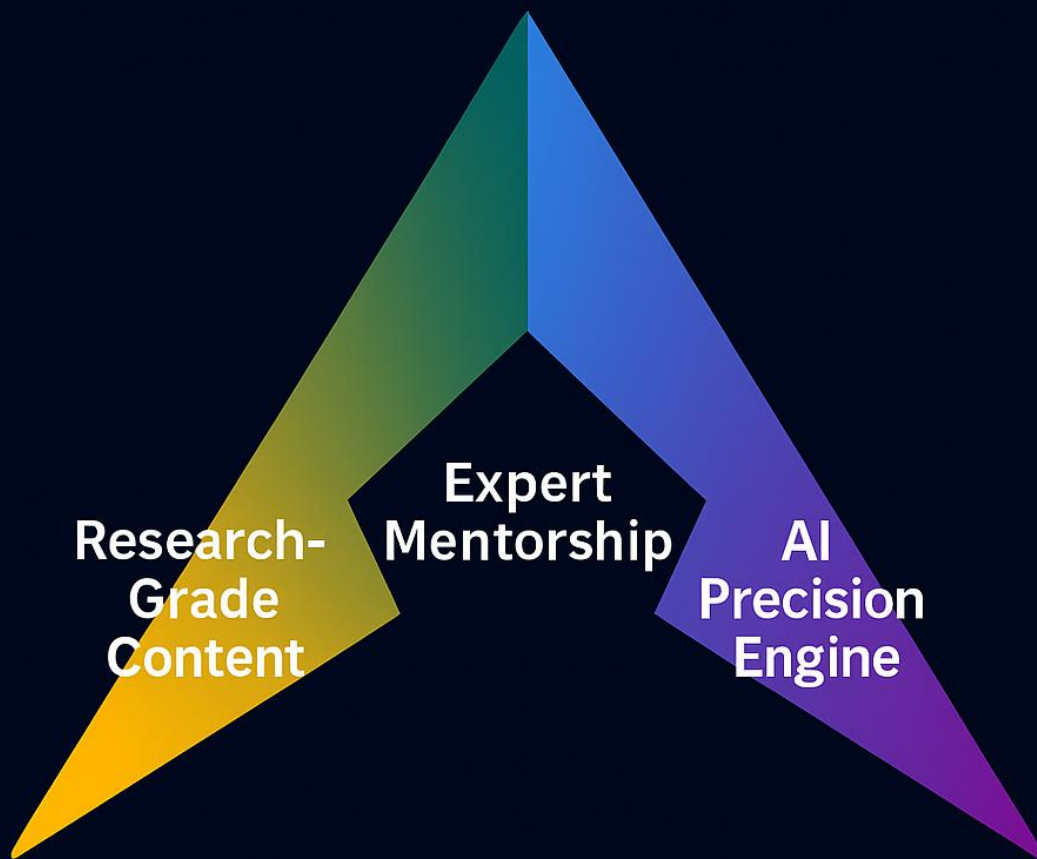


# PrepAlpine

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# DAILY CURRENT AFFAIRS DATED 05.06.2026

## GS Paper II: International Relations

### 1. India–Venezuela Energy Partnership

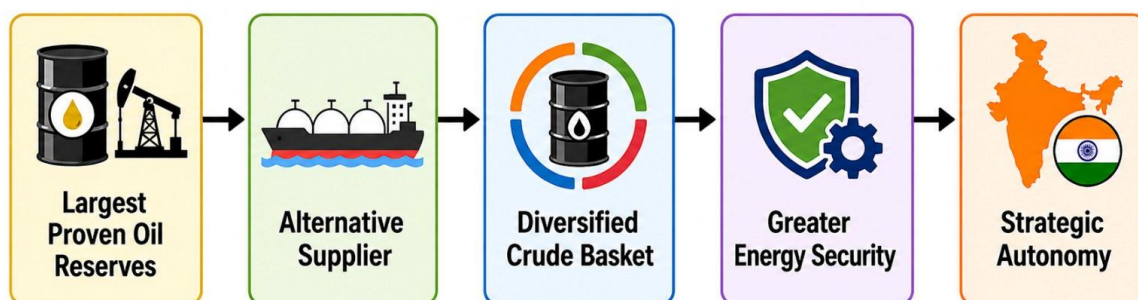
#### a. Introduction

India and Venezuela have renewed discussions on building a long-term energy partnership. The issue came into focus during Venezuelan Acting President Delcy Rodríguez's visit to India in June 2026, when both sides discussed long-term energy contracts, upstream and downstream oil cooperation, critical minerals, technology, agriculture, health and people-to-people ties.

The engagement is significant because India is one of the world's largest crude oil importers and remains vulnerable to supply disruptions, price volatility, sanctions and geopolitical instability in major oil-producing regions. Venezuela, with one of the world's largest proven oil reserves, offers India an additional source of crude oil and a potential partner in energy diversification.

Thus, India–Venezuela energy cooperation should be understood not merely as an oil-import arrangement, but as part of India's wider effort to build a diversified and strategically autonomous energy policy.

#### Strategic Importance of Venezuela for India



#### b. Strategic Context of India–Venezuela Relations

- **India's Energy Dependence:** India's engagement with Venezuela must be understood through the larger lens of energy security. India imports a major share of its crude oil requirements. This creates vulnerability whenever global energy markets are affected by conflict, sanctions, shipping risks or price shocks.
- **Need for Supplier Diversification:** Traditionally, India's crude oil imports have depended heavily on West Asia. While this region remains central to India's energy needs, excessive dependence on any one geography creates strategic risk. Therefore, India has consistently tried to diversify its energy basket by engaging with suppliers in Russia, Africa, Latin America and the United States.
- **Venezuela's Resource Significance:** In this context, Venezuela is important because it possesses vast oil reserves. A stable energy partnership with Venezuela can add resilience to India's crude sourcing strategy and reduce excessive dependence on limited supply regions.

This strategic context explains why India's engagement with Venezuela has relevance beyond bilateral trade and enters the domain of energy security and foreign policy autonomy.

### c. Importance of Long-Term Oil Contracts

- **Supply Predictability for India:** Long-term oil contracts can provide India with greater predictability in crude oil supply. They can help Indian refiners plan procurement, manage price risks and reduce exposure to sudden market disruptions.
- **Assured Demand for Venezuela:** For Venezuela, such contracts can provide assured demand and stable commercial engagement with a large energy-consuming country. For India, they can become part of a diversified oil import strategy.
- **Need for Careful Contract Design:** However, long-term contracts must be designed carefully. Pricing formulas, payment mechanisms, shipping arrangements, insurance coverage, refinery compatibility and sanctions-related risks must be clearly addressed. Without these safeguards, energy cooperation may remain vulnerable to political and commercial uncertainty.

Thus, the importance of the proposed partnership lies not only in access to oil but also in the reliability of the institutional framework supporting that access.

### d. Upstream and Downstream Cooperation

- **Meaning of Upstream Cooperation:** The discussions also covered upstream and downstream energy cooperation. Upstream cooperation refers to activities related to oil exploration and production. Indian public sector and private energy companies may explore commercially viable opportunities in Venezuelan oil fields, provided investment conditions are stable and legally secure.
- **Meaning of Downstream Cooperation:** Downstream cooperation refers to refining, marketing, petrochemicals and energy infrastructure. Indian refiners may benefit if Venezuelan crude is available on competitive and predictable terms. However, technical compatibility is important because different crude grades require different refining configurations.
- **Lessons from Past Engagement:** Past Indian engagement with Venezuelan oil faced challenges linked to payment delays, sanctions, operational uncertainty and investment risks. Therefore, any renewed cooperation must be based on stronger contractual protection, financial safeguards and clear dispute-resolution mechanisms.

