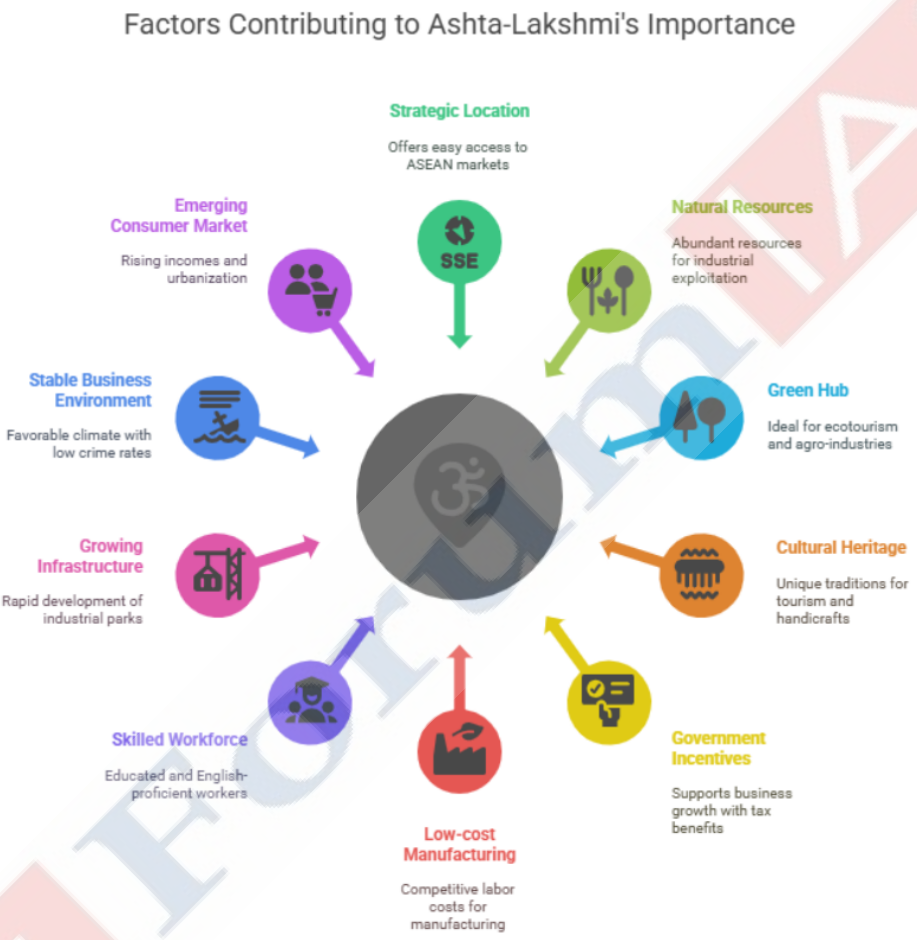
India's Northeast, comprising the **"Ashtalakshmi" states**, is emerging as a keystone in India's growth and strategic vision. With 5,484 km of international borders, rich biodiversity, and vast renewable resources, it is no longer India's periphery but its "strategic and digital frontier." According to **NITI Aayog's North Eastern Region District SDG Index (2021-22),** progress in basic indicators is improving, yet remains uneven. The **Economic Survey 2024-25 identifies** the Northeast as a high-potential zone for infrastructure and trade integration with ASEAN under India's Act East Policy. With recent investments exceeding ₹1.5 lakh crore, the region is transitioning from insurgency to innovation.

What is The 'Rising Northeast' Investor Summit?

The "Rising Northeast: The Investor Summit," organized by the **Ministry of Development of North-Eastern Region (DoNER),** marks a significant step towards showcasing the investment potential of the NER. Key announcements and developments from the summit include:

1. **Infrastructure Development**: The Ministry of Road Transport and Highways allocated 10% of its budget to the region, constructing 4,950 km of National Highways with investments over $5 billion.
2. **Renewable Energy Investments**: A total of 115 Memoranda of Understanding (MoUs) worth ₹38,856 crore have been signed for renewable energy projects in the NER.

3. **Digital Connectivity**: Over ₹1.5 lakh crore has been invested in digital and physical infrastructure, with ₹50,000 crore dedicated to BharatNet and the Digital North East Vision. Currently, more than 90% of the region enjoys 4G coverage, and 80% of rural households are digitally connected via fiber optics.
4. **Skill Development**: Over 2,000 individuals in the region have been trained under various programmes such as Suryamitra, Varunmitra, and Jal Urjamitra, focusing on renewable energy skills.
5. **Strategic Vision**: The summit emphasized the Northeast's role as India's gateway to ASEAN, leveraging its 5,484 km of international borders with five neighboring countries.



What is the significance of the North East for India?

1. **Geo-strategic Gateway:** The Northeast shares over 5,400 km of international borders, linking India to ASEAN and BIMSTEC markets. Its pivotal location enhances India's Act East Policy and bolsters regional connectivity. **Example**: India-Myanmar-Thailand Trilateral Highway; Sittwe Port, Myanmar.
2. **Renewable Energy Powerhouse:** With over 218 GW of solar, hydro, wind, and biomass potential, the region can drive India's green transition. It holds nearly 40% of India's hydropower capacity, ideal for clean energy investments. **Example**: Champhai Solar Park, Mizoram; 20 MW Solar Project, Mizoram.
3. **Cultural Capital:** Home to 200+ ethnic groups, the Northeast fosters cultural diplomacy and strengthens India's soft power.

Its festivals, crafts, and languages enrich India's global cultural presence. **Example**: Hornbill Festival, Nagaland; Ziro Music Festival, Arunachal Pradesh.

4. **Biodiversity Hotspot:** The region is among India's richest ecozones, crucial for conservation and eco-tourism. It harbors endemic flora and fauna, including endangered species. **Example**: Kaziranga National Park (one-horned rhinos); Loktak Lake, Manipur.
5. **Agricultural and Organic Hub:** Diverse agro-climatic zones make it ideal for organic farming, horticulture, and floriculture. The region supports food security with rice, tea, fruits, and medicinal plants. **Example**: Sikkim's organic farming model; Assam's tea plantations.
6. **Human Capital Potential:** With high literacy, English fluency, and a young population, the region is ripe for skilling and innovation. Institutions and digital outreach are driving a tech-enabled workforce. **Example**: IIT Guwahati graduates; 5G Telemedicine in Arunachal Pradesh.
7. **Tourism and Wellness Destination:** Its scenic beauty, spiritual sites, and natural resources support eco-tourism and Ayurveda-based wellness. Mountains, lakes, and tribal culture draw global travellers. **Example**: Living Root Bridges, Meghalaya; Loktak Lake, Manipur.
8. **Industrial and Connectivity Boost:** Improved roads, digital networks, and manufacturing hubs are transforming the region's economy. New-age industries like semiconductors and bamboo processing are emerging. **Example**: First semiconductor plant in Assam; Kaladan Multi-Modal Project.

What are the challenges faced by the North East?

1. **Infrastructure Deficits:** Despite increased investments, the region continues to face inadequate road, rail, healthcare, and educational infrastructure, limiting economic expansion. **Example**: Arunachal Pradesh's low road density; poor rail access in interior Nagaland.
2. **Insurgency and Security Concerns:** Legacy of insurgencies and cross-border tensions still pose barriers to investments, development, and stable governance. **Example**: ULFA remnants in Assam; border skirmishes near Nagaland-Myanmar boundary.
3. **Limited Industrial Base and Unemployment:** The absence of major industries leads to high unemployment and youth migration, hindering sustainable local economies. **Example**: Youth migration from Manipur due to job scarcity.
4. **Connectivity Gaps:** Rugged terrain and complex geography delay infrastructure projects, limiting intra-regional mobility and market access. **Example**: Delayed highway projects in Arunachal interiors.
5. **Environmental and Climate Vulnerabilities:** Frequent natural disasters like floods, earthquakes, and landslides threaten infrastructure and fragile ecosystems. **Example**: 2022 Assam floods causing displacement and crop loss.
6. **Administrative and Governance Issues:** Overlapping jurisdictions and weak inter-agency coordination delay execution of developmental schemes. **Example**: Slow progress of Kaladan Multi-Modal Project due to bureaucratic delays.
7. **Resource Underutilization:** Vast renewable and mineral resources remain untapped due to policy gaps, poor access, and low private participation. **Example**: Less than 7% of 129 GW hydro potential harnessed.
8. **Financial and Skill Inclusion Gaps:** Limited credit access and skill mismatch restrict entrepreneurship and economic empowerment, especially in rural areas. **Example**: Low MSME loan penetration; 80% literacy with high skilling deficit.

