

## CA-VA Mains 2025 Reflections

### General Studies (Paper-II)

#### UPSC Question -3

Compare and contrast the President's power to pardon in India and in the USA. Are there any limits to it in both the countries? What are 'preemptive pardons'? (Answer in 150 words) 10

#### (RRT9 - Phase -1)

What are the constitutional provisions regarding the pardoning power in India? Discuss the issues associated with the exercise of pardoning power in India. How does it differ from the pardoning power of the U.S. President?

**UPSC Question - 5**

**“The Attorney General of India plays a crucial role in guiding the legal framework of the Union Government and ensuring sound governance through legal counsel.” Discuss his responsibilities, rights and limitations in this regard. (Answer in 150 words) 10**

**(Mains - GAT02 - Phase - 3)**

“The Attorney-General is the chief legal adviser and lawyer of the Government of India.”Discuss. (Mains - GAT02)

### UPSC Question - 6

Women's social capital complements in advancing empowerment and gender equity. Explain.

(Answer in 150 words) 10

### Class Topics (SHG)

□ SHG

▶ NEWS

→ PM Modi hailed the transformative role of women, who are leading change through SHGs - Mann Ki Baat (June 2025)

ECONOMIC SURVEY 22-23

→ Positive effect on emp  
↳ financial decision making  
↳ livelihood diversification, asset ownership  
↳ improved social networks

### GAT 8 - Phase -1

Examine the role of the 'founding mothers,' i.e., the distinguished women members of the Constituent Assembly, in shaping feminist ideals within the Indian Constitution.

### Mains - GAT01 - Phase -3

How has the contemporary women's movement encompassed diverse approaches beyond traditional methods? Also, highlights the unique contributions and challenges of the contemporary women's movement.

**UPSC Question - 7**

**e-governance projects have a built-in bias towards technology and back-end integration than user-centric designs. Examine. (Answer in 150 words) 10**

**RRT 9 - Phase - 1**

What is PRAGATI platform and explain its key features. Discuss its significance in addressing infrastructure challenges in India and transforming governance.



India-Africa digital partnership is achieving mutual respect, co-development and long-term institutional partnerships. Elaborate. (Answer in 150 words) 10

Class Topic (Africa)

Economic

- Trade & invst - India Africa trade  $\approx$  \$100bn
  - largest destination for Ghana's exports (Gold)
  - \$27bn invst in Nigeria
- Diversification of energy - Nigeria, Gabon, Libya
- Digital cooperation - UPI in Namibia
- Port infrastructure - Tanzania
- Reformed global financial architecture - AfCRA
- Export - Railways diesel locomotives

Defence & Security

- Defence supplier - Egypt, Algeria, Tanzania
- AIKEYME - inaugural multilateral exercise
- IOS Sagar initiative - INS Sunayna
- Counter Terrorism - Anti piracy

Economic

MEA → India is 10th largest FDI source for Africa, completed ~200 infra projects in 43 countries in the continent

→ Trade & invst - India Africa trade  $\approx$  \$100bn China is Africa's largest bilateral trade partner  $\approx$  \$200bn

India - largest destination for Ghana's exports (Gold)

India - \$27bn invst in Nigeria like Pharma, healthcare, agric., energy sectors

India needs Africa for

- Diversification of energy - Nigeria, Gabon, Libya, Rep. of Congo [US sanctions of Russian oil]
- Digital cooperation - UPI in Namibia
- Port infrastructure - Tanzania, JN Port Auth. signed an agreement to set up SEZ in Tanzania
- Reformed global financial architecture - AfCRA (African Credit Rating Agency) reforms
- Export - Railways diesel locomotives test repurposed
- Acc. to CII: India's investment may  $\uparrow$  to \$150bn by 2030

Defence & Security

Key defence supplier - Egypt, Algeria, Tanzania, Mozambique

→ AIKEYME - inaugural multilateral exercise

→ IOS Sagar initiative - INS Sunayna

→ Counter Terrorism - Anti piracy

Deployment of Indian Naval ships

→ India wants to remain the preferred security partner & first responder in the region

Developmental Assistance

→ concessional loans

"With the waning of globalization, post-Cold War world is becoming a site of sovereign nationalism." Elucidate. (Answer in 150 words) 10

Class Topic (Changing Global Order)

CHANGING GLOBAL ORDER

NEWS

→ 'Global order under churn, every region needs to look out for itself'  
EAM S. Jaishankar

DISRUPTIONS

1) GEOPOLITICAL

- ↳ two-bloc world
- ↳ New cold war (Traps)
- ↳ multipolarity

2) TECHNOLOGICAL

- ↳ techno-nationalism
- ↳ Quasi-sovereign actors
- ↳ techno-feudalism

3) ECONOMIC

- ↳ Trade-war
- ↳ Supply chain reconfiguration
- ↳ de-globalisation

4) SOCIAL

- ↳ rising inequality
- ↳ political confusion

5) INSTITUTIONAL

- ↳ erosion of multilateralism
- ↳ failure of UN
- ↳ rise of alternative frameworks

6) DEMOGRAPHIC

- ↳ global demographic shifts
- ↳ rising xenophobia

7) CLIMATE

- ↳ Climate change
- ↳ neo-colonialism

8) MILITARY WARFARE

- ↳ new warfare
- ↳ TWS

BOOK

Why Bharat matters - S. Jaishankar

- interdependence → mobility & migration
- globalised era in which we live is a double edged existence
- weaponisation of everything
- 'while there is advancement of tech & promise of science, world politics moving back to the future'

## Class Topic (Trade Wars)

### → MECHANISM

↳ tariffs - reciprocal tariffs - NTB - export restrictions - currency manipulation

### ▷ OBJECTIVES

- reduce trade imbalance
- Reshoring production
- revenue generation
- National policy objectives (fentanyl exports)
- self-reliance
- strategic coercion

### ▷ IMPLICATIONS

#### MACRO-ECONOMIC

- increased cost and inflation
- Economic slowdown

#### GVC

- supply chain disruption
- Trade diversion

#### INVESTMENT

- Policy uncertainty
- reduced business confidence

#### GEO-ECONOMIC

- shift in global trade order
- china's dominance in rare earth minerals
- De-Americanisation - De-Dollarisation
- challenges to multilateralism (WTO)
- weaponisation
- Deglobalisation
- 'Beggars - thy - neighbour'

#### SOCIO-POLITICAL

- social unrest

#### GEO-POLITICAL

- bloc-politics
- erosion of trust
- multipolarity
- regionalism

"Constitutional morality is the fulcrum which acts as an essential check upon the high functionaries and citizens alike..." In view of the above observation of the Supreme Court, explain the concept of constitutional morality and its application to ensure balance between judicial independence and judicial accountability in India. (Answer in 250 words) 15

Class Topic (Constitutional morality)

## CONSTITUTIONAL MORALITY

### MEANING

- adherence to the core principles of the constitution
- substantive content of the @

### DR B R AMBEDKAR

- cm is not a natural sentiment, it has to be cultivated

### SIGNIFICANCE

- ensure RoL & GG
- upheld individual HRs
- check on Legislature & Executive
- avoids majoritarianism
- combat oppressive structures

### IMP CASE LAWS

- Naz Foundation case
  - cm as morality derived from cl values, distinct from popular morality
- Manoj Narula case
  - cm is to ensure RoL