This shows that oil cooperation must be commercially sound and legally secure if it is to become durable.

### e. Energy Diversification and Strategic Autonomy

- **Energy Diversification as Strategic Autonomy:** Energy diversification is central to India's strategic autonomy. A country that depends heavily on a few energy suppliers may face pressure during geopolitical crises. By widening its energy partnerships, India gains greater flexibility in foreign policy and economic planning.
- **Pragmatic Energy Policy:** Engagement with Venezuela allows India to maintain an independent and pragmatic energy policy. India can pursue its national interest without being locked into ideological or bloc-based alignments.
- **Need for Diplomatic Balancing:** However, this requires diplomatic balancing. Venezuela's political situation and its relationship with the United States have often affected sanctions, investment conditions and oil trade. India must therefore engage with Venezuela in a sanctions-aware, commercially cautious and strategically balanced manner.
- **Avoiding Political Over-Identification:** The goal should be practical energy cooperation, not political over-identification with any side.

Thus, India-Venezuela energy engagement reflects India's attempt to balance strategic autonomy with commercial realism and diplomatic caution.

## **f. Latin America in India's Foreign Policy**

- **Underutilised Region:** India's discussions with Venezuela also reflect the need to expand engagement with Latin America. Compared to West Asia, Europe, Southeast Asia and the Indo-Pacific, Latin America has remained relatively underutilised in India's foreign policy.
- **Wider Regional Potential:** Yet the region has considerable potential for India. It offers opportunities in energy, lithium, copper, agriculture, food security, pharmaceuticals, digital technology, mining, defence cooperation and South-South development partnerships.
- **Venezuela as Part of Wider Outreach:** Venezuela can become one part of a wider Indian outreach to Latin America. Such engagement would help India diversify its economic and strategic partnerships beyond its traditional diplomatic geographies.

This makes the partnership useful not only for crude oil sourcing, but also for expanding India's presence in a resource-rich and strategically relevant region.

## **g. Critical Minerals and Mining**

- **Importance of Critical Minerals:** The inclusion of critical minerals and mining in the talks is especially significant. Critical minerals are essential for electric vehicles, batteries, renewable energy systems, electronics, defence technologies and advanced manufacturing.
- **Relevance for India's Industrial Future:** As India expands electric mobility, solar energy, wind power, battery manufacturing and electronics production, its demand for minerals such as lithium, cobalt, nickel, copper and rare earth elements will rise sharply. Diversified and reliable mineral supply chains will therefore become crucial for India's industrial and strategic security.
- **Venezuela's Mineral Potential:** Venezuela's mineral potential can complement India's search for diversified sources outside dominant global supply chains. However, cooperation must be transparent and responsible.
- **Responsible Mining Standards:** Mining partnerships should avoid illegal extraction, environmental damage, weak labour standards and conflict-linked supply chains.

Therefore, critical minerals cooperation should be pursued as part of India's clean-energy and strategic-industrial security, but with strong environmental and governance safeguards.

## **h. Cooperation Beyond Oil**

- **Need for a Broader Partnership:** A durable India-Venezuela partnership should not remain limited to crude oil. Broader cooperation in technology, agriculture, health and people-to-people ties can make the relationship more stable and less vulnerable to oil-market cycles.
- **Agriculture and Food Cooperation:** In agriculture, India and Venezuela can explore cooperation in food products, farm technology, irrigation, agricultural machinery and commodity trade.
- **Health and Pharmaceutical Cooperation:** In health, India's pharmaceutical strength can support affordable medicines and healthcare collaboration.
- **Technology and Capacity-Building:** Technology cooperation can include digital solutions, capacity-building and innovation partnerships.

Such diversification is important because a relationship built only on oil can become unstable when prices, sanctions or domestic political conditions change. A wider partnership creates more stakeholders and deeper institutional continuity.

## **i. Risks and Constraints**

- **Political and Institutional Risks:** The partnership carries several risks. Venezuela has faced political instability, sanctions exposure, institutional weakness and economic governance challenges. These factors can create uncertainty for Indian companies.

- **Commercial Risks:** Commercial risks are also important. Indian firms will need clarity on payment mechanisms, contract enforcement, investment protection, shipping insurance and regulatory permissions. Past difficulties in payment settlement and sanctions compliance show that energy cooperation requires strong financial and legal safeguards.
- **External Geopolitical Dimension:** There is also an external geopolitical dimension. Venezuela's changing political situation and its relationship with the United States can affect sanctions and oil trade.
- **Need for Realistic Engagement:** India must avoid being drawn into ideological disputes while protecting its energy interests. Therefore, the partnership should be pursued with caution, realism and strategic discipline.

These risks show that the India-Venezuela partnership has potential, but it must be managed through careful diplomacy and robust commercial safeguards.

#### j. Way Forward

- **Diversify Energy Sourcing:** Venezuela should be treated as one component of India's broader crude oil basket. It should add resilience to India's energy supply without creating a new form of overdependence.
- **Secure Long-Term Contracts Carefully:** Any long-term agreement must provide clarity on pricing, payment security, insurance arrangements, shipping logistics, refinery compatibility and sanctions compliance. Contract design will determine the durability of the partnership.
- **Revive Upstream Cooperation Selectively:** Indian public sector undertakings and private energy firms can assess exploration and production opportunities in Venezuela, but only where commercial viability and legal protection are assured.
- **Expand Critical Minerals Engagement:** India should explore transparent supply chains for minerals needed in clean energy, electronics and strategic industries. Environmental and social safeguards must be built into mining cooperation.
- **Use Local Currency Mechanisms Where Feasible:** Rupee or local currency arrangements may reduce payment risk and improve trade continuity, provided they are acceptable to both sides and aligned with financial regulations.
- **Maintain Diplomatic Balance:** India should pursue energy cooperation with Venezuela while maintaining strategic autonomy and carefully navigating United States, Venezuelan and global energy interests.
- **Broaden the Partnership Beyond Oil:** Cooperation in pharmaceuticals, agriculture, technology, health, mining and capacity-building should be expanded. A diversified relationship will be more resilient than a narrow oil-based partnership.

A strong way forward must therefore combine energy diversification, sanctions-aware diplomacy, commercial safeguards, responsible mining and broader South-South cooperation.

#### Conclusion

India-Venezuela energy talks are significant for India's crude oil diversification and long-term energy security. Venezuela offers major resource potential, especially in oil and minerals, while India offers a large energy market, refining capacity, pharmaceutical strength and development partnership experience.

However, the partnership must be pursued with caution because political instability, sanctions exposure, payment risks and contract uncertainty can affect implementation. A successful India-Venezuela partnership will depend on combining strategic energy interests with commercial viability, sanctions-aware diplomacy, payment security and broader economic cooperation.

For India, the larger objective should be clear: to build a diversified, resilient and strategically autonomous energy policy that can withstand geopolitical shocks and support long-term economic growth.