What can be the way forward?

1. **Integrated Infrastructure and Connectivity:** Fast-track multimodal connectivity—road, rail, air, and waterways—to link the NER with national and ASEAN trade corridors. **Example**: Completion of Trans-Arunachal Highway; operationalization of ICP Moreh on India-Myanmar border.
2. **Industrial Promotion and Investment Facilitation:** Develop Special Economic Zones (SEZs), agro-processing clusters, and one-stop investor portals to boost employment and regional output. **Example**: Agri-processing SEZ in Assam; DoNER's Invest North East portal.
3. **Peacebuilding and Border Management:** Sustain dialogue with insurgent groups, enhance border policing, and resolve disputes to foster a secure and cooperative environment. **Example**: Ongoing Assam-Meghalaya border settlement talks; enhanced deployment near Indo-Myanmar border.
4. **Environmental Sustainability and Climate Resilience:** Implement sustainable development policies, promote green energy, and build disaster-resilient infrastructure to safeguard fragile ecosystems. **Example**: Community forest conservation in Arunachal Pradesh; World Bank-funded resilience infrastructure.
5. **Skill Development and Human Capital Formation:** Align training with regional industries, expand vocational institutes, and bridge skilling gaps for youth employment. **Example**: NER Skill Plan 2022; handloom training centers in Nagaland.
6. **Tourism and Cultural Diplomacy:** Develop eco- and cultural tourism circuits and promote festivals to generate revenue and build soft power. **Example**: Living root bridge circuit in Meghalaya; Hornbill Festival in Nagaland.
7. **Digital and Financial Inclusion:** Expand broadband under BharatNet, promote e-governance, and improve credit access and digital banking in rural zones. **Example**: Digital land records in Tripura; BHASHINI real-time translation tool.
8. **Healthcare and Educational Transformation:** Upgrade medical facilities through telemedicine and enhance higher education with regional research institutes. **Example**: Telehealth services in remote Arunachal; North East Regional Institute of Education.

Conclusion:

The North Eastern Region holds immense potential to contribute significantly to India's growth story. By addressing the challenges and leveraging its strengths, the NER can transform into a hub of economic activity, cultural exchange, and strategic importance. As Prime Minister Narendra Modi aptly stated, the Northeast is not India's periphery but its strategic and digital frontier—a region "where policy meets possibility, nature meets networks, and heritage meets hyper-connectivity."

Read More: The Indian Express
UPSC Syllabus GS 2: Development

India-Africa Digital Compact

The African Union's Digital Transformation Strategy (2020-2030) places digital innovation at the center of its agenda, urging governments to adopt digital solutions to accelerate socio-economic progress. This digital shift is also influencing India's digital diplomacy in Africa.
Traditionally, India has combined state-led financing with socially embedded solutions, such as technical training and infrastructure projects funded by concessional credit. Recently, India's approach has evolved to include social enterprises that deliver affordable, high-impact innovations, reflecting a move toward more inclusive and adaptable partnerships. This new paradigm highlights the growing importance of digital

technology and collaborative, flexible models in fostering sustainable development and deeper ties between India and African nations.

What is the significance of India-Africa Digital Compact?

1. Promoting Digital Inclusion: India is sharing its proven Digital Public Infrastructure (DPI) models—such as Aadhaar (digital ID), UPI (digital payments), and DIKSHA (digital education)—to help African nations leapfrog traditional development barriers and expand access to essential services. This approach is designed to make digital tools affordable, adaptable, and accessible, particularly for underserved populations.

2. Open-Source and Public Good Approach: Unlike proprietary or surveillance-heavy models from other countries, India's digital solutions are open-source and promoted as digital public goods. This ensures that African nations can adopt and adapt these technologies without restrictive licensing or geopolitical strings attached.

3. Capacity Building and Knowledge Transfer: The compact emphasizes co-development and skill-building rather than one-sided technology transfer. Initiatives like the IIT Madras campus in Zanzibar and technical collaborations for national digital ID systems foster local talent and innovation.

4. Addressing Socio-Economic Gaps: By focusing on digital financial inclusion, healthcare, education, and governance, the compact aims to tackle persistent challenges such as rural-urban divides, gender gaps in digital access, and weak infrastructure.

5. Mutual Growth and Global South Leadership: The partnership boosts economic growth for both regions, reinforces India's leadership in the Global South, and supports Africa's voice on the world stage. It is rooted in mutual respect and long-term partnerships, offering a model for equitable, resilient development.

What are the challenges to India-Africa Digital Compact?

1. High Cost of Digital Access: Many African countries experience prohibitively expensive data and device costs, with mobile data sometimes exceeding 5% of average monthly income. This restricts internet use, especially among low-income and rural populations.

2. Digital Divide and Inequality: There are pronounced gaps in internet connectivity between rural and urban areas, and a significant gender gap in digital access and literacy. For example, women in sub-Saharan Africa are 37% less likely than men to use mobile internet, deepening socio-economic disparities.

3. Weak Energy and Infrastructure: Reliable electricity is essential for digital services, but many African regions suffer from inconsistent power supplies. This slows the deployment and reliability of digital infrastructure and services.

4. Limited Digital Skills and Capacity: Both India and Africa face challenges in digital literacy and skills mismatch. The rapid pace of digital transformation requires robust investments in education and capacity-building to ensure populations can effectively use new technologies.

5. Regulatory and Governance Issues: There are concerns about the lack of robust digital governance frameworks in Africa. Issues include weak enforcement of data protection, limited stakeholder engagement, and insufficient alignment with local legal and human rights frameworks, such as the African Charter on Human and Peoples' Rights.

6. Affordability and Policy Gaps: Even as broadband coverage expands, the cost remains a barrier. There is a need for policies that prioritize not just connectivity, but also affordability and equitable access, including for marginalized groups.

7. Sustainable Financing: Bridging the "missing middle" of Africa's digital infrastructure requires significant investment—estimated at $100 billion for broadband alone. Many African countries face budget constraints that make such investments challenging without external support.

8. Local Adaptation and Ownership: While India's digital models are open-source and adaptable, successful implementation in Africa requires meaningful local engagement, adaptation to local contexts, and building local expertise to ensure long-term sustainability.

What can be the way forward for India-Africa Digital Compact?

1. Enhance Affordable Digital Access: Invest in expanding low-cost internet infrastructure and subsidize digital devices, especially for rural and underserved communities, to bridge the digital divide.

2. Strengthen Energy and Digital Infrastructure: Prioritize renewable energy solutions and resilient digital networks to ensure reliable connectivity and power, addressing Africa's weak electricity grids and enabling sustained digital growth.

3. Promote Open-Source, Scalable Solutions: Continue sharing India's Digital Public Infrastructure (DPI) models—such as Aadhaar (digital ID), UPI (digital payments), and DIKSHA (digital education)—as open-source digital public goods, allowing African nations to adapt and scale these technologies to local needs.

4. Invest in Capacity Building and Skill Development: Deepen technical collaboration through joint research, training programs, and academic partnerships (e.g., IIT Madras campus in Zanzibar), fostering local talent and digital literacy.

5. Foster Public-Private Partnerships: Encourage collaboration between governments, Indian and African tech firms, and startups to co-develop innovative digital solutions, drive investment, and accelerate technology adoption.