## JUDICIAL STANDARDS & ACCOUNTABILITY

### NEWS

→ Controversy over the remarks by the Allahabad HC Judge

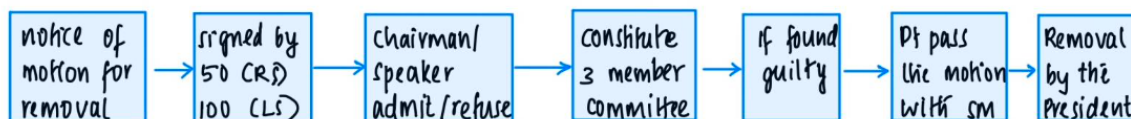
### MEANING

→ JA refers to the mechanisms and principles that ensure judges and the judiciary as a whole are responsible for their decisions and actions

### REMOVAL OF JUDGES

→ Art 124 & 217 - Judges of the SC/HC shall be removed by the President on the grounds of proved misbehavior or incapacity after a motion is passed in each House of the Parliament by a special majority in the same session

→ Procedure for removal is provided in Judges Inquiry Act 1968



→ Reinstatement of values of 'Judicial Life' adopted by the SC in 1997 mandates that behaviour and conduct of members of higher judiciary must reaffirm people's faith in the impartiality of judiciary

→ In-House procedure

### ISSUES

#### Removal

- Complex procedure
- In-House procedure is opaque
- Political interference

Eg:  
J. V. Ramaswami  
J. Sumitra Sen  
J. P. A. Dinakaran

#### Other issues

- Collegium
- Conduct of the Judges
- Contempt of court

### IMPLICATIONS

→ erosion of public trust

### WAY FORWARD

- Judicial Standards & Accountability Bill, 2010
- 'Bangalore Principles'

### GLOBAL

### QUOTE

→ Effective judiciary should be independent as well as accountable - Argya Sengupta



Indian Constitution has conferred the amending power on the ordinary legislative institutions with a few procedural hurdles. In view of this statement, examine the procedural and substantive limitations on the amending power of the Parliament to change the Constitution. (Answer in 250 words) 15

**Class Topic (Transformative Constitution)**

**TRANSFORMATIVE CONSTITUTION**

**QUOTES**

"Constitution is an evolving document" – CJI BR Gavai

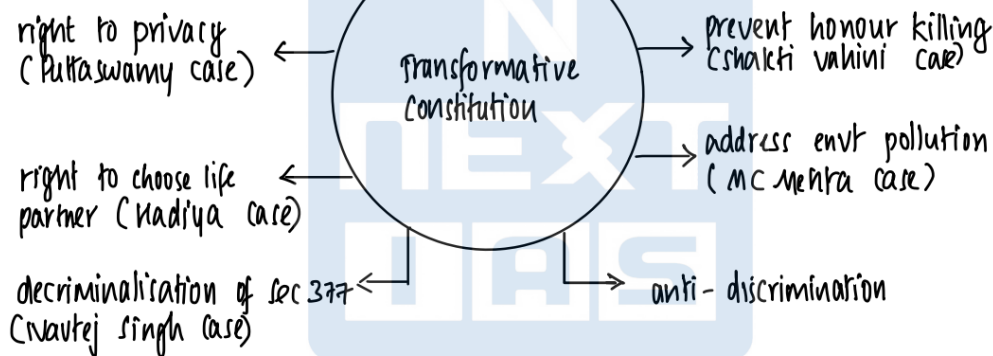
'Indian constitution is a great social document, almost revolutionary in its aim of transforming a medieval hierarchical society into a modern egalitarian democracy' Supreme court

**MEANING**

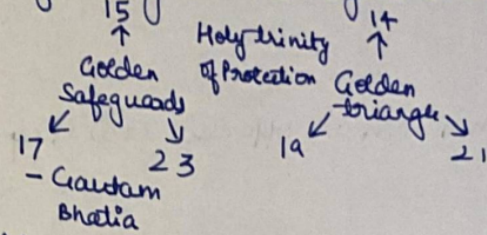
- transforming in nature
- fundamental rights
- universal adult franchise

**Individual rights**

**Social transformation**



→ Social Jus, Rights vs Restrictions, Envs. Jurisprudence, Digital Rights, Art 21, 19 expansion  
Justice Vikram Nath → A state gains only as much legitimacy as the rights it seeks to protect



1. ① Serves 2 different purposes

Conservative (taken from Col 1955)

Seeks to preserve & codify existing set of values → BN. Rau

or ② was more abt transfer of power rather than transformation

• Transformative

- from a medieval, hierarchical society into a modern
- transformed the legal relationship b/w individual & state: Subjects → citizens ensured through popular sovereignty, universal adult franchise from day 1, FRs, J & C f
- transformed state & society

Indian society → Layered sovereignty → to one based on equality by FR & their safeguards

→ Transformative reading of the ① = The ① we have and the ① we deserve

↳ by judicial interpretation of the ①

↓ Evolution of Judiciary

① Textual Interpretation: Plain meaning of the words used in ① quite literally → A K Gopalan case

② Structural Approach: Tests whether a law or policy aligns with the ①'s overall str.

③ Eclecticism: Result oriented approach ↑ Judges SC → Sub SC 'mini benches' → Keshavanandan B. Basic Str. Doc. SC focused on achieving a specific outcome rather than rigorous, consistent, logical reasoning → Doctrine of Essential Religious Practices, Series of Judges Cases (Judicial Independence) - Eng. EWS judgement breaching 50% was OK.

↳ Panchayati Eclecticism

④ Purposive Interpretation: Court started considering the purpose for which constitution has been enacted → social revolution, ensuring liberty, equality, fraternity → Transformative Judgements

▲ Dr. B. R Ambedkar: ① is not a mere lawyers document, it's a vehicle of life & its spirit is always the spirit of age

▲ Prof. Granville Austin: Indian ① is first & foremost a social document one that embodied the objectives of a social revolution

▲ Morris Jones Pol. Scientist: talked abt 3 idioms of Indian politics in his book 'The Government and the Politics of India' ① Modern Idiom: The language of the ①, laws, parliamentary debates

② Traditional Idiom: Caste based political mobilisations, language/linguistic loyalty ③ Saintly

Political Culture: Abt moral & ethical leadership, self-sacrifice - Gandhi, Vinoba Bhave [Still Relevant]

④ Instrumental Pol. Culture: Politics is a means to advance personal interest

**UPSC Question - 13**

**Discuss the evolution of collegium system in India. Critically examine the advantages and disadvantages of the system of appointment of the Judges of the Supreme Court of India and that of the USA.**

**(Answer in 250 words) 15**

**(RRT-1 Phase 1)**

Discuss the pros and cons of the collegium system and critically evaluate the National Judicial Appointments Commission (NJAC) as an alternative. (RRT-1 Phase 1)