## GS Paper II: International Relations

### 2. India–Nepal Relations and the Challenge of a “New Nepal”

#### a. Introduction

India–Nepal relations are among the most intimate and complex relationships in South Asia. The two countries share an open border, deep civilisational links, religious and cultural connections, extensive trade, labour mobility and dense people-to-people ties. However, this closeness has also produced recurring sensitivities, especially around sovereignty, political interference, border disputes and perceptions of unequal treatment.

The recent meeting between Rabi Lamichhane, chief of Nepal’s ruling Rastriya Swatantra Party, and Prime Minister Narendra Modi has brought renewed attention to India’s engagement with a politically changing Nepal. The development comes after a major political shift in Nepal, where younger leadership has emerged from Gen Z-driven politics and Balen Shah has assumed national leadership.

This shift matters because India is no longer dealing only with familiar traditional parties and older political elites. A younger, more assertive and less conventional political class is now shaping Nepal’s domestic and foreign policy discourse. India’s Nepal policy must therefore adapt to a “new Nepal” that seeks dignity, development and equal partnership.

Thus, India–Nepal relations must now be understood not only through historical closeness, but also through the changing political psychology of a younger and more assertive Nepal.



#### b. Historical and Structural Foundations of India–Nepal Relations

- **Open Border and Social Interdependence:** India and Nepal share a relationship shaped by geography, history and society. The open border allows citizens of both countries to live, work, trade and travel across the boundary with unusual ease. Millions of Nepali citizens live and work in India, while many Indians have family, business and cultural links with Nepal.
- **Civilisational and Religious Linkages:** Religious and civilisational ties further strengthen the relationship. Sites associated with Hinduism and Buddhism, such as Pashupatinath, Janakpur, Lumbini, Ayodhya and Varanasi, create a shared cultural geography. These links give the relationship a social depth that goes beyond formal diplomacy.
- **Economic Dependence and Connectivity:** Economically, India remains Nepal’s largest trade partner and one of its most important sources of employment, remittances, fuel, essential goods, investment and connectivity. Nepal’s access to global markets also depends significantly on routes passing through India.
- **Proximity and Friction:** These structural ties give India a natural advantage in Nepal. However, such proximity also creates friction whenever Nepal perceives India’s role as intrusive or unequal.

This foundation shows that India–Nepal relations are both deeply connected and emotionally sensitive.

#### c. The Perception Challenge

- **“Big Brother” Perception:** A central challenge in India–Nepal relations is perception. Some sections of Nepali society view India as a “bullying big brother” rather than an equal partner. This perception became stronger after the events surrounding Nepal’s Constitution-making process in 2015.
- **Legacy of the 2015 Blockade:** India had raised concerns about the representation and rights of Madhesi communities in Nepal’s new Constitution. However, the subsequent unofficial border blockade created deep resentment among many Nepalese citizens. It affected fuel supplies, essential goods and daily life, leaving a lasting political memory.
- **Public Memory and Political Attitudes:** For many in Nepal, the 2015 experience became a symbol of Indian pressure. Whether or not India formally accepted responsibility for the blockade, the public perception in Nepal shaped political attitudes. This memory continues to influence how Nepalese citizens, especially younger generations, evaluate India’s intentions.
- **Need for Trust Rebuilding:** Therefore, India’s challenge is not only diplomatic. It is also psychological and political. New Delhi must rebuild trust by avoiding patronising language, respecting Nepal’s sovereignty and showing that it can act as a reliable partner during both normal times and crises.

Thus, perception management is now as important as policy substance in India’s Nepal strategy.

#### d. Rise of a New Political Leadership

- **Shift from Traditional Elites:** The emergence of a younger political leadership in Nepal has changed the diplomatic landscape. Traditional Nepali politics was shaped mainly by established parties, veteran leaders and long-standing networks with India. India was familiar with these actors and often managed the relationship through personal political channels.
- **Character of New Leadership:** The new leadership is different. It appears more urban, youth-driven, performance-oriented and sensitive to public opinion. It is also more cautious about external engagement and more assertive in projecting Nepal’s independent identity.
- **Political Signalling by New Leadership:** Prime Minister Balen Shah’s reported decision to avoid foreign travel in the first year and meet only heads of government reflects a new style of political signalling. It suggests that the leadership wants to show domestic audiences that Nepal will not be casually managed by external powers.
- **Need for Recalibrated Indian Outreach:** For India, this requires recalibration. Engagement can no longer be limited to traditional elites. New Delhi must build wider relationships with youth-led parties, city leaders, civil society, entrepreneurs, local governments, students, media, cultural institutions and business groups.

This political change means India must move from elite-centred diplomacy to society-wide engagement with Nepal.

#### e. China Factor in India–Nepal Relations

- **Nepal’s Balancing Strategy:** Nepal’s location between India and China gives it strategic importance. Nepali leaders have historically used relations with China as a balancing tool in their engagement with India. Beijing has expanded its role in Nepal through infrastructure projects, political outreach, investment, diplomatic engagement and narratives of non-interference.
- **China and Anti-India Sentiment:** China may try to use anti-India sentiment to expand its influence in Kathmandu. If India is perceived as overbearing, China can present itself as an alternative partner that respects Nepal’s sovereignty. This makes perception management even more important for India.
- **India’s Structural Advantages:** However, India has structural advantages that China cannot easily replicate. The open border, labour mobility, religious links, daily trade, social networks, family ties and shared cultural spaces make India indispensable to Nepal’s economy and society.



- **Correct Indian Response:** The correct Indian response is not pressure-based competition with China. India should counter external influence through faster delivery, better connectivity, respectful diplomacy and visible benefits for ordinary Nepalese citizens.

Thus, India's advantage lies not in coercive leverage, but in trust, proximity and practical development delivery.

#### f. Economic Interdependence and Development Diplomacy

- **Economic Linkages:** India and Nepal are deeply economically connected. India remains Nepal's largest trade partner and a key source of essential supplies. Nepali workers in India contribute significantly to Nepal's household incomes through remittances. Indian tourists, pilgrims and investors also contribute to Nepal's economy.
- **Development Priorities of New Nepal:** The future of India–Nepal relations may depend increasingly on development diplomacy. Nepal's new leadership is likely to prioritise economic stabilisation, infrastructure, anti-corruption reforms, governance improvement and job creation. India can support these goals through practical and visible cooperation.
- **Connectivity as a Core Instrument:** Connectivity must be central to this approach. Road, rail, air and digital links can convert cultural closeness into economic opportunity. Cross-border railways, integrated check posts, power transmission lines, petroleum pipelines, digital payment systems and trade facilitation can make India's partnership with Nepal more useful and less politically contested.
- **Citizen-Focused Cooperation:** UPI-based payment corridors, digital connectivity and smoother movement of goods and people can especially appeal to Nepal's younger population. Development diplomacy should therefore be citizen-focused, not only government-focused.

This makes economic delivery the most effective way to rebuild trust in a politically changing Nepal.

#### g. Hydropower and Energy Cooperation

- **Natural Complementarity:** Hydropower is one of the strongest areas of India–Nepal cooperation. Nepal has vast hydropower potential, while India has a large and growing electricity market. Cross-border energy trade can benefit both countries.
- **Benefits for Nepal and India:** For Nepal, hydropower exports can generate revenue, attract investment and support economic development. For India, electricity imports from Nepal can contribute to clean energy, regional energy security and grid cooperation.
- **Need for Sensitivity:** However, hydropower projects must be handled with sensitivity. Delays, local concerns, environmental issues and perceptions of unequal benefit-sharing can create political resistance. Transparent agreements, fair pricing, local consultation and timely implementation are essential.
- **Pillar of Trust:** Energy cooperation can become a pillar of trust if it is seen in Nepal as mutually beneficial rather than extractive.