6. Support Inclusive and Gender-Responsive Policies: Design digital initiatives that address gender gaps and promote access for marginalized groups, ensuring that benefits of digital transformation are equitably distributed.

7. Respect Local Priorities and Co-Development: Engage African partners in co-creating solutions, respecting local contexts and needs, and avoiding one-size-fits-all approaches or strategic conditionalities.

8. Strengthen Digital Governance and Data Protection: Collaborate on developing robust digital governance frameworks, including data protection, privacy, and cybersecurity, aligned with African legal and human rights standards.

9. Mobilize Sustainable Financing: Explore innovative financing models and leverage international partnerships to bridge Africa's digital infrastructure investment gap, estimated at $100 billion for broadband alone.

10. Build Long-Term, Trust-Based Partnerships: Anchor the compact in mutual respect, long-term commitment, and shared prosperity, positioning both regions as leaders in a more equitable, connected, and resilient digital future.

Conclusion:

A new India-Africa digital compact, anchored in mutual respect, co-development, and long-term institutional partnerships, could serve as a scalable framework for advancing digital inclusion.

Read More: The Hindu
UPSC Syllabus GS-2: South-South Cooperation

Operation Sindoor & Self-Reliant India

Operation Sindoor was a moment of reckoning for Make in India which was launched in 2014. The operation not only showcased India's ability to strike with precision & confidence using indigenous defence technologies but also the success of Make in India programme as much of the equipment used in Operation Sindoor was developed under Make in India & Atmanirbhar Bharat initiatives. Atmanirbhar Bharat Abhiyaan (Self-Reliant India Mission) was launched in 2020, which called for action to not only make India self-reliant but also become a global lighthouse in state-of-the-art manufacturing, with modern & efficient value chains while integrating global value chains.

What has been the role of Indian industry in the success of Operation Sindoor?

1. Indigenous Air Defence and Counter-UAS Systems: Indian private and public sector companies developed and deployed advanced indigenous air defence systems such as the Akash surface-to-air missile and integrated counter-UAS (Unmanned Aerial Systems) grids. These systems effectively neutralized Pakistani drone and missile attacks on multiple Indian military installations during the operation, demonstrating superior surveillance, interception, and electronic warfare capabilities.

2. Loitering Munitions and Drones: Indian firms like Tata Advanced Systems and Paras Defence supplied loitering munitions ("suicide drones") and swarm drones that enhanced precision strike capabilities without crossing international borders. These platforms were critical in targeting terrorist infrastructure and neutralizing threats.

3. Private Sector Innovation and Government Support: The success was underpinned by government initiatives such as iDEX (Innovations for Defence Excellence), SRIJAN (import substitution), and Production Linked Incentive schemes that encouraged private sector participation and innovation. This synergy between industry, military, and government accelerated the development and deployment of cutting-edge indigenous technologies.

4. Validation of 'Made-in-India' Weapons: Operation Sindoor validated the combat readiness and reliability of Indian-made defence equipment, boosting confidence domestically and enhancing India's reputation as a global defence manufacturing hub. Prime Minister Narendra Modi highlighted this as a milestone for India's defence self-reliance and export potential.

5. Strategic Edge and Jointness: The integration of indigenous technologies across the Indian Army, Air Force, and Navy facilitated a coordinated, multi-domain response, underscoring the strategic advantage gained through homegrown defence solutions.

6. Net Defence Exporter: Operation Sindoor not only neutralized the threats across the border but also symbolised India's gradual transition from an dependent arms importer to a producer of world-class defence equipments. India's defence exports has climbed up to Rs 23,000cr in FY25 – reaching out to 80 countries & is expected to touch Rs 50,000cr by 2029. The private sector's contribution to these exports is Rs 15,000cr.

7. Developing frontier technologies: India's defence industry is helping India in enhancing its defence capabilities by developing advanced technologies, supporting indigenous manufacturing, and collaborating in joint ventures for systems such as missiles, drones, and combat platforms.

What are the challenges that Indian defence industry facing?

1. Technological Gaps and Import Dependence: Despite progress in indigenization, India continues to rely heavily on foreign imports for high-tech and critical defence systems. As of 2023, 36% of the defence procurement budget was still allocated to foreign imports, reflecting gaps in domestic technological capabilities.

2. Insufficient Budget for Modernization and R&D: While the overall defence budget is substantial, allocations for modernization and research remain inadequate. Only about 3.9% of the defence budget is dedicated to R&D, limiting advancements in cutting-edge areas like hypersonic weapons, AI, and quantum technologies.

3. Bureaucratic Delays in Procurement: The defence procurement process is often slow and encumbered by bureaucratic inefficiencies, resulting in significant delays between contract approvals and equipment delivery. This affects operational readiness and timely modernization.

4. Fragmented Ecosystem and Limited Private Sector Role: The defence sector is still dominated by public sector units, with private industry contributing only about 21% of total production. Collaboration between public and private entities remains limited, and private players face hurdles in accessing major defence projects.

5. Export Market Challenges: Although defence exports have grown, India struggles to penetrate key international markets and compete with established exporters like the US, Russia, and China. The pace of securing major international contracts is slow, and overall export volumes remain modest.

6. Cybersecurity and Electronic Warfare Vulnerabilities: India's cybersecurity frameworks and electronic warfare capabilities lag behind those of major adversaries, exposing critical systems to potential cyber-attacks and electronic threats.

7. Internal Security and Resource Diversion: Ongoing internal security challenges, such as insurgencies and terrorism, divert resources and focus away from conventional military modernization.

8. Lack of Integrated Defence Strategy: Despite reforms, integration across the Army, Navy, and Air Force remains limited, with delays in implementing joint command structures and harmonizing strategies.

9. Delays in Indigenous Projects: Key indigenous projects, such as the Light Combat Aircraft (LCA), have faced significant delays, impacting operational capabilities for e.g. only 31 operational fighter squadrons against a requirement of 42.

10. Policy and Implementation Gaps: Efforts to enforce higher indigenous content in procurement face practical challenges due to the globalized nature of defence supply chains and difficulties in accurately assessing local content.

What can be the way forward?

1. Accelerate Indigenous Technology Development:

- Invest in advanced weapons and systems such as the Advanced Medium Combat Aircraft (AMCA), hypersonic weapons, quantum communication, and AI-driven platforms to reduce dependence on imports and address future warfare needs.
- Foster innovation through initiatives like iDEX (Innovations for Defence Excellence) and the Technology Development Fund, enabling startups and MSMEs to contribute to defence R&D.

2. Strengthen Public-Private Partnerships:

- Encourage deeper collaboration between Defence Public Sector Undertakings (DPSUs), private industry, and academia to drive innovation and production efficiency.
- Establish more collaborative platforms—such as public-private innovation labs and Defence Innovation Zones—to expedite the development and deployment of new technologies.

3. Modernize Procurement and Export Processes:

- Streamline and digitize defence procurement to reduce delays and enhance transparency, prioritizing "Buy Indian" policies to favor domestic manufacturers.
- Expand India's global footprint by targeting emerging export markets in Africa, Southeast Asia, and Latin America, leveraging streamlined export approval processes and government-supported lines of credit.

4. Build a Skilled Defence Workforce: Launch comprehensive defence skill development programs and specialized training institutes in partnership with global defence corporations and top educational institutions to create a pipeline of skilled engineers, technicians, and cyber specialists.

5. Boost Infrastructure and Advanced Manufacturing: Invest in Defence Industrial Corridors (such as those in Uttar Pradesh and Tamil Nadu) and smart manufacturing technologies, including robotics, automation, and additive manufacturing (3D printing), to enhance production capabilities and quality.

6. Enhance Cybersecurity and Digital Defence: Establish a National Defence Cyber Command (NDCC) to protect critical infrastructure, integrate AI-based cyber defence, and conduct regular cyber warfare simulations.

7. Policy Stability and Increased Investment: Ensure policy continuity and increase defence spending, especially for R&D and modernization, to maintain momentum in reforms and keep pace with global technological advancements.