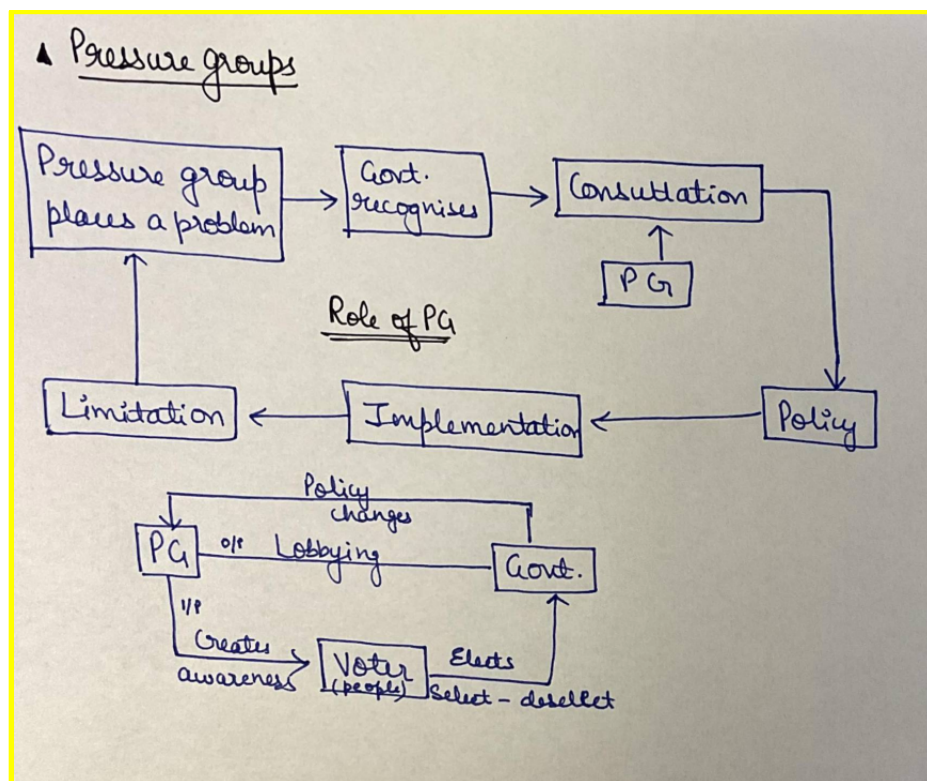
**(RRT-6 Phase 1)**

What are the reasons for lower representation of women in higher judiciary? Highlighting the need for greater women representation in higher judiciary. Suggest some measures to achieve the same.



### UPSC Question - 15

What are environmental pressure groups? Discuss their role in raising awareness, influencing policies and advocating for environmental protection in India. (Answer in 250 words) 15



(RRT 7 - Phase -1)

What are the key challenges India faces in addressing climate change while balancing economic growth and social equity? Evaluate the effectiveness of India's current climate policies and suggest measures to enhance a multi-stakeholder approach for sustainable development.

Inequality in the ownership pattern of resources is one of the major causes of poverty. Discuss in the context of 'paradox of poverty'.  
(Answer in 250 words) 15

Class Topic (Poverty)

POVERTY

NEWS: India's triumph in combating poverty (WB Poverty & Equity brief 2025)

DATA

WB

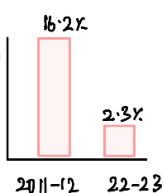
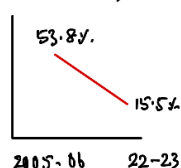
→ Extreme poverty ( $\leq 2.15$ )

→ 171 mn people lifted from poverty

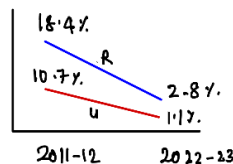
→ Key states

↳ UP, MN, BI, WB & MP

MPI (WB)

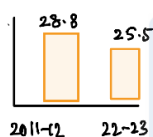


rural poverty



INEQUALITY

→ Gini index (consumption based)



CONSUMPTION PATTERN HCES 2023-24

R	1430	R	3773
U	2630	U	6459
2010-11	C MPC	2022-23	

EVOLUTION OF POVERTY MEASUREMENT

- 1) Early nutrition based approach - caloric intake 2400 cal/day (R), 2100 (U)
- 2) Tendulkar committee - based on expenditure pattern Rs 30 (R), Rs 30 (U)
- 3) Rangarajan Committee - Threshold - Rs 32/day (R), Rs 47 (U)
- 4) HCES - HH spending - MNRP - 405 items - 3 times visit imputed value

WORLD BANK - PPP based - evolution

1985	2017	2025
\$ 1	\$ 2.15	\$ 3

KEY DRIVERS

- Govt welfare programs - PMKAY, DBT, MGNREGA
- Economic factors - rural electrification, LPG expansion
- Sustained growth
- Physical, social & digital infrastructure

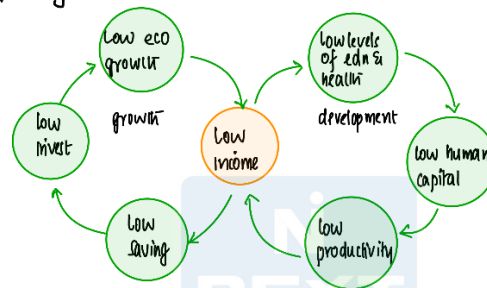
## CHALLENGES

### 1) Methodological issues

- updated PL
- divergence of data
- survey limitations - under reporting

### 2) OTHER

- Poverty trap
- food budget squeeze
- feminisation of poverty
- old age & poverty
- ruralisation of poverty
- regional disparities
- jobless - jobless growth
- employed poverty



## Poverty & TFL

- cultural preferences for more children
- economic factors
- female literacy & autonomy
- rural - urban TFL gap

## CASE STUDIES (ECO SURVEY 2023)

- Demchok village (Leh) → 1st tap water (JTM)
- Bulumgavan (Mn) electric supply for the first time
- Baramulla (JK) birth waiting wards
- Gumla (Jh) tackled malnutrition by Ragi cultivation

## FIGHTING POVERTY

- Tackle down growth
- Redistribution
- Lewis model
- Human capital formation
- universal Basic income
- SHG
- CSR

## UPSC Question - 17

"In contemporary development models, decision-making and problem-solving responsibilities are not located close to the source of information and execution defeating the objectives of development." Critically evaluate.  
(Answer in 250 words) 15

### Class Topic (Local Bodies)

#### ▶ PANCHAYAT RAJ MOVEMENT - SHIFTS

- Admin decentralisation plateaued
- ceding fiscal autonomy
- reimagination of the welfare state
- rapid urbanisation

#### ▶ MDPRI - 'STATUS OF DEVOLUTION TO PANCHAYATS IN STATES' (IUPA)

##### CONCERNS

##### FRAMEWORK

- rotation of reserved seats
- delay in elections
- SEC autonomy
- electoral rolls

##### FUNCTIONS

- Activity/responsibility mapping
- role of Panchayats in schemes

##### FINANCES

- funds release
- SFC effectiveness
- own revenue generation

##### SUGGESTIONS

- freeze for 2-3 terms
- empower SEC - collegium system for appt
- common electoral roll

- integrate Panchayats in CSS
- electronic tracking of funds
- Comprehensive GDP

- unconditional funds
- Strengthen SFC - qualifications, timely cn
- property tax collection

##### FUNCTIONARIES

- infrastructure deficit
- staffing shortage
- traditional training

- dedicated recruitment bodies (L&SC)
- Link with state cadre
- Participatory approach

##### ACCOUNTABILITY

- absence of record maintenance
- Auditing

- Periodic surveys
- Performance evaluations

**UPSC Question - 18**

The National Commission for Protection of Child Rights has to address the challenges faced by children in the digital era. Examine the existing policies and suggest measures the Commission can initiate to tackle the issue. (Answer in 250 words) 15

**(RRT2 - Phase -1)**

What are your views on the impact of the Supreme Court judgment in the Just Rights for Children Alliance v. S. Harish case (2024)?