Therefore, hydropower must be framed as shared prosperity rather than one-sided resource utilisation.

#### h. Border Disputes and Sovereignty Sensitivities

- **Sensitivity of Territorial Questions:** Border disputes remain a sensitive issue in India–Nepal relations. Nepal has raised claims over areas it considers encroached, while India has rejected third-party mediation and prefers bilateral resolution.
- **Link with National Identity:** These disputes are not merely technical. They are linked with national identity, sovereignty and domestic politics. Public confrontation can strengthen nationalist narratives in Nepal and reduce space for quiet diplomacy.

- **Need for Quiet Bilateralism:** Therefore, border issues must be handled through bilateral mechanisms, technical surveys, historical records and political restraint. Public escalation should be avoided.
- **Protecting the Larger Relationship:** Both countries should ensure that territorial questions do not overwhelm the larger relationship.

This requires patient diplomacy, because border disputes can quickly become symbols of unequal treatment if mishandled.

#### i. Managing the Open Border

- **Value of the Open Border:** The open border is one of the defining features of India–Nepal relations. It supports livelihoods, family ties, trade, tourism and cultural exchange.
- **Security Challenges:** At the same time, it creates challenges related to smuggling, illegal movement, trafficking, counterfeit currency, criminal networks and security concerns.
- **Avoiding Over-Securitisation:** India must avoid securitising the border in a manner that disrupts traditional mobility and local livelihoods. At the same time, border management must be strengthened through technology, coordinated policing, intelligence sharing and better infrastructure.
- **Balanced Border Management:** A balanced approach is needed. The open border should remain a bridge between societies, but its misuse must be prevented through cooperative mechanisms.

Thus, the open border must be managed as a shared asset, not treated only as a security liability.

#### j. Way Forward

- **Treat Nepal as an Equal Partner:** India should avoid patronising language and “big brother” optics. Nepal must be treated as a sovereign and equal neighbour. Mutual respect should become the foundation of all political and diplomatic engagement.
- **Engage New Political Actors:** New Delhi must build relationships beyond traditional parties. Youth-led movements, emerging leaders, local governments, civil society, entrepreneurs, students and professional groups must become part of India’s outreach.
- **Focus on Development Diplomacy:** India should prioritise infrastructure, digital corridors, energy trade, health, education, tourism and trade facilitation. Projects that produce visible local benefits will strengthen trust more effectively than symbolic diplomacy.
- **Handle Border Issues Bilaterally:** Territorial disputes should be handled quietly through diplomatic and technical mechanisms. Public confrontation should be avoided because it can deepen nationalist resentment.
- **Counter China Through Delivery, Not Pressure:** India’s advantage should come from reliability, faster implementation, trust and local benefits. A pressure-based approach will only increase anti-India sentiment and create space for China.
- **Strengthen People-to-People Ties:** Tourism, student exchanges, religious circuits, labour mobility, cultural diplomacy and professional networks should be expanded. These links are India’s greatest long-term strength in Nepal.
- **Improve Crisis Communication:** Both countries should create better mechanisms for communication during political, border, trade or humanitarian crises. Misunderstandings like those associated with the 2015 blockade should not be allowed to shape long-term public opinion.

A durable India–Nepal relationship must therefore combine respect, delivery, quiet diplomacy, youth outreach and better crisis management.

#### Conclusion

India’s Nepal policy must adapt to a younger, more assertive and politically transformed Nepal. Historical ties remain strong, but old assumptions may no longer work. India cannot rely only on traditional political networks or civilisational memory.

New Delhi must combine strategic sensitivity with visible developmental delivery. It must engage Nepal as an equal partner, address sovereignty concerns, manage border issues carefully and build trust among the younger generation.

The core objective should be to ensure that India is seen not as a “big brother,” but as a reliable, respectful and mutually beneficial partner in Nepal’s development and regional future.

## GS Paper III: Environment

### 3. Financing India’s Climate Future

#### a. Introduction

India’s climate transition is one of the largest development financing challenges of the twenty-first century. The country has to expand energy access, industrialise, urbanise, create jobs and raise living standards, while also reducing emissions and adapting to climate risks. This makes climate finance not merely an environmental concern, but a central issue of economic planning, fiscal policy, banking regulation and sustainable development.

Estimates suggest that India may require around 162.5 trillion rupees, or about 2.5 trillion dollars, by 2030 to meet its Nationally Determined Contributions. To achieve net-zero emissions by 2070, the requirement may rise to nearly 10.1 trillion dollars. These figures show that the challenge is not only about raising money. It is equally about building institutions that can channel finance at scale into the right sectors, regions and projects.

Thus, climate finance should be understood not merely as funding for environmental projects, but as a core pillar of India’s future development strategy.

## CLIMATE FINANCE REQUIREMENT

| AREA                                                                                                         | REQUIREMENT              |
|--------------------------------------------------------------------------------------------------------------|--------------------------|
|  NDC by 2030              | ~ \$2.5 Trillion         |
|  Net Zero by 2070         | ~ \$10.1 Trillion        |
|  Sectoral Decarbonisation | ~ \$467 Billion by 2030  |
|  Major Need               | Public + Private Finance |

#### b. Scale of India’s Climate Finance Challenge

- **Mitigation and Adaptation Needs:** India’s climate finance requirements are enormous because the transition involves both mitigation and adaptation. Mitigation refers to reducing

greenhouse gas emissions through measures such as renewable energy, energy efficiency, electric mobility and cleaner industrial processes. Adaptation refers to preparing society and the economy for climate impacts such as floods, droughts, heatwaves, cyclones, coastal erosion and water stress.

- **High-Emission Sectors:** India's high-emission sectors, especially steel, cement, power and road transport, account for more than half of the country's emissions. These sectors are also central to India's infrastructure and manufacturing growth. Their decarbonisation will require large investments in clean technologies, new production processes, green hydrogen, carbon capture, energy efficiency and low-carbon transport systems.
- **Additional Capital Requirement:** Sectoral decarbonisation alone may require around 467 billion dollars of additional capital expenditure by 2030. This shows that India's climate future cannot be financed through ordinary budgetary allocations alone.
- **Need for Multiple Financing Channels:** It will require a mix of public finance, private capital, concessional funds, banking reform, international climate finance and innovative financial instruments.

The scale of this challenge shows why climate finance must be treated as a national economic priority rather than a narrow environmental sub-sector.

### c. Why Climate Finance Is a Developmental Necessity

- **Link with India's Development Pathway:** India's climate transition cannot be separated from its development pathway. The country still needs infrastructure, housing, transport, electricity, industry and employment. If this development follows a high-carbon model, emissions and climate vulnerability will rise. If it is financed through clean and resilient systems, India can combine growth with sustainability.
- **Areas Requiring Climate Finance:** Climate finance is therefore not a luxury. It is necessary for building renewable energy, modernising power grids, expanding electric mobility, improving urban resilience, protecting coasts, supporting climate-resilient agriculture and strengthening water security.
- **High Upfront Costs:** The challenge is that green investments often require high upfront capital. For example, green steel, green cement, offshore wind, battery storage and green hydrogen may be expensive in the early stages.
- **Role of Public Policy:** Private investors may hesitate unless risks are reduced and returns become predictable. This is where public policy and institutional design become crucial.