8. Foster Defence Export Diplomacy: Strengthen diplomatic and strategic partnerships to facilitate defence exports and position India as a reliable supplier of advanced military technologies.

9. Integrated Theatre Commands and Jointness: Implement Integrated Theatre Commands (ITCs) to unify the Army, Navy, and Air Force under single commands, enhancing operational synergy and readiness for multi-domain operations.

10. Focus on Strategic Deterrence: Prioritize the development of next-generation deterrent technologies in air, space, cyber, and hypersonic warfare to counter evolving threats and reinforce national security.

Conclusion:
India today stands at a defining juncture. With economic resilience, manufacturing strength, innovation-led growth, and a global outlook – India is no long catching up – it is shaping the future. Thus, India must now aim to lead the next wave of global innovation. It must embed technological ambition into its industrial, academic & strategic fabric. The vision is clear: a strong, secure, self-reliant, and globally respected India.

Read More: The Hindu
UPSC Syllabus GS-3: Sectors of Indian Economy

Rising Overnutrition in Urban India

India is grappling with a paradoxical nutritional landscape. While undernutrition remains a concern in many regions, overnutrition is now rapidly escalating in urban centres. In 2021, India ranked second globally in overweight and obesity prevalence. The trend is particularly evident in metropolitan IT corridors, where professionals are unwittingly becoming the face of a silent metabolic crisis. India's double burden of malnutrition — rampant undernutrition coexisting with overnutrition — is reflected in its low ranking on the Global Hunger Index.

What are the CAUSES for overnutrition in urban India?

1. The "Nutrition Transition" and Changing Dietary Patterns:

- **Shift from Traditional to Westernized Diets:** Urbanization has led to a move away from traditional, home-cooked meals rich in whole grains, pulses, fruits, and vegetables. Instead, there's a growing reliance on:
    - **Ultra-processed foods (UPFs):** These are typically high in refined sugars, unhealthy fats (trans fats, saturated fats), and sodium, while being low in essential nutrients and fiber.
    - **Increased out-of-home eating:** Busy urban lifestyles, especially among working professionals, lead to more frequent consumption of restaurant food, street food, and takeaway options, which are often calorie-dense and prepared with excessive oil and sugar.
    - **Reduced intake of healthy foods:** The consumption of traditional staples like coarse grains (millets) and pulses has decreased, and despite greater availability, the actual intake of fruits and vegetables often remains insufficient.
- **Aggressive Marketing:** The food industry aggressively markets unhealthy processed foods, particularly to children and youth, through various media channels, influencing food preferences and consumption habits.

2. Sedentary Lifestyles:

- **Reduced Physical Activity:**
    - **Desk-bound jobs:** Many urban occupations – particularly related to IT sector – involve prolonged sitting and minimal physical exertion.
    - **Mechanized transportation:** Increased reliance on private vehicles and public transport reduces walking and cycling.
    - **Lack of green spaces and recreational facilities:** Urban planning often prioritizes infrastructure over accessible parks, playgrounds, and safe walking/cycling paths, limiting opportunities for physical activity.
    - **Increased screen time:** Children and adults alike spend significant hours on digital devices (TV, smartphones, computers), contributing to a sedentary lifestyle.
- **Convenience and Automation:** Modern conveniences like elevators, escalators, and household appliances reduce daily physical activity.

3. Socioeconomic and Cultural Factors:

- **Rising Incomes and Aspirations:** As incomes rise, particularly among the urban middle class, there's a tendency to spend more on convenient, often less healthy, processed foods and eating out, which are sometimes seen as symbols of modernization and higher living standards. According to NFHS-5, the

prevalence of overweight or obesity rises from 10% in the lowest wealth quintile to 37% in the highest wealth quintile.

- **Poverty and Food Insecurity (The Paradox):** While overnutrition is often linked to affluence, it's increasingly prevalent among the urban poor. This is because:
    - **Cheaper calorie sources:** Ultra-processed foods are often cheaper per calorie than fresh, nutritious foods, making them an economically viable option for those with limited budgets.
    - **"Hidden hunger":** Even if calorie intake is sufficient, a diet dominated by refined grains and processed foods can lead to micronutrient deficiencies while simultaneously causing weight gain.
- **Changing Family Structures:** Nuclear families and working parents may have less time for home cooking, leading to a greater reliance on convenience foods.
- **Maternal Health:** Maternal obesity is a significant risk factor for childhood obesity, creating an intergenerational cycle.

4. Urban Environment (Obesogenic Environment):

- **Food Environment:** Urban areas are often characterized by an abundance of fast-food outlets, small shops selling processed snacks, and readily available sugary drinks, making unhealthy choices convenient and ubiquitous.
- **Limited Access to Nutritious Food:** While supermarkets exist, fresh produce may still be expensive or less accessible in certain urban pockets, especially informal settlements or lower-income neighborhoods, creating "food deserts" where healthy options are scarce.
- **Air Pollution:** Studies in Indian cities have linked high levels of air pollution (e.g., PM2.5) to reduced outdoor physical activity, contributing indirectly to weight gain.

5. Biological and Genetic Predispositions:

- **Genetic Susceptibility:** Indians, particularly South Asians, have a higher predisposition to abdominal obesity and related metabolic diseases (like Type 2 Diabetes) at lower BMIs compared to Caucasian populations. This means they are at higher risk even without being "clinically obese" by international standards.
- **Fetal Origins of Adult Disease (FOAD):** Poor maternal nutrition (both under- and overnutrition) during pregnancy can predispose the offspring to obesity and NCDs later in life.

<u>What are the CONSEQUENCES of overnutrition in urban India?</u>

1. Rise in Non-Communicable Diseases (NCDs): Overnutrition significantly increases the risk of chronic NCDs such as type 2 diabetes, hypertension, cardiovascular diseases, and certain cancers.

- India has witnessed a sharp rise in diabetes prevalence—from 5.9% in 2000 to 10.4% in 2017—amounting to about 72 million people affected.
- Hypertension rates have also climbed, with 29.2% of the population affected as of 2014.
- A recent article published in Nature magazine studied the prevalence of Metabolic Dysfunction Associated Fatty Liver Disease (MAFLD) among IT employees in Hyderabad found that 84% of the participants had fatty liver, indicating MAFLD, and 71% were obese.

- STEPS Survey (2023-24) in Tamil Nadu found out that 65% of deaths in Chennai are attributable to NCDs.

2. Dual Burden of Malnutrition: Urban India faces a dual burden: while undernutrition persists in some groups, overweight and obesity rates have surged, especially among women (about half of urban women affected). This coexistence complicates public health responses and stretches healthcare resources.

3. Childhood Obesity and Related Health Issues: Overnutrition among children is rising, leading to early onset of obesity, metabolic syndrome, and increased risk of adult NCDs. The cumulative prevalence of overweight/obesity among children has increased to 19.3%. According to an article published in Lancet, Childhood obesity has surged by 244% over the past three decades and is expected to climb another 121% in the next three. The National Family Health Survey-5 shows that obesity steadily rises with age, from 7% among men (15-19 years) to 32% among those aged 40 to 49 years.

4. Lower Immunity and Increased Infection Risk: Being overweight or obese is linked to a weakened immune system, making individuals more susceptible to infections, as seen during the COVID-19 pandemic.

5. Economic and Social Impact: The growing burden of NCDs leads to higher healthcare costs (Out of Pocket Expenditure), loss of productivity, and increased economic strain on families and the healthcare system.

6. Psychosocial Consequences: Overnutrition can lead to stigma due to obesity, low self-esteem, and mental health issues, particularly among children and adolescents.

7. Micronutrient Deficiencies: Despite excess calorie intake, urban diets often lack essential micronutrients, leading to hidden hunger and associated health problems.

What have been the government initiatives?