**(RRT-1 - Phase -1)**

Technology is increasingly being viewed as a significant factor contributing to the decline in mental wellbeing among youth. Do you agree with this assessment? Justify your answer

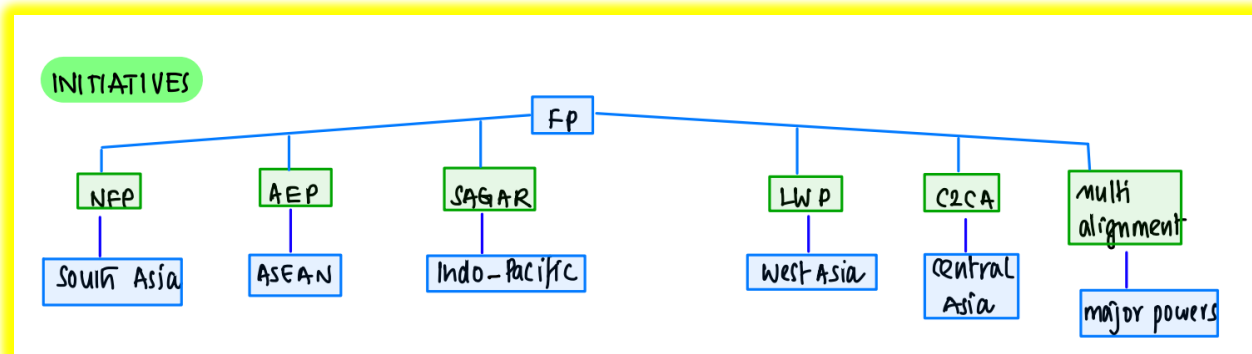
**(Mains - GAT 4 - Phase -3)**

'Despite the growing harmful impact of online spaces on adolescents, curbing these negative effects remains a significant challenge'. Discuss the factors responsible for this challenge and suggest measures to protect adolescents in the digital age

## UPSC Question - 19

"Energy security constitutes the dominant kingpin of India's foreign policy, and is linked with India's overarching influence in Middle Eastern countries." How would you integrate energy security with India's foreign policy trajectories in the coming years? (Answer in 250 words) 15

### Class Topic (Foreign Policy)



if you're not a rule shaper, you're rule taker  
 Global Rule Shaper  
 India's FP is "Boxed up in S. Asia" (China using Pak as a proxy to deliver against India)  
 CA-VA 250611  
 Page 1  
 10) PROF. HAPPY MON JACOB  
 → Five levels of balancing  
 Level 1 → China & US (US will provoke but we have land border)  
 Level 2 → W. Asia (to protect our energy security)  
 Level 3 → Addressing Russia-China Partnership (impacts Indian Interest)  
 Level 4 → China-Pakistan Relationship  
 Level 5 → Balancing Interest in Afghanistan (part of our immediate neighbourhood)  
 → A rising India must build a grand strategy

### ▲ 5 Arcs

1. Arc of Prosperity - India + SE Asia + E Asia; Economic Opportunities
2. " " Energy - Persian Gulf to Russia
3. " " Instability - Myan. to Pak, Iran, Afg; Regions of conflict & volatility
4. " " Uncertainty - Nepal, Tibet, C. Asia;
5. " " Comm - SLOC, Under sea cables, invited to G7: sitting on prime trade route

### ▲ 3 Security Rings

1. Immediate Neighbourhood - From Hindukush to Irrawaddy R.
2. Extended " - Includes IOR & its major choke pts
3. Outer Ring - Suez Canal to Eurasia

"The reform process in the United Nations remains unresolved, because of the delicate imbalance of East and West and entanglement of the USA vs. Russo-Chinese alliance." Examine and critically evaluate the East-West policy confrontations in this regard. (Answer in 250 words) 15

### Class Topic (Foreign Policy)

#### UN SUMMIT OF THE FUTURE

##### NEWS

UNGA adopted the 'Pact of the Future'

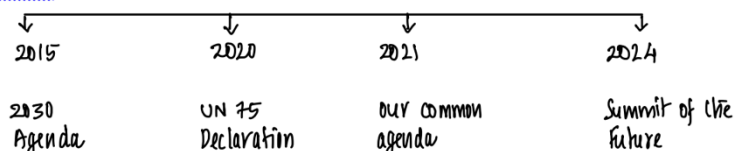
##### QUOTE

'UN can't build a future for our grand children with the institutions of our grandparents'  
- The UN Sec General

##### AIM

- reforming & strengthening international governance
- address the contemporary global challenges and secure a sustainable future

##### PATHWAY



##### KEY OUTCOMES

- A Pact for the future
- Global Digital Compact
- Declaration on Future Generations

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- A Pact for the future
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##### GLOBAL CHALLENGES

- Global rearmament
- Terrorism
- Information manipulation & interference
- Lagging SDG progress
- Climate change impact
- Unreformed & underfunded MFIs
- Solidarity deficit
- Weakening of multilateralism

#### UN REFORMS

##### QUOTE

'UN faces a crisis of confidence without comprehensive reforms'  
- PM Modi

##### OBJECTIVES

(Article 1 UN charter)

- maintaining international peace & security
- developing friendly relations
- achieving international cooperation

##### UNSC

- P5 (USA, UK, France, Russia, China)
- Non Permanent - 10 members

##### ROLE

- maintain peace & security
- Impose sanctions
- Peacekeeping Mission

##### CHALLENGES

- P5 veto powers
- democratic deficit
- non representative (under or over repn)
- ineffective
- crisis of confidence
  - " " legitimacy
  - " " credibility



Every country wants to be independent - self help

- revival of 'strategic autonomy'
- de-risking: diversification
- consequence of china's arrival ~ 18%
- challenger emanating from "freezing the moment" to protect their advantageous pos.<sup>n</sup>
- growth of minilateralism small groups with obj's
- two big contradictions
  - East west divide / polarisation ~~the~~ R-UK war
  - North South gap / disparity

World Order Shifted through Wars:

- world War
- Cold War
- Trade War

Developed countries want status quo



## CA-VA Mains 2025 Reflections

### General Studies (Paper-III)

#### UPSC Question -2

What are the challenges before the Indian economy when the world is moving away from free trade and multilateralism to protectionism and bilateralism? How can these challenges be met?

(Answer in 150 words) 10

#### Class topic - (Trade War)

##### TRADE WAR

##### NEWS

→ initiated by Trump Admin

##### IMPLICATIONS

###### MACRO-ECONOMIC

- increased cost and inflation
- Economic slowdown

###### GVC

- supply chain disruption
- Trade diversion

###### INVESTMENT

- Policy uncertainty
- reduced business confidence

###### GEO-ECONOMIC

- shift in global trade order
- china's dominance in rare earth minerals
- De-Americanisation - De-Dollarisation
- challenges to multilateralism (WTO)
- Weaponisation
- Deglobalisation
- 'Beggars - thy - neighbour'

###### SOCIO-POLITICAL

- social unrest

###### GEO-POLITICAL

- bloc-politics
- erosion of trust
- multipolarity
- regionalism

## ▶ POSITIVES FOR INDIA

- comparatively lower tariff on India
- 'China plus one'
- exemptions (pharma)
- textiles sector
- service sector resilience
- renewable energy

## ▶ REPORTS

- EAM-PAC
- NITI Aayog

## ▶ WAY FORWARD FOR INDIA

### ECONOMIC

- FTAs
- Global Talent Hub
- 'Atma Nirbhar Bharat'