Thus, climate finance is a developmental necessity because it determines whether India's future growth will be carbon-intensive or climate-resilient.

### d. Hard-to-Abate Sectors and the Financing Gap

- **Meaning of Hard-to-Abate Sectors:** The largest financing challenge lies in hard-to-abate sectors. These are sectors where emissions are difficult to reduce because production depends on energy-intensive processes or fossil fuels. Steel, cement, power and road transport fall into this category.
- **Importance of These Sectors:** Steel and cement are essential for infrastructure, housing and industrial growth. Power is central to every sector of the economy. Road transport is important for logistics, mobility and commerce. Therefore, India cannot simply reduce activity in these sectors. It must transform how these sectors produce and consume energy.
- **Need for Policy Support:** Private capital will not automatically flow into green steel, green cement or low-carbon industrial processes unless the policy environment supports them. Investors need clarity on standards, demand, pricing, carbon markets, tax incentives, procurement policies and technology risks.
- **Climate Finance as Risk Allocation:** This makes climate finance a problem of risk allocation. The state must create conditions in which private capital finds green investment commercially attractive.

Therefore, financing hard-to-abate sectors will require targeted public support, regulatory clarity and demand-creation mechanisms.

#### e. India's Progress in Green Finance Instruments

- **Emerging Green Finance Tools:** India has made progress in developing green finance instruments. Green bonds, sovereign green bonds, sustainability-linked bonds, blended finance structures, transition finance and infrastructure investment trusts have begun to create a climate finance ecosystem.
- **Growth in Green Debt:** By the end of 2024, India had issued around 55.9 billion dollars in green, social and sustainability-linked debt. Sovereign green bonds worth about 477 billion rupees have also been issued. These bonds help create pricing benchmarks and signal the government's commitment to climate-aligned finance.
- **Limits of Financial Instruments Alone:** However, financial instruments alone are not enough. The missing link is institutional architecture. India needs clear definitions, risk-sharing mechanisms, liquidity support, regulatory incentives and credible monitoring systems.
- **Need for Mainstreaming Green Finance:** Without these, green finance may remain limited to a few large projects rather than becoming a mainstream financing channel.

This shows that India's next challenge is not only to create instruments, but to build the institutions that can scale them.

#### f. Role of the RBI and Banking Regulation

- **RBI's Climate Finance Directions:** The Reserve Bank of India's 2025 climate finance and risk-management directions are significant because they require banks to integrate climate risks into lending and risk assessment. This is important because banks remain central to India's financial system.
- **Physical Climate Risk:** Climate risks affect banks in two major ways. The first is physical risk, which arises from floods, heatwaves, droughts, cyclones and other climate-related disasters. These can damage assets, reduce borrower income and increase loan defaults.
- **Transition Risk:** The second is transition risk, which arises when high-carbon sectors face new regulations, changing technologies or declining demand.
- **Banking Regulation as a Climate Tool:** If banks begin to assess these risks properly, lending decisions will gradually shift towards climate-resilient and low-carbon investments. Green activities can also be encouraged through priority sector lending, regulatory support for sovereign green bonds and differentiated capital requirements.

Thus, banking regulation can become a powerful instrument for steering capital towards climate-aligned development.

#### g. Need for a Climate Finance Taxonomy

- **Meaning and Importance of Taxonomy:** A climate finance taxonomy is crucial for India's green finance ecosystem. A taxonomy provides a clear legal and technical definition of what counts as green, transition-aligned or adaptation-oriented finance.
- **Preventing Greenwashing:** Without such a classification, investors may not know whether a project is genuinely green. Banks may classify lending inconsistently. Regulators may find it difficult to prevent greenwashing. Greenwashing means presenting a project or investment as environmentally beneficial when it does not actually meet credible environmental standards.
- **Improving Investor Confidence:** A clear taxonomy can improve investor confidence, reduce misuse of green labels and help channel finance to priority areas. Sector-specific taxonomies, such as for green steel, can further help industries understand what qualifies as a credible transition pathway.

- **Need for a Realistic Indian Taxonomy:** For India, the taxonomy must be realistic. It should recognise that India is a developing economy and that some sectors will need transition finance before they become fully green. Therefore, the taxonomy should include both green finance and transition finance.

This makes taxonomy the foundation for credible and development-sensitive climate finance.

#### **h. Blended Finance as a Transformative Tool**

- **Meaning of Blended Finance:** Blended finance can play a major role in India's climate transition. It refers to the use of public or concessional funds to reduce risk and attract larger private investment.
- **How It Works:** For example, a public fund can absorb the first loss in a risky project, making private investors more comfortable. Similarly, concessional loans, guarantees or viability gap funding can make investments in offshore wind, green hydrogen, climate-resilient agriculture or battery storage more attractive.
- **Use in High-Risk Sectors:** This approach is especially useful in sectors where commercial risks are high but developmental benefits are large. It allows limited public money to mobilise much larger private capital.
- **Relevance for India:** For India, blended finance should be used strategically in emerging sectors, adaptation projects and technologies that are not yet commercially mature but are important for long-term climate resilience.

Thus, blended finance can convert limited public resources into large-scale private investment for climate action.

#### **i. Adaptation Finance and the Federal Dimension**

- **Local Nature of Adaptation:** Climate finance cannot remain limited to mitigation. India's adaptation needs are deeply local and federal. Coastal protection in Odisha, drought-proofing in Vidarbha, flood resilience in Bihar, heat adaptation in urban areas and spring rejuvenation in the Himalayas require location-specific investments.
- **Role of States and Local Bodies:** Many of these projects fall within the domain of States, municipalities and local bodies. However, these institutions often lack the borrowing capacity, technical expertise and project preparation skills needed to access climate finance.
- **Subnational Financing Gap:** This creates a serious gap. India may have national climate targets, but adaptation is implemented largely at the State and local levels. Without strengthening subnational financing capacity, India's adaptation goals will remain underfunded.
- **State Climate Finance Facility:** A dedicated State Climate Finance Facility can help bridge this gap. It can support States and municipalities with project design, technical assistance, credit enhancement, guarantees and access to green debt markets.

Therefore, adaptation finance must be treated as a federal governance issue, not only as an environmental finance issue.

#### **j. International Climate Finance: Promise and Limitations**

- **Inadequacy of Global Commitments:** The international climate finance system remains inadequate. Developed countries had promised to mobilise 100 billion dollars annually for developing countries, but delivery has remained contested and insufficient. The newer goal of 300 billion dollars by 2035 is also far below the actual requirements of developing countries.
- **Implication for India:** For India, this means that external climate finance will remain useful but insufficient. India cannot depend primarily on international flows to fund its transition. It must mobilise most climate finance domestically while using international finance strategically.

- **Strategic Use of External Finance:** International funds should be directed towards high-impact areas such as adaptation, technology transfer, concessional finance for emerging sectors, resilient infrastructure and capacity-building.
- **Climate Justice Dimension:** India must also continue to argue for climate justice, because developing countries are being asked to transition despite having contributed far less historically to global emissions.