1. Eat Right India Movement (FSSAI):

- **Objective:** Led by the Food Safety and Standards Authority of India (FSSAI) under the Ministry of Health and Family Welfare, this movement aims to transform the country's food system into one that promotes safer and healthier eating habits. It addresses the "triple burden of malnutrition" (under-nutrition, micronutrient deficiencies, and overnutrition).
- **Key Pillars:**
    - **Eat Safe:** Emphasizes personal and surrounding hygiene in food preparation and consumption.
    - **Eat Healthy:** Promotes diet diversity and balanced diets, focusing on reducing consumption of salt, sugar, and saturated fats, and eliminating trans fats. It also encourages fortification of staples to address micronutrient deficiencies, which can indirectly help in shifting dietary patterns away from ultra-processed foods.
    - **Eat Sustainably:** Promotes local and seasonal foods, and aims to prevent food loss and waste.
- **Initiatives within Eat Right India:**
    - **Reformulation of Packaged Foods:** Nudging food businesses to reduce salt, sugar, and fat content in their products and reformulate them to be healthier.
    - **Consumer Awareness Campaigns:** Engaging, exciting, and enabling people to make the right food choices through various activities like "Eat Right Melas," quizzes, street plays, and educational materials.
    - **Food Labeling:** Educating consumers about ingredients, nutritional properties, and energy content to enable informed choices.

- ***"Aaj Se Thoda Kam"* Campaign:** Encourages consumers to gradually reduce their intake of fat, sugar, and salt.
- **"The PURPLE Book":** A handbook providing general guidelines for hospitals on suitable diets for common medical conditions like diabetes and hypertension.

2. National Nutrition Strategy (NITI Aayog):

- **Vision:** "Kuposhan Mukt Bharat" (malnutrition-free India) by 2022, with a broader goal to progressively reduce all forms of undernutrition by 2030. While primarily focused on undernutrition, it acknowledges the co-existence of overnutrition.
- **Key Strategic Areas of Action:** While the strategy primarily emphasizes reducing undernutrition, it also implicitly contributes to tackling overnutrition through:
  - **Promotion of balanced diets:** Encouraging a diverse and healthy diet.
  - **Community-based interventions:** Awareness campaigns at the local level about healthy eating habits.
  - **Integration with Health & Wellness Centres (HWCs):** Strengthening HWCs to provide personalized diet counseling, regular screenings for malnutrition and NCDs, and locally tailored meal plans. This can extend nutrition services beyond maternal health to include adolescents, the elderly, and NCD patients.

3. POSHAN Abhiyaan (National Nutrition Mission): Launched in 2018, this mission aims to improve the nutritional status of children, adolescents, pregnant women, and lactating mothers. While its primary focus is on addressing undernutrition and stunting, its broader approach to improving nutritional outcomes and promoting healthy behaviors can have a positive spillover effect on preventing overnutrition.

4. Makkalai Thedi Maruthuvam (MTM) programme of Tamil Nadu government: It is a multisectoral approach to control the prevalence of NCD. It includes regular screening of employees through workplace interventions, 8km health walk & 'Eat Right Challnege' to encourage behavioral change & nutrition awareness.

4. Policy and Regulatory Interventions:

- **Taxation on Unhealthy Foods:** There have been discussions and recommendations for a graded taxation system on ultra-processed, high-sugar, and trans-fat-laden foods to curb unhealthy eating habits and promote affordable healthy alternatives. (While not fully implemented on a wide scale specifically for overnutrition, it's a policy intervention under consideration).
- **Amending National Food Security Act (NFSA):** Suggestions to include millets in the Public Distribution System (PDS) to incentivize farmers to diversify crops and promote nutritionally superior grains, which can help in dietary diversification away from calorie-dense, nutrient-poor staples.

5. Awareness and Education:

- **Public Awareness Campaigns:** Various government bodies and health organizations conduct campaigns to raise awareness about the risks of overnutrition, the importance of physical activity, and healthy lifestyle choices.
- **School and Workplace Initiatives:** Promoting healthy eating habits in schools and workplaces through nutrition programs and meal plans.

What can be the way forward?

1. Policy and Regulatory Interventions:

- **Taxation and Subsidies:**
  - **Graded taxation:** Implement higher taxes on ultra-processed foods, sugary drinks, and foods high in unhealthy fats and sodium. This can discourage consumption and generate revenue for public health initiatives.
  - **Subsidies for healthy foods:** Subsidize fruits, vegetables, whole grains, and other nutrient-dense foods to make them more affordable and accessible, especially for lower-income households.
- **Food Labeling and Advertising:**
  - **Mandatory front-of-pack labeling (FOPL):** Enforce clear, easy-to-understand FOPL that highlights high levels of sugar, salt, and fat in packaged foods. This empowers consumers to make informed choices.
  - **Restrictions on advertising:** Regulate and restrict the aggressive marketing of unhealthy foods, especially to children, across all media platforms (TV, social media, celebrity endorsements).
  - **Defining "junk food":** Establish clear thresholds for sugars, salt, and fats in ultra-processed foods to provide a standard for warning labels and advertising bans.
  - **Health Star Rating:** Proposed by FSSAI in 2022. It aimed to provide clear nutritional information on packaged food.
- **Urban Planning and Infrastructure:**
  - **Promote active living:** Develop pedestrian-friendly roads, cycling tracks, and safe public parks and recreational facilities to encourage physical activity and active commuting.
  - **Increase green spaces:** More parks and open areas can facilitate outdoor exercise and community activities.
- **Procurement Policies:**
  - **Healthy food in public institutions:** Implement policies that mandate healthier food options in government canteens, hospitals, and educational institutions.
  - **Incentivize local and fresh produce:** Encourage the procurement of locally sourced, fresh produce for public feeding programs.

2. Public Awareness and Education:

- **Nationwide campaigns:** Expand and intensify existing campaigns like "Eat Right India" and "Fit India Movement" with targeted, culturally relevant messages. These campaigns should:
  - Promote balanced diets, portion control, and the benefits of traditional Indian foods.
  - Educate about the risks of ultra-processed foods and sugary drinks.
  - Encourage regular physical activity.
  - Address common misconceptions, such as associating "chubbiness" with good health.
- **School-based nutrition programs:**
  - Integrate comprehensive nutrition education into school curricula from an early age.
  - Implement mandatory physical education and provide access to healthy meals and snacks in schools.
  - Discourage the sale of unhealthy foods on school premises.
- **Community-led initiatives:**

- Empower local communities, self-help groups (SHGs), and faith-based organizations to lead awareness programs.
- Leverage platforms like Ayushman Bharat Health & Wellness Centres (HWCs) as Nutrition Resource Centres offering personalized diet counseling and regular screenings.
- Promote "Poshan Vatikas" (Nutri-Gardens) for homegrown nutrition.

- **Digital and social media outreach:** Utilize short educational videos, jingles, and engaging content in multiple languages to reach diverse audiences, as seen with the UNICEF India **#MeriThaliSehatwali campaign**.

3. Healthcare System and Services:

- **Strengthening primary care:** Extend and strengthen primary healthcare delivery mechanisms, especially in urban poor areas, to provide preventive, promotive, and curative services for overnutrition and related non-communicable diseases (NCDs).
- **Early screening and intervention:** Implement regular screenings for overweight, obesity, and NCDs across all age groups, particularly in health camps and clinics.
- **Personalized counseling:** Offer personalized diet counseling and lifestyle modification advice through trained health professionals.
- **Accessibility of treatment:** While expensive weight-loss drugs are emerging, focus on making sustainable behavioral change interventions and affordable management protocols universally available. Bariatric surgery should be considered only in extreme cases and be more accessible.

4. Food System Transformation:

- **Promoting dietary diversity:** Encourage the consumption of a wide variety of nutrient-rich foods, including millets, pulses, and leafy greens, reducing over-reliance on staple grains like rice and wheat.
- **Support for local food systems:** Strengthen local food production and distribution networks to increase access to fresh and seasonal produce.
- **Responsible food industry:** Encourage food businesses to reformulate products to reduce sugar, salt, and unhealthy fats. Incentivize the development and marketing of healthier food options.
- **Food fortification:** While crucial for micronutrient deficiencies, ensure it is complemented by dietary diversification to provide a holistic nutritional approach.