### PROACTIVE FP

- multialignment
- strategic vigilance
- lead new global governance principles

## ▶ DATA

### INDIA

- global trade
- exports to USA
- oil dependence

### IMF

- WEO - 2.8%
- India's ~ 6%+
- India & China - 36%  
global eco growth  
over the next 5yrs

### USA

- 70% US rare imports from China
- OTC forex turnover \$ 7.5 tn/day
- Tax burden on poorest 20%  
Americans ↑ by 6.2%

### UPSC Question -3

Explain the factors influencing the decision of the farmers on the selection of high value crops in India.  
(Answer in 150 words) 10

#### Class topic - (Horticulture)

#### ● HORTICULTURE - FRUITS & VEGETABLES

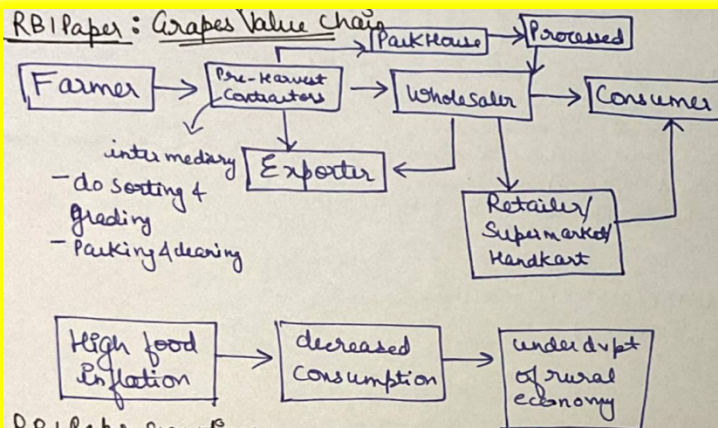
**NEWS** : RBI paper 'Price dynamics of value chain of fruits in India'

**DATA** : → 2nd largest producer  
→ 33% of Agriculture GVA  
→ Production 367 MT  
→ 37% of agri exports  
→ 40% lost due to inefficient supply chain  
→ Farmers share in consumer price 31% (banana) 35% (grapes) 43% (mangoes)  
→ most consumed - TOP

## UPSC Question - 4

Elaborate the scope and significance of supply chain management of agricultural commodities in India.  
(Answer in 150 words) 10

### Class topic - (Horticulture)



### Supply chain & infra

- high post harvest loss
- inadequate cold storage
- fragmented - unorganised
- Transportation
- procurement

### RB1 Paper Suggestions

1. Strengthening Supply chain
2. Promote B2B models
3. Boosting R & D → Coloured varieties of grape, tissue culture for Bananas
4. Shade Net Cultivation - Polyhouses
5. Incentivising processing of fruits to ↓ post harvest loss → Utilising Banana waste for value added products.

### SIGNIFICANCE

- Quiet revolution & structural transformation
- economic contribution & investment attraction
- employment generation (FLFPR)
- reduction in post harvest loss & value addition
- market access and global engagement
- innovation



## UPSC Question – 5

The fusion energy programme in India has steadily evolved over the past few decades. Mention India's contributions to the international fusion energy project – International Thermonuclear Experimental Reactor (ITER). What will be the implications of the success of this project for the future of global energy? (Answer in 150 words) 10








### Class topic - (ITER - Nuclear)

#### Overview of ITER

- ITER (International Thermonuclear Experimental Reactor) is the world's largest nuclear fusion experiment, aimed at demonstrating the feasibility of sustained nuclear fusion as a large-scale, carbon-free energy source.
- It is being constructed in Cadarache, France, under an international collaboration of leading scientific and technological nations.
- The reactor is designed to produce 500 MW of fusion power from 50 MW of input heating power, achieving a  $Q \geq 10$  (energy gain factor of 10).
- ITER is based on the Tokamak design, where plasma is confined magnetically in a toroidal chamber.

#### Major Member Countries of ITER

The project is a joint collaboration of seven members, collectively representing 85% of the world's GDP:

Member	Contribution (%)	Role
 European Union (EU)	45%	Largest contributor and host
 United States	9%	Fusion research & technology
 Russia	9%	Superconducting magnets & fuel cycle tech
 China	9%	Vacuum vessel & magnet components
 India	9%	Cryostat, cooling systems, diagnostics
 Japan	9%	Divertors, superconducting coils
 South Korea	9%	Vacuum vessel & blankets

European Union (EU), as the host, contributes 45% of the total cost, while the remaining six partners contribute 9% each.

#### Key Scientific Goals of ITER

ITER is designed to bridge the gap between experimental fusion reactors and commercial power plants by demonstrating the technical feasibility of sustained nuclear fusion. The primary objectives include:

##### 1. Achieving $Q \geq 10$ Energy Gain

- ITER aims to produce 500 MW of fusion power with only 50 MW of input heating power, achieving a tenfold energy gain ( $Q = 10$ ).
- This would be the first time in history that a fusion reactor generates significantly more energy than it consumes.
- The success of ITER will prove that fusion can be a viable energy source for future power plants.

## UPSC Question - 6

How can India achieve energy independence through clean technology by 2047? How can biotechnology play a crucial role in this endeavour? (Answer in 150 words) 10

### Bioenergy

#### Types of Bioenergy with Feedstock, Technology, and Applications

##### Solid Bioenergy (Biomass)

Type of Biofuel	Feedstock	Technology Used	Applications
Agricultural residues	Rice husk, bagasse, wheat straw	Direct combustion, pelletization	Electricity, industrial heat, rural cookstoves
Forestry residues	Wood chips, sawdust, firewood	Combustion, torrefaction	Heating, thermal power
Energy crops	Switchgrass, miscanthus	Co-firing, briquetting	Power plants, biochar
Organic MSW	Biodegradable municipal solid waste	Incineration, composting, RDF	Waste-to-energy plants, soil conditioner

##### Liquid Biofuels

Type of Biofuel	Feedstock	Technology Used	Applications
Bioethanol (1G)	Sugarcane, maize, sorghum, molasses	Fermentation, distillation	Petrol blending (E10, E20)
Bioethanol (2G)	Agri-residues (straw, husk, stalks)	Cellulolysis, enzymatic hydrolysis	Advanced ethanol blending
Biodiesel	Jatropha, pongamia, used cooking oil	Transesterification	Diesel blending (B5-B20), logistics fuel
Algal Biofuel	Microalgae, macroalgae	Lipid extraction,	Jet fuel, biodiesel,

#### Solutions to Just Energy Transition

1. Phase Down Not Phase Out With Equity
2. Employment Diversification
3. Repurposing Legacy Assets
4. Access to Finance for Vulnerable States and Communities
5. Participatory Governance and Community Consent
6. Decentralized Renewable Energy for Livelihood Integration
7. Gender Responsive Energy Transition

### (Mains GAT 6)

Despite their potential, second-generation biofuels pose several challenges in India. In this context, discuss the steps taken by India to promote and scale up 2G biofuels

### **UPSC Question - 7**

**Q7. What is Carbon Capture, Utilization and Storage (CCUS)? What is the potential role of CCUS in tackling climate change? (Answer in 150 words) 10**

#### **(RRT 7 - Phase - 1)**

Examine the significance of Carbon Capture, Utilisation, and Storage (CCUS) as a tool for decarbonization in India, highlighting its potential to contribute to a circular economy and reduce import dependency. Evaluate the challenges related to its implementation, including technology, financing, and infrastructure, and suggest measures to enhance its adoption.