Thus, international finance is important, but India's climate transition must rest on strong domestic financial architecture.

#### k. Institutional Bottlenecks

- **Beyond Financial Instruments:** India's bottleneck is not the complete absence of financial instruments. The deeper challenge is institutional capacity. Projects need to be identified, designed, appraised, financed, monitored and verified.
- **Bankability Challenge:** Many climate projects fail to attract finance because they are not structured in a bankable manner. Bankability means that a project has clear revenue streams, risk allocation, legal approvals, technical feasibility and repayment capacity.
- **Climate-Risk Data Gap:** There is also a shortage of reliable climate-risk data. Banks and investors need information on flood risk, heat exposure, water stress, carbon intensity and transition vulnerability. Without such data, climate risks cannot be priced properly.
- **Need for Stronger Institutions:** Therefore, India needs stronger institutions for project preparation, climate-risk assessment, monitoring, reporting and verification. These systems will decide whether climate finance can move at the scale required.

This institutional gap is the central reason why climate finance has not yet matched India's transition needs.

#### 1. Way Forward

- **Finalise the Climate Finance Taxonomy:** India should create clear standards for green, transition and adaptation finance. This will reduce greenwashing, improve investor confidence and help banks classify climate-related lending more accurately.
- **Mandate Climate Risk Assessment:** Banks should conduct climate stress tests for flood, heat, drought and transition risks in their loan portfolios. This will help financial institutions understand how climate change can affect borrower repayment and asset quality.
- **Use Differentiated Capital Requirements:** High-carbon lending may be made more capital-intensive over time, while green lending can receive regulatory support. Such measures should be gradual and carefully designed so that they do not abruptly disrupt essential sectors.
- **Expand Priority Sector Lending:** Priority sector lending should include climate adaptation and resilience projects, not only mitigation-oriented green activities. Climate-resilient agriculture, water security, urban flood management and heat adaptation deserve greater financial support.
- **Create a State Climate Finance Facility:** A dedicated facility should help States and municipalities access green debt markets, climate funds and project preparation support. This would strengthen cooperative federalism in climate action.
- **Scale Sovereign Green Bonds:** India should increase sovereign green bond issuances and deepen the domestic green bond market. Sovereign bonds can create benchmarks and improve investor confidence in climate-linked debt instruments.
- **Promote Blended Finance:** Public guarantees, concessional capital and first-loss funds should be used to attract private investment into sectors with high developmental value but higher commercial risk.
- **Support Adaptation Finance:** India must prioritise climate-resilient agriculture, urban flood control, coastal protection, water security, heat adaptation and resilient public health systems. Adaptation finance should be treated as central, not secondary.

- **Build Institutional Capacity:** Project design, monitoring, verification and climate-risk data systems must be strengthened. Banks, States, municipalities and local bodies need technical support to prepare bankable climate projects.

A credible way forward must therefore combine taxonomy, banking reform, blended finance, green bonds, adaptation finance and subnational capacity-building.

## Conclusion

India's climate finance challenge is not only about raising trillions of dollars. It is about creating institutions that can move capital to the right sectors, regions and projects. The next phase must focus on climate finance taxonomy, banking regulation, blended finance, sovereign green bonds and State-level climate finance capacity.

India's bottleneck is not the absence of financial instruments, but the institutional capacity to deploy them at scale. A successful climate finance strategy must combine public investment, private capital, regulatory reform, international support and federal coordination.

Only then can India pursue a climate transition that is both environmentally credible and developmentally just.

## GS Paper III: Environment

### 4. Mangroves and Ecosystem-based Adaptation

#### a. Introduction

India's long coastline is increasingly exposed to sea-level rise, cyclones, storm surges, saline intrusion and coastal erosion. Cyclone Dana's landfall near Bhitarkanika in Odisha once again highlighted the protective role of mangroves in reducing the impact of cyclones and storm surges. It also brought attention to a larger policy issue: India's coastal adaptation strategy remains heavily dependent on concrete-based structures such as seawalls and embankments, while natural systems such as mangroves, seagrass meadows, coral reefs and wetlands remain under-recognised.

Mangroves show that climate adaptation need not always be concrete-heavy. They provide natural protection against waves, stabilise coastlines, support fisheries, store carbon and sustain local livelihoods. This makes them important not only for biodiversity conservation but also for disaster risk reduction and climate resilience.

Thus, mangroves should be understood not merely as coastal vegetation, but as climate adaptation infrastructure that protects people, livelihoods and ecosystems.

#### b. Coastal Vulnerability and the Need for Adaptation

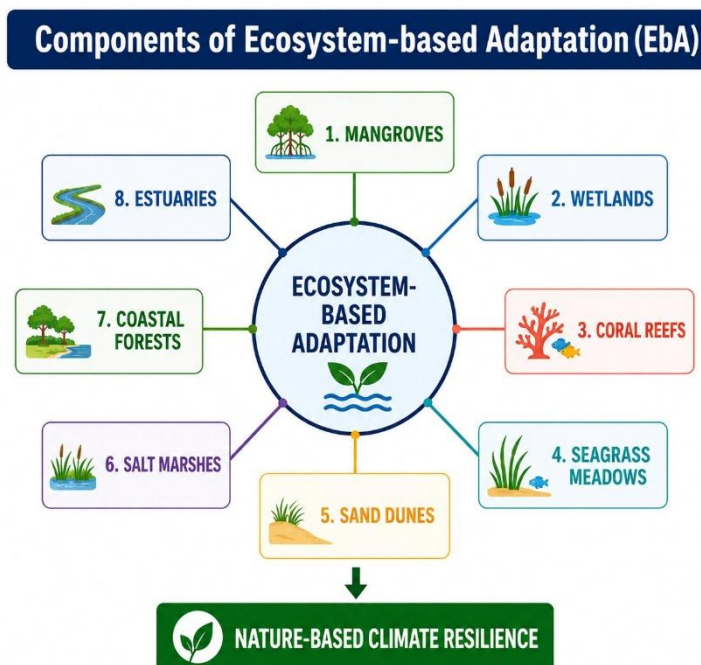
- **India's Exposure to Coastal Risks:** India has a coastline of around 11,000 kilometres, exposing coastal regions to climate and disaster risks. Cyclones, storm surges, erosion, sea-level rise and saline intrusion increasingly threaten coastal settlements, agriculture, fisheries, ports and infrastructure.
- **Livelihood Vulnerability:** Around 250 million people depend directly or indirectly on coastal landscapes and livelihoods. Many of them are fisherfolk, small farmers, informal workers and coastal communities with limited capacity to recover from repeated shocks. For such communities, climate adaptation is not an abstract environmental goal. It is a question of livelihood security, disaster safety and survival.
- **Limits of Hard Protection:** India has traditionally responded to coastal risks through hard protection measures such as seawalls, embankments, groynes and tetrapods. Coastal States reportedly spent around 2,641 crore rupees on such measures over the last decade. These structures are often useful in dense urban areas, ports and high-value infrastructure zones. However, they are not sufficient as a universal solution.



This is where ecosystem-based approaches become important, because they protect coastlines while also supporting livelihoods and biodiversity.