Case Study: SAUDI ARABIA

As part of its **Vision 2030** initiative, the kingdom of Saudi Arabia has embedded NCD prevention into its national policy framework.

It enforces **calorie labelling** in restaurants, imposes a **50% excise tax on sugar-sweetened beverages**, and levies a **100% tax on energy drinks**.

It has instituted **sodium limits in processed foods**.

Saudi Arabia is among the few nations meeting **WHO's sodium reduction best practices** and recognised for **eliminating trans fats**.

Conclusion:
Reversing the tide of NCDs demands not just awareness but action. Regulatory reforms, especially those addressing the food industry, are imperative. However, the success lies in the coherent strategy – integrating health, regulatory oversight, industry compliance, and civic engagement.

Read More: The Hindu
UPSC Syllabus GS-2: Poverty & Hunger, Health sector

India's Financial Sector – Challenges & Reforms

The government and regulators have attempted incremental reform in banking, financial services, and insurance (BFSI), yet systemic frictions persist. These frictions are not just inefficiencies, but are barriers that deter savers, discourage investors and delay growth. A truly professional, transparent and investor-friendly financial sector demands deeper structural corrections, particularly in corporate bond markets, retirement planning instruments, nomination processes across BFSI.

What are the CHALLENGES that the financial sector in India is facing?

1. Nomination regime: Across BFSI verticals, the rules governing the nominees are inconsistent. A citizen can nominate a single person for one account but multiple for another, with different rights attached. This patchwork approach not only lacks legal clarity but confuses the ordinary citizens & benefits only those who seek to exploit the legal ambiguities.

2. Underdeveloped Corporate Bond Market: An underdeveloped bond market in India is a large structural lacunae in our financial landscape. Despite several initiatives over the years, the corporate bond market in India remains shallow, illiquid & opaque. An efficient bond market is significant for business growth as it can reduce funding costs by 2 to 3%. RBI once directed the NSE (National Stock Exchange) to develop a secondary bond market, but no development has been done in this regard so far.

3. Lack of transparency in capital flow: As a member of FATF, India is committed to implementing global KYC norms, which include clear identification of UBOs (Ultimate Beneficial Owners). FATF in its updated guidelines has underscored the need for countries to maintain accurate & accessible ownership data to prevent misuse of financial structures. But, the practical implementation of this guideline remains a challenge for e.g. SEBI recently has had to ask 2 Mauritius-based FPIs to disclose their shareholder's data related to their holdings in listed Indian company – because these 2 firms had not complied with multiple disclosure requests. Opacity in ownership structures weakens the market integrity & inhibits long-term investments, both domestic & foreign.

4. Limited retirement planning products: Retirement planning in India is mostly routed through annuities. These annuities are costly due to intermediation margin charged by the insurance companies. There are simpler & cheaper alternatives such as 'Zero-coupon G-Secs', but the government & the RBI has shown little interest in promoting them as retirement products. This complacency is not only preventing the young professionals from getting financial gains but also preventing us from building a vibrant, low-cost retirement ecosystem based on sovereign credibility.

5. Shadow Banking: Shadow banking which includes NBFCs, margin lenders, repo traders, and brokers is an ominous blind spot in Indian financial sector. They are offering bank-like services without being subjected to full regulatory oversight. The global economists have already warned that the next financial crisis could originate from here, just like the 2008 financial crisis originated from unregulated derivatives in USA.

What are the REFORMS & INITIATIVES already been taken?

1. Basel Norms Implementation: India has progressively adopted and implemented Basel I, II, and III norms for capital adequacy and risk management. This ensures that Indian banks maintain sufficient capital buffers to absorb potential losses, enhancing their resilience.

2. Asset Quality Review (2015): The RBI initiated an AQR to ensure transparent recognition of stressed assets, leading to the reclassification of many stressed accounts as Non-Performing Assets (NPAs).

3. Prompt Corrective Action (PCA) Framework: The RBI's PCA framework allows for stricter supervision and intervention in financially weak banks, helping to restore their health and prevent systemic risks.

4. Central KYC (CKYC) Registry Revamp: A new CKYC registry will be rolled out in 2025, streamlining customer verification and making banking and investment processes more efficient.

5. Scale-Based Regulation (SBR) for NBFCs: Introduced a tiered regulatory framework for NBFCs based on their size, activity, and perceived risk, with stricter regulations for larger and more systemically important NBFCs. Post events like the IL&FS crisis, the RBI has significantly tightened regulatory oversight on NBFCs regarding governance, asset-liability management (ALM), and capital adequacy.

6. Financial Sector Legislative Reforms Commission (FSLRC) Recommendations: While not all recommendations have been implemented, the FSLRC's report provided a blueprint for comprehensive legislative reforms aiming for a non-sectoral, principles-based financial law. Key themes include consumer protection, micro-prudential regulation, resolution mechanisms, and systemic risk management.

7. Financial Stability and Development Council (FSDC): The FSDC, established by the government, plays a crucial role in maintaining financial stability, enhancing inter-regulatory coordination, and promoting financial sector development.

What can be the way forward (REFORMS NEEDED)?

1. Reforms in nomination regime: Government needs to bring a harmonised nomination framework, with clarity on nominee rights vis-a-vis legal heir claims.

2. Reforms in Shadow Banking: India needs to bring the legislation to regulate the shadow banking similar to EU's legislation that aims to gather comprehensive data on shadow banking activities. It will help in brining transparency in shadow banking & saving lakhs of retail investors from losing their savings in future (e.g. IL&FS Crisis).

3. Corporate Bond Market Development: Further reforms to deepen the corporate bond market, making it an attractive alternative to bank finance, including facilitating easy access to global capital markets for Indian companies.

4. Regulatory Sandboxes and Innovation Hubs: Continue to utilize and expand regulatory sandboxes to allow FinTech innovations to be tested in a controlled environment, fostering responsible innovation.

5. Data for transparency v/s Privacy: Establishing clear and comprehensive data governance frameworks that balance data sharing for transparency & financial innovation with robust data privacy protection for customers. The revamped CKYC registry is a step in this direction, but its full potential needs to be realized.

6. Consumer Protection and Financial Literacy:

- **Addressing Mis-selling:** Stricter enforcement and deterrents against mis-selling of financial products, especially complex insurance and investment products, ensuring transparency and appropriate disclosure of risks and costs.
- **Continuous Financial Literacy:** Expanding targeted financial literacy programs, particularly for vulnerable groups and those newly brought into the financial fold through digital channels, to empower informed decision-making.

CONCLUSION:
India's financial sector reforms must go beyond slogans and cosmetic amendments. We need a coherent, forward-looking strategy that harmonizes rules across verticals, nurtures a deep bond market, innovates in retirement finance, and reins in shadow banking.

Read More: The Hindu
UPSC Syllabus GS-3: Financial Sector

Early Childhood Education – Significance & Challenges – Explained Pointwise

'Lottery of birth' refers to the acknowledgement about how, when, where & to whom you are born, grow up and live plays such a profound role in shaping one's future & dramatically alters access to resources like nutrition, healthcare, education, and safe living environments. A child born in India has a one-in-five chance of being born into poverty, affecting their health, nutrition, learning and earning potential. However, there are ways to beat this matter of luck – one of which is Early Childhood Education (ECE).

What is the SIGNIFICANCE of Early Childhood Education?

1. Brain Development: Early childhood refers to the period between birth and 8 years of age, wherein a child's brain is highly sensitive to the environment around them. This time of "remarkable growth" requires a specialized educational approach to ensure that children learn key skills and foundational concepts to prepare them for later life.

2. School Readiness: Children who attend quality ECE programs are significantly better prepared for formal schooling. They enter with foundational skills in literacy, numeracy, self-regulation, and social interaction, which helps them transition smoothly and succeed academically.

3. Improved Academic Outcomes: Research consistently shows that children with a strong ECE background perform better academically in later years, have higher graduation rates, and are more likely to pursue higher education.