#### **(Mains - GAT6 - Phase - 3)**

What is meant by Carbon Capture, Utilization, and Storage (CCUS)? Critically evaluate its effectiveness and limitations in the context of global climate change mitigation efforts.



## UPSC Question - 8

Seawater intrusion in the coastal aquifers is a major concern in India. What are the causes of seawater intrusion and the remedial measures to combat this hazard? (Answer in 150 words) 10

### Sea Level Rise (SLR) - Causes

**Thermal Expansion of Oceans:** As global temperatures rise due to **greenhouse gas (GHG)** emissions, oceans absorb over 90% of the Earth's excess heat. The high **specific heat capacity of water** causes the ocean to expand, a phenomenon known as **thermal expansion**, which accounts for nearly **50% of observed sea level rise**, according to **IPCC AR6**. This is a direct response to increased **climate forcing** and is projected to accelerate under warming scenarios.

**Deforestation of Coastal Buffers:** The destruction of **mangroves, wetlands, and coral reefs** diminishes the capacity of coastal ecosystems to stabilize shorelines. These **blue carbon ecosystems** play a critical role in trapping sediments, regulating tidal flows, and sequestering carbon. Mangroves, for instance, can build up to 5 mm of sediment per year—buffering coasts against **coastal erosion** and rising seas. Their loss accelerates **wetland degradation** and exposes communities to storm surges.

**Disruption of Ocean Circulation and Salinity Gradients:** The slowdown of **thermohaline circulation**, especially the **Atlantic Meridional Overturning Circulation (AMOC)**, alters heat distribution across the oceans. This results in **regional sea level anomalies**, creating **SLR hotspots** like the Bay of Bengal and the Eastern US seaboard. Changes in **salinity gradients** and ocean density contribute to uneven sea level changes despite similar global temperature trends.



## UPSC Question - 9

Terrorism is a global scourge. How has it manifested in India? Elaborate with contemporary examples. What are the counter measures adopted by the State? Explain. (Answer in 150 words) 10

### Class Topic (Radicalisation)

#### OPERATION SINDOOR - DOCTRINAL SHIFT

##### NEWS

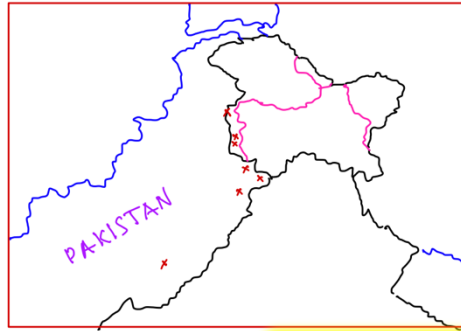
Pahalgam terror attack  
by Pak based terrorists.  
in response India launched OS  
- in May 7, 2025

##### OBJECTIVES

Political  
Military  
Psychological

##### OPERATIONAL TACTICS

- intelligence & target selection
- kinetic & non-kinetic tools
- communication & clarity



##### VIEWS / QUOTES

###### PM MODI

- Terror & talks;  
Terror & Trade;  
Water & blood — cannot flow together

###### MOD RAJNATH SINGH

- Any act of terror is now considered as an act of war

###### EAM S JAISHANKAR

- Perpetrators of evil cannot be put at par with victims

#### RADICALISATION

NEWS → Pakistan's state sponsored terrorism

#### RADICALISATION

→ Process by which an individual or group comes to adopt increasingly extreme political or religious ideas and aspirations

→ pre-radicalisation → self identification → indoctrination → radicalisation

#### MEASURES

- PMLA 2002
  - ↳ ML - Cognisable & non-bailable
  - ↳ confiscation of proceeds of crime
  - ↳ investigation by ED
  - ↳ stringent bail provisions

#### PMLA RULES 2023

- Politically exposed persons
- Non profit organisations
- Beneficiary ownership

CASE STUDY : Terrorists are using online payment services, e-com platforms, VPNs (Pulwama 2019, Goraknath 2022)

#### REPORT : July 2025

- Recognition of 'state sponsored terrorism'
- Inadequate global response
- Rise of digital TF
- Diverse methods of raising funds for TF

## UPSC Question - 10

The Government of India recently stated that Left Wing Extremism (LWE) will be eliminated by 2026. What do you understand by LWE and how are the people affected by it? What measures have been taken by the government to eliminate LWE? (Answer in 150 words) 10

### Class Topic (LWE)

#### LEFT WING EXTREMISM

##### NEWS

Intensified campaigns against LWE supported by MOHA have led to encounters & numerous surrenders

##### LWE

- Socio political movement that seeks to overthrow the existing state structure through armed struggle

#### COUNTER NAXALISM

##### → Security operations

- specialised forces
- operation greenhunt
- Area domination
- clear-hold-build strategy

##### → Development initiatives

- infrastructure ; roads ; embgsy
- electrification ; communication
- employment MGNREGA ; Skill devel ; Ekalavya
- Aspirational Dts ; PM JANMAN

##### → Governance & Admin

- PESA, PRA
- UAPA

##### → Rehabilitation & Surrender

- Incentivise surrender
- re integration programs
- Community engagement

##### → Psychological

- Counter narratives
- WHAM strategy

### GAT-1 - Phase -1

What is the role of frontal organizations and Maoist sympathizers in the spread of left-wing extremism in urban areas? Also, suggest a way forward to address such internal security challenges.

### (Mains GAT - 7)

Left Wing Extremism has witnessed a steady decline in recent years, yet continues to pose challenges in certain regions. Identify the key measures that have contributed to this decline. In this context, critically examine whether the objective of a Naxal free India by 2026 is Attainable?

## UPSC Question - 14

Examine the scope of the food processing industries in India. Elaborate the measures taken by the government in the food processing industries for generating employment opportunities. (Answer in 250 words) 15

### Class Topic (Food Processing Sector)

#### FOOD PROCESSING SECTOR

**NEWS:** 100 new FTL to be established with support from MOSPI  
National Makhana Board was announced

**FP:** methods and techniques used to transform raw ingredients into food products that are safe for consumption, convenient & have longer shelf life

#### INITIATIVES

- 100% FDI
- PM Kisan SAMPADANA Yojana
- Mega Food Parks
- PM FME
- PLI for FPI
- Operation Green
- One Dr One Product
- Krishi udaan
- role of PS&I

#### SUGGESTIONS DRAFT NATIONAL POLICY ON FP

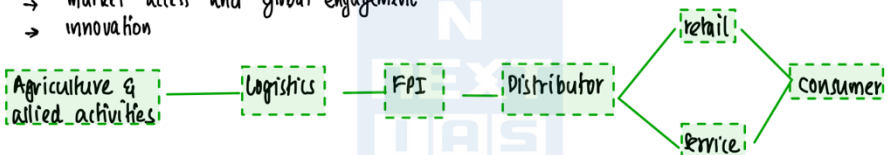
- institutional credit
- incentivise FPOs
- support unorganised FPIs
- ensure regulatory compliance
- promote cluster approach

#### BEST PRACTICES

- Amul
- Innovations - millet ice cream

#### SIGNIFICANCE

- Quiet revolution & structural transformation
- economic contribution & investment attraction
- employment generation (FLFPR)
- reduction in post harvest loss & value addition
- market access and global engagement
- innovation



## UPSC Question - 15

How does nanotechnology offer significant advancements in the field of agriculture? How can this technology help to uplift the socio-economic status of farmers? (Answer in 250 words) 15