### c. Meaning of Ecosystem-based Adaptation

- **Definition:** Ecosystem-based Adaptation refers to the use of biodiversity and ecosystem services to help people adapt to climate change. In simple terms, it means protecting and restoring natural systems so that they reduce climate risks for human communities.
- **Natural Buffers:** Mangroves, seagrasses, coral reefs, sand dunes and wetlands are examples of natural buffers. They reduce wave energy, absorb flood impacts, trap sediments, protect shorelines and support livelihoods. They also provide additional benefits such as carbon storage, fish breeding grounds and biodiversity conservation.
- **Related Concepts:** Related concepts include Nature-based Solutions, Ecosystem-based Disaster Risk Reduction and ecological restoration. These ideas overlap in practice. All of them recognise that healthy ecosystems can reduce disaster risks and climate vulnerability.
- **Policy Recognition Gap:** The challenge is that policy frameworks often treat these interventions as conservation activities, not as core climate adaptation. This weakens their visibility in climate finance and planning.



Therefore, ecosystem-based adaptation must be mainstreamed into climate policy, disaster management and coastal planning.

### d. Protective Role of Mangroves

- **Natural Barrier Against Storms:** Mangroves are among the most effective natural barriers along tropical coastlines. Their dense root systems reduce the force of waves and storm surges. Their vegetation traps sediments and helps stabilise shorelines. Their presence can reduce coastal erosion and limit the inland movement of saline water.
- **Examples from Cyclone-Prone Regions:** In cyclone-prone regions such as Odisha and West Bengal, mangroves have repeatedly demonstrated their protective value. Bhitarkanika and the Sundarbans are important examples. During cyclones, mangrove belts can reduce wind and wave intensity before they reach human settlements.
- **Livelihood Support:** Mangroves also support fisheries by acting as nursery grounds for fish, crabs, prawns and other marine life. This makes them important for local livelihoods.
- **Carbon Storage:** They also store large amounts of carbon in biomass and sediments, making them valuable for climate mitigation.

Thus, mangroves offer multiple benefits at the same time: disaster protection, livelihood support, biodiversity conservation and carbon storage.

### e. Limits of Grey Infrastructure

- **Meaning of Grey Infrastructure:** Grey infrastructure refers to engineered structures such as seawalls, embankments, groynes and concrete barriers. These structures are visible, politically attractive and can provide immediate protection to specific locations.
- **Limitations:** However, they have limitations. They are expensive to build and maintain. They can fail under extreme events. In some cases, they transfer erosion or flood risks to neighbouring areas by altering natural coastal processes. They may also reduce beach width, disturb sediment movement and damage coastal ecosystems.
- **Selective Usefulness:** This does not mean that grey infrastructure is unnecessary. In dense urban zones, ports, industrial areas and critical infrastructure sites, engineered protection may be required. However, relying only on concrete structures creates a narrow and expensive adaptation model.
- **Hybrid Coastal Resilience:** The better approach is hybrid coastal resilience, where engineered structures are used selectively and combined with natural buffers such as mangroves, wetlands, dunes, coral reefs and seagrass meadows.

This balanced approach allows India to combine immediate protection with long-term ecological resilience.

### f. India as a Hotspot for Coastal Ecosystem-based Adaptation

- **Suitability of India:** India is highly suitable for Ecosystem-based Adaptation because of its long coastline, dense coastal population and rich coastal ecosystems. Research identifies India as a global hotspot for coastal ecosystem-based adaptation, especially because Indian mangroves protect large numbers of people per hectare.
- **High Social Returns:** This means that every hectare of mangrove restoration in India can produce significant social benefits. It can protect villages, reduce storm damage, support fisheries and improve ecological resilience.
- **Community-Based Examples:** Examples from the Sundarbans show that mangrove restoration by women's groups has helped reduce cyclone impacts while supporting livelihoods such as honey collection and crab farming. Such examples show that ecosystem restoration can become a community-based adaptation strategy.
- **Multi-Disciplinary Planning:** The key lesson is that coastal protection should not be designed only by engineers. It should also involve ecologists, disaster managers, local communities and livelihood experts.

Therefore, India has strong ecological and social reasons to scale ecosystem-based adaptation along vulnerable coasts.

### g. Policy Gap: Poor Recognition of EbA

- **Existing but Under-Classified Interventions:** The main problem is not that ecosystem-based adaptation is entirely absent in India. Mangrove restoration, wetland protection and coastal conservation do exist under various schemes. The problem is that these interventions are often classified as forestry, conservation or restoration projects, while their climate adaptation benefits are not separately measured.
- **Finance and Reporting Gap:** This creates a policy and finance gap. If mangrove restoration is not officially recognised as adaptation, it becomes harder to access adaptation funds, track progress under climate commitments or include such actions under the Global Goal on Adaptation.
- **National Coastal Mission and MISHTI:** The National Coastal Mission's budget declined from 195 crore rupees in 2022–23 to 50 crore rupees in 2024–25. At the same time, the MISHTI initiative aims to restore around 540 square kilometres of mangroves across nine States. This shows that policy attention exists, but climate-adaptation classification and sustained financing remain inadequate.

- **Importance of Measurable Outcomes:** Classification matters because climate finance increasingly depends on measurable outcomes. Investors and climate funds want evidence of avoided losses, reduced vulnerability, carbon storage, livelihood benefits and biodiversity gains. Without proper measurement, ecosystem-based adaptation remains underfunded.

This policy gap must be addressed if mangroves are to be treated as climate-resilience assets rather than only conservation assets.

#### **h. Governance Fragmentation**

- **Multiple Departments and Overlapping Mandates:** Coastal adaptation is divided among several departments and sectors. Environment, fisheries, disaster management, rural development, urban development, ports, revenue departments and climate agencies all have partial responsibilities.
- **Weak Integrated Planning:** This fragmentation weakens integrated planning. A seawall may be approved quickly because it falls under a clear engineering and public works framework. Mangrove restoration, in contrast, may require land records, community participation, hydrological restoration, forest approvals, fisheries coordination and long-term monitoring.
- **Institutional Delays:** Such multi-agency requirements often slow ecosystem-based adaptation. Yet these interventions are more sustainable when properly designed. Therefore, institutional coordination is essential.
- **Mainstreaming EbA in Plans:** Coastal Zone Management Plans, State Action Plans on Climate Change, disaster management plans and local development plans should all recognise ecosystem-based adaptation as a core strategy.

Thus, ecosystem-based adaptation requires coordinated governance rather than fragmented project-level action.

#### **i. Community and Livelihood Dimension**

- **Beyond Plantation Targets:** Mangrove restoration cannot succeed through plantation targets alone. It requires community participation and ecological suitability. Fisherfolk, women's collectives, panchayats and local institutions must be involved in planning, restoration and monitoring.
- **Local Knowledge:** Local communities understand tidal patterns, fish breeding zones, erosion points and livelihood needs. Their participation improves both ecological success and social legitimacy.
- **Livelihood Opportunities:** Community-based restoration can also create livelihood opportunities. Mangroves support fisheries, crab farming, honey collection, eco-tourism and nursery development. If local communities see direct benefits, they are more likely to protect restored ecosystems.
- **Communities as Custodians:** This is especially important because coastal communities are not merely beneficiaries of adaptation. They are active custodians of coastal ecosystems.

Therefore, mangrove restoration must be livelihood-sensitive and community-owned to remain sustainable.