4. Social, Emotional & Physical Development: ECE helps children develop vital social skills like sharing, cooperation, and communication, and emotional resilience to cope with challenges. These skills are crucial for building healthy relationships throughout life. ECE helps children in developing skills through free and planned play, engaging activities like building, painting, playing instruments, etc., and coordinated games where children practice running, pulling, pushing, hopping, and working together while having fun.

5. Lifelong Love of Learning: A positive early learning experience can instill a lifelong curiosity and enthusiasm for learning.

6. Reduced Disparities: High-quality ECE is particularly beneficial for children from disadvantaged backgrounds, helping to mitigate the effects of poverty and provide them with a better start in life. It can reduce

developmental vulnerabilities and improve long-term outcomes. For e.g. children who receive quality early education are four times more likely to have higher earnings and three times more likely to own a home as adults.

7. Economic Benefits: Investing in ECE yields high returns. It can lead to higher earning potential, better adult health, reduced involvement in the criminal justice system, and a more productive workforce as parents are better able to participate in employment. High-quality early childhood care and education is considered by the OECD to be a key economic indicator when assessing the health and future positioning of a nation. For e.g. according to Nobel Laureate Prof. James Heckman, every dollar invested in early childhood education yields a return that ranges from $7 to $12.

8. Good Habits: Daily routines and structured environments in ECE settings help children develop good habits related to hygiene, self-care, and routines.

9. SDG: UNESCO supports high-quality early childhood education as one of its sustainable development goals.

What are the CHALLENGES faced by Early Childhood Education in India?

1. Uneven Distribution: While programs like Anganwadi Centers exist, access to quality ECE is highly uneven. Urban areas often have a mix of private and public options, but rural and remote areas, and particularly marginalized communities, suffer from limited or no access to structured ECE.

2. Bypassing of ECE: While the Integrated Child Development Services (ICDS) through Anganwadis cater to children under six, many children in the crucial 3-6 age group still do not enroll in any ECE service, whether public or private. Many children in India are bypassing essential ECE entirely. 2% of three-year-olds, 5.1% of four-year-olds, and nearly one-fourth of five-year-olds are enrolled directly in Class one.

3. Poor quality ECE:
Children getting ECE in India are not receiving sufficient instructional time. Nearly 5.5 crore children between ages three to six are enrolled in 14 lakh operational Anganwadis and 56,000 government pre-primary schools. However, Anganwadi workers spend only 38 minutes per day on preschool instruction, which is far short of the scheduled two hours, and only 9% of pre-primary schools have a dedicated ECE teacher.
The effects are reflected in learning outcomes. The **India Early Childhood Education Impact Study** found that only 15% of pre-primary children could match basic objects, a skill essential for letter recognition in Class one. Similarly, only 30% could identify larger and smaller numbers, which are foundational for arithmetic. As a result, children often start formal schooling without the skills they need.

4. Poor optimization of resources: The Government of India spends only Rs1,263 a child annually on ECE compared to Rs 37,000 a student on school education — largely on producing teaching-learning materials that are often underused. There simply are not enough teachers to implement these resources, and there is a lack of oversight — one supervisor is responsible for monitoring 282 Anganwadis.

5. Limited Parental Awareness: Many parents, especially from disadvantaged backgrounds, may not fully understand the long-term benefits of quality ECE, often viewing it as mere childcare rather than a crucial educational foundation. Most parents care deeply about their children's education but may lack guidance on supporting early learning. Factors like parents' education levels, work commitments, and financial difficulties can hinder their active involvement in their child's early education.

What have been the GOVERNMENT INITIATIVES in this regard?

1. Integrated Child Development Services (ICDS) Scheme: Launched in 1975, ICDS is one of the world's largest flagship programs under the Ministry of Women and Child Development. It's the primary platform for

ECE delivery in India, especially in rural areas, through Anganwadi Centers. ICDS provides a package of six services, three of which are directly related to ECE:

- **Pre-school Non-formal Education:** This is the core ECE component, focusing on the development of children aged 3-6 years through play-based activities, storytelling, and group interactions.
- **Nutrition & Health Education:** For women (15-45 years) to improve their health and nutrition knowledge, indirectly benefiting young children.
- **Supplementary Nutrition Program (SNP):** Addresses malnutrition in children (6 months to 6 years), pregnant women, and lactating mothers, ensuring better health and cognitive development

2. National Education Policy 2020: The NEP 2020 marks a paradigm shift in India's education policy by formally integrating ECE into the mainstream education system. Its core tenets for ECE include:

- **New 5+3+3+4 Curricular Structure:** The previous 10+2 structure is replaced with a new pedagogical and curricular framework, where the first five years (ages 3-8) constitute the "Foundational Stage." This explicitly brings ECE (3 years of pre-school/Anganwadi education) under the formal education umbrella, followed by Grades 1 and 2.
- **Universal Access to Quality ECCE by 2030:** The policy aims to ensure that all children entering Grade 1 are school-ready by providing universal access to high-quality ECCE. Special focus is given to socio-economically disadvantaged districts.

3. National Curricular and Pedagogical Framework for Early Childhood Care and Education (NCPFECCE): Developed by NCERT, this framework provides guidelines for a comprehensive curriculum for children up to age 8, ensuring a seamless continuum from pre-primary to primary school.

4. "Balavatika" or Preparatory Class: Before age 5, every child will move to a 'Preparatory Class' or 'Balavatika' (before Class 1) within an Anganwadi or primary school, taught by an ECCE-qualified teacher. Odisha government has launched its own **Shishu Vatikas** in all government schools for ECE to make children in the age group 5 to 6 school ready.

5. Professional Development for ECCE (Early Childhood Care & Education) Educators:

- **Training for Anganwadi Workers:** Anganwadi workers (AWWs) with 10+2 qualification and above will receive a 6-month certificate program in ECCE, while those with lower qualifications will undergo a one-year diploma program.
- **Cadre of Qualified Educators:** NEP envisions creating professionally qualified cadres of ECCE educators through stage-specific professional training, mentoring, and career mapping.
- UP government has also decided to hire 11,000 dedicated early childhood care & education educators for Balvatikas in all the districts. The State also organised a six-day residential training programme for 50 master trainers from 13 districts to train them on ECE pedagogy.

6. Parental Engagement: In Madhya Pradesh, the monthly **Bal Choupal programme** engages with parents directly by showing them the importance of play-based learning.

What can be the WAY FORWARD?

1. Significant Budgetary Allocation: ECE needs to be recognized as a high-priority public good. The government must drastically increase its financial allocation to the ECE sector, moving towards the recommended 1.5-2.2% of GDP for universal quality ECE.

2. Infrastructure Upgradation: Invest significantly in upgrading infrastructure at Anganwadi Centers and pre-primary sections of schools, ensuring safe, child-friendly, well-ventilated, and adequately spaced learning environments with proper sanitation and hygiene facilities.

3. Comprehensive Teacher Training: Develop and implement a standardized, high-quality, and practical training curriculum for all ECE educators (Anganwadi Workers, pre-primary teachers in schools), focusing on child development, play-based pedagogy, socio-emotional learning, and inclusive education. Provide specialized training for educators working with children with special needs or those from diverse linguistic and cultural backgrounds.

4. Active Parental Engagement: Empowering parents with simple, effective ECE practices can make a significant difference. For instance, providing worksheets or encouraging their participation in ECE centre activities can deepen their involvement. Parental engagement can be further strengthened through WhatsApp or EdTech apps, allowing parents to support their children's development.

5. Develop Contextualized Resources: Create and distribute a rich variety of culturally relevant, low-cost, and easily accessible teaching-learning materials (TLMs), including storybooks, puppets, puzzles, and outdoor play equipment, that support the play-based curriculum in local languages.

6. Leverage NGOs and Civil Society: Partner with experienced NGOs and civil society organizations who have a proven track record in ECE, particularly in reaching marginalized communities and implementing innovative models.