### Class Topic (Nano Technology)

#### Applications of Nanotechnology - Development

Sector	Nanotechnology Applications	Expected Impact (with Keywords, Data & Examples)
<b>Healthcare &amp; Medicine</b>	Targeted drug delivery via nanoparticles- Nano-diagnostics & biosensors- Nano-vaccines	- <b>Early disease detection</b> through nano-biosensors (e.g., <i>IIT Bombay's paper-strip test for COVID</i> )- <b>Next-gen vaccines</b> with nano-adjuvants
<b>Agriculture</b>	Nano-fertilizers & nano-pesticides- Smart delivery of agrochemicals- Soil quality monitoring	- <b>30–50% reduction in chemical usage</b> (ICAR-IARI studies)- <b>Improved nutrient uptake</b> and yield- <i>IFFCO's nano urea</i> boosts productivity and reduces urea usage by 50% (launched in 2021)
<b>Water Purification</b>	Nano-membranes for desalination- Nano-filters for removing heavy metals & pathogens	- <b>Affordable clean water solutions</b> (e.g., <i>Tata Swach nanotech water filter</i> )- <b>Improved rural water quality</b> via nano-silver and nano-iron filtration
<b>Energy</b>	Nanomaterials in solar cells (quantum dots, perovskites)- Hydrogen fuel cells- Nano-batteries	- <b>Higher solar efficiency</b> : Quantum dot solar cells show >11% efficiency (IISc Bangalore)- <b>Next-gen energy storage</b> via graphene-based batteries (e.g., CSIR-CECRI research)
<b>Textiles &amp; Apparel</b>	Anti-bacterial & anti-odor fabrics- UV-resistant clothing- Nano-coatings for smart wearables	- <b>Smart clothing industry</b> boost with moisture sensors and UV blockers- <b>Increased textile exports</b> due to high-performance fabrics
<b>Electronics &amp; IT</b>	Nano-transistors for high-speed chips- Quantum dot displays- Flexible electronics	- <b>Smaller, faster devices</b> (e.g., <i>Samsung's quantum dot TVs</i> )- <b>India's Electronics Policy 2020</b> targets nanoelectronics for AI & IoT- <b>Improved computational efficiency</b> and wearable electronics
<b>Environment</b>	Air pollution control using nano-catalysts- Carbon capture- Nanomaterials for biodegradable packaging	- <b>Nano-coated filters</b> used for PM2.5 air purification (IIT Delhi project)- <b>Green packaging solutions</b> using nano-cellulose- <b>Sustainable development</b> via eco-friendly nano-materials
<b>Construction &amp; Infrastructure</b>	Nano-concrete & self-healing materials- Thermal insulating coatings- Anti-corrosion paints	- <b>Increased durability of infrastructure</b> (e.g., <i>UltraTech Nanotech cement</i> )- <b>Energy-efficient buildings</b> via nano-thermal coatings-
<b>Defense &amp; Security</b>	Lightweight nano-armors- Stealth coatings- Nanodrones for surveillance	- <b>Enhanced soldier protection</b> with nano-ceramic armors (DRDO trials)- <b>Camouflage &amp; radar evasion</b> via carbon nanotube-based coatings- <b>Precision surveillance</b> with nano-UAVs and biosensors
<b>Food &amp; Nutrition</b>	Nano-encapsulation of nutrients- Shelf-life extension- Nanosensors for food quality monitoring	- <b>Reduced food spoilage</b> with antimicrobial nano-films- <b>Bioavailability enhancement</b> of micronutrients (e.g., <i>nano-iron &amp; zinc</i> fortification in PM-POSHAN)- <b>Safe food packaging</b> using silver nanoparticles

India aims to become a semiconductor manufacturing hub. What are the challenges faced by the semiconductor industry in India? Mention the salient features of the India Semiconductor Mission. (Answer in 250 words) 15

**Class Topic (Semi-Conductors and Semiconductors Indigenisation)**

**Semiconductor Manufacturing**

**Semiconductor manufacturing** is the process of producing integrated circuits or microchips that power electronic devices such as smartphones, computers, automobiles, and defense systems. It involves complex steps like **wafer fabrication, photolithography, doping, etching, and packaging**, often conducted in ultra-clean environments known as **fabs**.

Semiconductors are the backbone of the modern digital economy, and their strategic importance has made **chip manufacturing a critical area of national security, technological self-reliance, and industrial policy** for countries like India under the **Semicon India Programme**.

**Significance of Semiconductor Manufacturing in India**

1. Strategic Technology Sovereignty
2. Enabler of Electronics and EV Manufacturing Ecosystem
3. Catalyst for Job Creation and High Tech Skill Development
4. Anchor for Advanced R and D and Innovation Ecosystem
5. Boost to Strategic Sectors Defense Space and Telecom
6. Contribution to GDP and Trade Competitiveness
7. Geoeconomic Leverage in Global Value Chains

**Challenges in Semiconductor Manufacturing in India**

1. Fragile Fabless Ecosystem and Low IP Ownership
2. Capital Intensity and High Financial Risk
3. Scarcity of Skilled Workforce and Fab Specific Expertise
4. Weak Supply Chain and Logistics Infrastructure
5. Limited Domestic Demand for Leading Edge Nodes
6. Geopolitical Supply Chain Dependencies and Tech Denial Regimes

**Solutions**

1. **Fast-Track Establishment of Legacy Node Fabs (28nm and above):** India should prioritize commercially viable mature nodes like 28nm and 65nm for immediate applications in EVs, telecom, defence, and IoT; E.g. **India Semiconductor Mission (ISM)**, launched with an outlay of Rs 76,000 crore;; Fast-tracking projects like **Micron's ATMP facility in Gujarat** and **Tata-Powerchip fab at Dholera**

**Challenges**

1. **Absence of Commercial-Scale Foundries (Fabs)** No operational silicon wafer fabrication plants for advanced logic or memory chips. Nodes like 28nm and below remain out of reach. Heavy reliance on imports for microprocessors, GPUs, SoCs, and DRAM persists.
2. **High Capital Requirements and Long Gestation Periods:** Chip fabrication plants require 5 to 10 billion USD investment per unit with a payback horizon of 7 to 10 years: Private sector hesitant due to global chip cycle volatility and low return margins.
3. **Technology Access Barriers and IP Monopolies:** Core technologies such as photolithography, node architecture are monopolized by select countries. Export controls and tech denial regimes limit access; IP bottlenecks, monopoly, tech denial regimes, export control barriers
4. **Skill Deficit and Human Capital Gaps:** India lacks cleanroom-trained engineers, semiconductor physicists, and packaging specialists; Fabrication processes demand high-precision skills in doping, ion implantation, lithography, and etching.
5. **Weak Domestic Supply Chain and Ecosystem:** India imports most upstream inputs including ultra-pure silicon wafers, photoresists, etching gases, and deposition tools; Limited OSAT (Outsourced Semiconductor Assembly and Testing) capacity restricts backend integration.
6. **Infrastructure Constraints: Power, Water, and Logistics:** Fabs need 99.9999 percent uptime power and millions of litres of ultra-pure water per day; India lacks utility-integrated industrial zones with plug-and-play fab infrastructure; Grid instability, water stress, and zoning delays hinder site readiness.
7. **Global Subsidy Race and Investment Competition:** India's 10 billion USD incentive scheme is dwarfed by other nations:
  - o US CHIPS Act: > 50 billion USD
  - o EU Chips Act: > 40 billion euros
  - o China's Big Fund: 150 billion USD
8. **Geopolitical Supply Chain Risks:** India must navigate export bans, chip sanctions, and political risks tied to the Taiwan Strait, US-China rivalry, and tech alliances.
9. **Limited Domestic Demand for Advanced Nodes:** Most Indian industries rely on legacy nodes (40nm, 65nm) used in EVs, defence electronics, and white goods; Absence of domestic anchor clients for 14nm and below limits economies of scale for fabs.