CONCLUSION:

By 2047, over a billion Indians will enter the global workforce, presenting an unprecedented opportunity to reshape India's role in the world economy. Strategic investments in ECE and engaging parents in their children's learning journey could help 200 million Indians escape the **'lottery of birth'** and give today's young learners the chance to become tomorrow's leaders. This is a critical pathway to realising India's vision of becoming a true Vishwa Guru, empowering generations to come.

Read More: The Hindu
UPSC Syllabus GS-2: Education

Internet Connectivity in India – Significance & Challenges – Explained Pointwise

According to the Minster of Communication, Jyotiraditya Scindia, India has become the 2nd largest telecom market in the world, with number of internet users increased from 250 million to 974 million in last 11 years & expected to hit 1 billion users in few months.

In this article, we will try to analyze the significance of increased internet connectivity in India, what are some of the challenges associated, various government initiatives & what can be the way forward.

Facts related to internet connectivity:

- India has an approximately **974 million internet users**, representing a penetration rate of **~56%** of the total population.

- Rural India is now the primary driver of internet growth. In 2024, rural internet users (488 million) surpassed urban users (397 million) for the fourth consecutive year.
- The average data cost per GB has seen a massive reduction, from **₹287 in March 2014 to ₹9 in March 2024**, making internet access highly affordable.
- Calling prices have gone from 50 paise to **0.003 paise** a minute.
- Average data consumption per user has surged from 0.26 GB in March 2014 to **20.27 GB in March 2024.**
- India has significantly improved its global ranking in average internet download speed (Ookla speed test), moving from 130th position to **16th position in March 2024**.

What is the significance of internet connectivity in India?

1. Growth Driver: The internet is a key driver of India's economic growth. The digital economy is projected to contribute nearly **one-fifth of India's GDP by 2029-30**, outpacing traditional sectors like agriculture and manufacturing.

2. Job Creation: It fuels job creation directly (in IT, telecom, e-commerce, FinTech) and indirectly by enabling businesses to scale, innovate, and reach wider markets. The digital economy employed **14.67 million workers in 2022-23**.

3. E-commerce and Online Businesses: The internet has revolutionized commerce, enabling millions of small and medium enterprises (SMEs) to access national and global markets, driving growth in online shopping, food delivery, and various service sectors.

4. Financial Inclusion: Initiatives like Pradhan Mantri Jan Dhan Yojana (PMJDY) coupled with internet connectivity have brought banking services to previously unbanked populations, enabling Direct Benefit Transfers (DBT) and reducing leakages.

5. Improved Service Delivery: Internet connectivity enables the online delivery of government services, making them more accessible, transparent, and efficient (e.g., birth/death certificates, land records, driving licenses, ration cards, tax filing).

6. Direct Benefit Transfer (DBT): A backbone of many welfare schemes, DBT relies heavily on internet connectivity to directly transfer subsidies and benefits to beneficiaries' bank accounts, reducing leakages and ensuring timely delivery.

7. Online Learning: The internet has transformed education, providing access to online courses (e.g., SWAYAM, Coursera, Byju's), virtual classrooms, and digital learning resources for students across all levels. This has been particularly crucial during the COVID-19 pandemic.

What are the challenges associated with internet connectivity in India?

1. Digital Divide (Rural vs. Urban Quality): While penetration is growing, a gap persists in the quality and reliability of internet services between urban centers and many rural areas.

2. Infrastructure Limitations: Despite efforts, significant infrastructure challenges remain in difficult terrains, remote locations, and sparsely populated areas, making deployment of traditional fiber optic cables costly and logistically challenging.

3. Affordability of Devices: While data is cheap, the cost of smartphones and other internet-enabled devices can still be a barrier for the poorest segments of the population.

4. Digital Literacy: Low digital literacy levels, particularly among older citizens and in remote areas, limit effective internet usage and the adoption of digital services.

5. Reliable Power Supply: Unreliable electricity in many rural areas affects the functioning of telecom towers and broadband infrastructure.

6. Cybersecurity Threats: The rapid increase in internet users and digital transactions brings a heightened risk of cyberattacks and data breaches.

7. Last-Mile Connectivity: Ensuring robust and reliable last-mile connectivity to individual homes and users, beyond the Gram Panchayat level, remains a challenge.

What are various government initiatives?

1. Digital India Program (Launched 2015): A flagship program aiming to transform India into a digitally empowered society and knowledge economy. Its pillars include Broadband Highways, Universal Mobile Connectivity, Public Internet Access Programs, and Digital Empowerment of Citizens.

2. BharatNet Project: It is one of the largest public sector investment project in connectivity to the grassroot level (rural connectivity project) globally, aiming to connect all **2.5 lakh Gram Panchayats (GPs)** with optical fiber cable:

- As of March 2025, over **2.14 lakh GPs have been made service-ready**.
- The Amended BharatNet Programme [Bharat Net-II] (approved August 2023) aims to enhance connectivity by providing optical fibre links in a ring topology to 2.64 lakhs GPs and extending services to non-GP villages on demand.

3. Pradhan Mantri Wi-Fi Access Network Interface (PM-WANI): Aims to boost public Wi-Fi hotspots, especially in rural and remote regions, through Public Data Offices (PDOs) to facilitate wider access.

4. National Broadband Mission (NBM): Launched in 2020, focuses on accelerating broadband infrastructure expansion. NBM 2.0 (starting April 2025) builds on this.

5. Digital Bharat Nidhi (DBN): Replaced the Universal Service Obligation Fund (USOF) to fund and bridge the digital divide in rural areas.

6. Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA): Aims to make rural citizens digitally literate, enabling them to access information and services online. Over 47.8 million rural citizens have been certified.

7. Gati Shakti Sanchar Portal: Streamlines Right of Way (RoW) permissions for OFC laying and telecom tower installation, accelerating infrastructure deployment. The Telecommunications Act, 2023, and RoW Rules 2024 further strengthened this.

8. PLI Scheme for Large-Scale Electronics Manufacturing (LSEM): Aimed at boosting mobile phone manufacturing and specified electronic components. This scheme has been highly successful in attracting major global players like Apple's contract manufacturers (Foxconn, Wistron/ICT, Pegatron) and Samsung, alongside Indian companies. India has seen a massive increase in mobile phone production and has transformed from a net importer to a net exporter of mobile phones.

What can be the way forward?

1. Expedited BharatNet Implementation: Despite progress, the BharatNet project needs to be executed with greater urgency and efficiency. Focus on completing the ring topology to all Gram Panchayats (GPs) and extending fiber-to-the-home (FTTH) connections to individual households, not just GPs. The "Amended BharatNet Program" should be fully utilized.

2. Leveraging 5G for Last-Mile Connectivity: The rapid 5G rollout needs to be strategically leveraged, particularly through Fixed Wireless Access (FWA) services, to provide high-speed broadband in rural and remote areas where fiber deployment is challenging or uneconomical.

3. Diverse Technologies for Difficult Terrains: Explore and adopt a technology-agnostic approach. For challenging terrains (hilly regions, islands, forest areas), complement fiber and 5G with satellite broadband (LEO satellites), microwave, and other wireless technologies to ensure connectivity.

4. Affordable Smart Devices: Work with device manufacturers to encourage the production of affordable smartphones and other internet-enabled devices specifically for the rural market. PLI schemes for electronics can be extended to incentivize such manufacturing.

5. Content in Regional Languages: Promote the creation and availability of high-quality, relevant digital content in all major regional languages to encourage adoption and meaningful usage among non-English speaking populations.

6. Regulatory Predictability: Maintain a stable and predictable regulatory environment to attract long-term investments from both domestic and international players.

7. Data Security and Privacy: Implement robust data protection laws and cybersecurity measures to build trust among users, especially as more sensitive transactions move online. This is crucial for sustained internet adoption.

Conclusion:

Government's multi-pronged approach—anchored by BharatNet, the National Broadband Mission, regulatory reforms, increased funding, and public-private partnerships—has significantly improved internet connectivity, especially in rural India. These efforts are central to bridging the digital divide, supporting inclusive growth, and positioning India as a global digital leader.

Read More: The Hindu
UPSC Syllabus GS-2: Development