## UPSC Question - 17

Mineral resources are fundamental to the country's economy and these are exploited by mining. Why is mining considered an environmental hazard? Explain the remedial measures required to reduce the environmental hazard due to mining. (Answer in 250 words)

15

### Class Topic (Critical and Rare Earth Minerals)

#### Critical/Rare earth Minerals

**Critical minerals** are raw materials that are essential for India's **economic development, clean energy transition, and national security**, but are prone to **supply disruptions due to import dependence or geopolitical risks**. These include minerals like **lithium, cobalt, nickel, rare earth elements, and graphite**, which are vital for batteries, semiconductors, electronics, EVs, and defense applications.

Recognizing their strategic importance, India has launched the **Critical Minerals List (2023)** and the **National Critical Minerals Mission** to ensure **domestic exploration, secure supply chains, and international collaborations**.

**Rare Earth Elements (REEs)** are a group of 17 chemically similar metals that are critical for **high-tech, green, and defense technologies**, including **permanent magnets, wind turbines, EV motors, lasers, electronics, and missile guidance systems**.

#### Significance of Critical Minerals

1. Enabler of Digital Economy and Emerging Technologies
2. Backbone of Green Energy Transition
3. Reducing Import Dependency and Economic Resilience
4. Catalyst for Economic Growth and Industrialization
5. Strategic Security and Defense Preparedness
6. Tool of Geostrategic Leverage and Mineral Diplomacy

#### Solutions to India's Critical Mineral Challenges

1. National Critical Mineral Mission NCM
2. Development of Midstream and Downstream Infrastructure
3. Diversification of International Mineral Supply Chains
4. Establishment of Strategic Reserves and Circular Economy Ecosystems
5. R and D Innovation and Human Capital Development

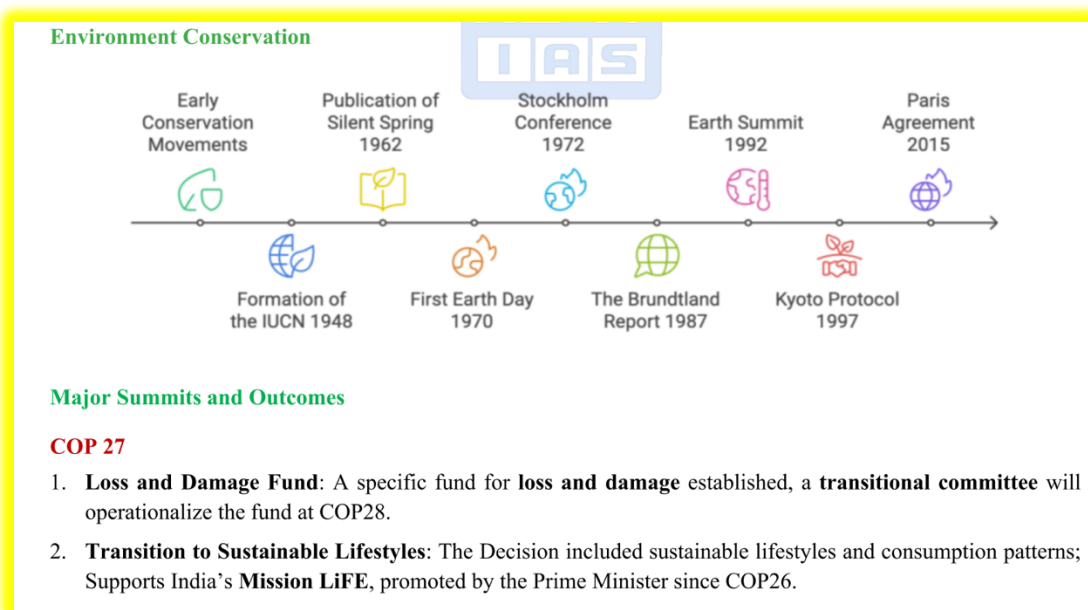
- **Diversifying Raw Material Sources:** Geographical diversification, sustainable extraction, cobalt substitution, strategic reserves, critical mineral partnerships
- **Advancing Battery Recycling Technologies:** Circular economy, direct recycling, hydrometallurgy,
- **Improving Thermal Management Systems:** Battery management systems, liquid cooling, solid-state electrolytes
- **Developing Next-Generation Chemistries:** Lithium iron phosphate, solid-state batteries, sodium-ion batteries, cobalt-free cathodes;
- **Enhancing Recycling Policies and Infrastructure:** Extended producer responsibility, recycling ecosystems, global standards
- **Lowering Costs Through Innovation and Scale:** Gigafactories, economies of scale, cobalt-free cathodes;
- **Addressing Temperature Sensitivity:** Low-temperature electrolytes, heat-resistant separators, cryogenic electrolytes;

## UPSC Question - 18

Write a review on India's climate commitments under the Paris Agreement (2015) and mention how these have been further strengthened in COP26 (2021). In this direction, how has the first Nationally Determined Contribution intended by India been updated in 2022?

15

### Class Topic (COP)



### (RRT -10 Phase-1)

Examine the role of developed countries in the weakening of global climate agreements, from the Kyoto Protocol to the Paris Agreement. How has this affected the responsibilities of developing countries?

## UPSC Question - 20

Why is maritime security vital to protect India's sea trade? Discuss maritime and coastal security challenges and the way forward.  
(Answer in 250 words)

15

### Class topic (Maritime Security)

#### MARITIME SECURITY

**NEWS:** : National maritime Domain Awareness (NDMA) Project  
: Strait of Hormuz, Red Sea conflicts

#### GEOPOLITICS

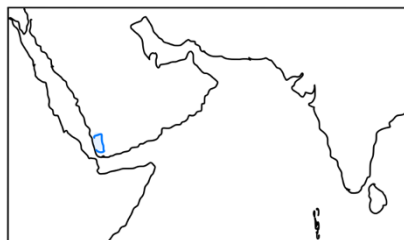
choke points

→ **Straight of Hormuz**

- ↳ Persian gulf to Arabian sea
- energy - 20 mn barrel / day
- ≈ 40% of India's energy imports
- Iran threatened to close

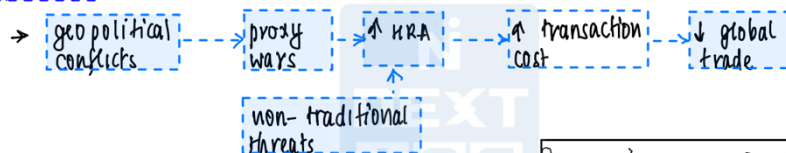
→ **Red Sea**

- ↳ Indian ocean to Mediterranean sea
- Suez canal - 15% global trade
- ≈ 80% Indian trade with Europe
- Houthis attacks



MAP 1. Red Sea & IOR

#### CHALLENGES



### (Mains GAT - Phase -3 - Test -1)

“The Indian Ocean is evolving as a critical geostrategic theatre, yet regional maritime security cooperation remains fragmented.” In this context, evaluate the potential of the Indian Ocean Rim Association (IORA) in fostering a collective maritime security architecture in the Indian Ocean region.