#### **j. Risks of Poor Restoration**

- **Failure of Unsuitable Plantations:** Not all restoration is successful. Poorly planned plantation drives may fail if they use unsuitable species, ignore tidal flows or plant mangroves in areas where they cannot naturally survive.
- **Risk of Monoculture:** Monoculture plantations can reduce biodiversity and weaken ecosystem resilience.

- **Requirements of Effective Restoration:** Effective mangrove restoration requires hydrological restoration, native species selection, protection from grazing or cutting, sediment management and long-term monitoring.
- **Ecological Recovery as the Goal:** The aim should be ecological recovery, not only increasing plantation numbers.

This is why ecosystem-based adaptation must be science-based as well as community-centred.

#### k. Way Forward

- **Formally Recognise Ecosystem-based Adaptation:** India should clearly classify mangroves, seagrasses, coral reefs, wetlands and dunes as climate adaptation assets. This would improve planning, financing and reporting under climate commitments.
- **Adopt Hybrid Coastal Protection:** India should combine grey infrastructure with ecosystem-based buffers. Seawalls and embankments should be used selectively, while mangroves, dunes, wetlands and reefs should be restored wherever ecologically suitable.
- **Scale Mangrove Restoration:** The MISHTI initiative should be expanded with attention to native species, tidal flows, hydrological restoration and community stewardship. Restoration must be ecological, not merely plantation-driven.
- **Measure Adaptation Outcomes:** India should track avoided disaster losses, livelihood benefits, erosion reduction, carbon storage, biodiversity gains and reduced storm surge exposure. Measurable outcomes will help mobilise climate finance.
- **Improve Coastal Planning:** Ecosystem-based Adaptation should be integrated into Coastal Zone Management Plans, disaster management plans, urban plans and State climate action plans. Coastal planning must be multi-sectoral and science-based.
- **Strengthen Community Participation:** Fisherfolk, women's groups, panchayats and local institutions should be involved in restoration, monitoring and protection. Community ownership increases long-term success.
- **Mobilise Climate Finance:** Clear classification of ecosystem-based adaptation can help India access adaptation finance, corporate social responsibility funds, green bonds and international climate funds. Mangrove restoration should be treated as a climate investment.
- **Avoid Monoculture Restoration:** Restoration should use ecologically suitable native species and respect local hydrology. Monoculture or poorly planned plantation can damage ecological resilience.

A strong way forward must therefore combine formal recognition, hybrid protection, scientific restoration, community participation and measurable adaptation outcomes.

#### Conclusion

Mangroves demonstrate that climate adaptation need not be only concrete-heavy. Ecosystem-based Adaptation offers India a low-cost, livelihood-supporting and ecologically resilient way to manage coastal risks.

The central challenge is to recognise, measure and finance such interventions as core climate adaptation, not merely as conservation projects. India's coastal future will depend on its ability to combine engineering, ecology and community participation into a balanced model of hybrid resilience.

In this sense, mangroves are not just biodiversity assets; they are frontline climate infrastructure for India's vulnerable coasts.

## GS Paper III: Science and Technology

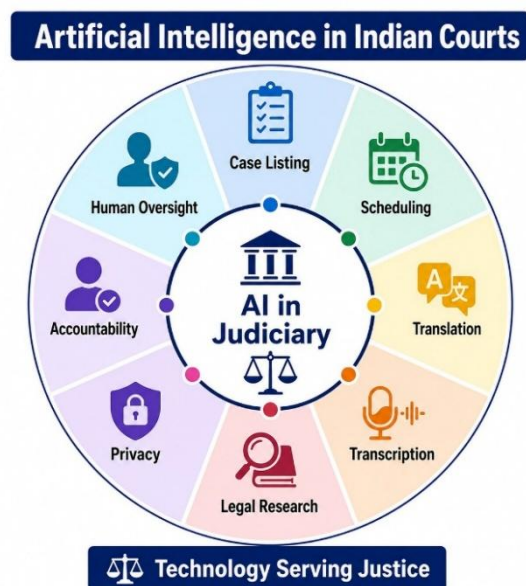
### 5. Draft Supreme Court Rules on the Use of Artificial Intelligence in Courts

### a. Introduction

The proposed draft regulations of the Supreme Court AI Committee mark an important moment in India's journey towards responsible use of technology in the justice system. Artificial Intelligence can help courts manage large volumes of cases, reduce administrative delays, improve transcription and translation, and make legal information more accessible. However, its use in the judiciary also raises serious concerns relating to due process, privacy, bias, accountability and judicial independence.

The draft rules adopt a cautious and rights-based approach. They make it clear that Artificial Intelligence must remain assistive and subservient to human judicial authority. It cannot determine judicial outcomes, replace judicial reasoning, profile witnesses or parties, or operate through opaque systems in court processes.

Thus, judicial AI must be understood not merely as a tool for efficiency, but as a constitutional governance issue involving rights, accountability and fairness.



### b. Context and Need for Regulation

- **Technology in a Backlogged Judiciary:** The Indian judiciary faces a large backlog of cases, procedural delays, shortage of support staff and growing demand for timely justice. Technology has already entered the court system through e-filing, virtual hearings, digital case records and live transcription. Artificial Intelligence is the next stage in this transformation.
- **Potential Benefits of AI:** Used properly, Artificial Intelligence can reduce repetitive administrative work, assist in legal research, improve case scheduling, support translation in Indian languages and make court processes more efficient. However, if used without safeguards, it can also threaten fairness and transparency.
- **High Stakes of Judicial Decisions:** Judicial decisions affect liberty, reputation, property, equality and dignity. Therefore, any technological system used in court processes must satisfy the highest standards of accountability.
- **Need for Cautious Adoption:** The draft rules recognise this concern and seek to prevent the judiciary from adopting Artificial Intelligence in a careless or outcome-determining manner.

This context shows why AI regulation in courts must be rights-first rather than technology-first.

### c. Key Features of the Draft Rules

- **AI as an Assistive Tool:** The draft rules state that Artificial Intelligence must function only in an assistive capacity. It cannot replace judicial reasoning or determine the final outcome of a case. The judge remains the ultimate constitutional authority responsible for decision-making.
- **Prohibition on Risk Scoring:** The draft also prohibits the use of Artificial Intelligence for risk scoring. This means that AI systems cannot be used to assess flight risk, recidivism, bail eligibility or the credibility of parties and witnesses. Such functions are deeply connected with personal liberty and fair trial rights, and therefore cannot be delegated to algorithmic systems.

- **Bar on Profiling:** Profiling of witnesses or parties through Artificial Intelligence is also barred. This is important because profiling can reinforce prejudice and affect the dignity and legal standing of individuals.
- **Ban on Opaque Systems:** The draft prohibits opaque or black-box AI systems in court processes. A black-box system is one whose reasoning or method of arriving at an output cannot be properly explained. In judicial contexts, such opacity is dangerous because every person affected by a decision has the right to understand the basis of that decision.
- **Permitted Administrative Uses:** At the same time, the draft permits Artificial Intelligence for administrative and support functions. These include case listing, scheduling, preparation of cause lists, transcription and translation. These uses can improve efficiency without interfering with the core judicial function.
- **Data Protection and Oversight:** The draft also requires personal data processing to comply with the Digital Personal Data Protection Act, 2023. Further, it proposes a full-time apex body at the Supreme Court to supervise AI adoption across the judicial system.

Together, these features show that the draft rules permit AI where it improves efficiency, but restrict it where it may affect liberty, fairness and judicial accountability.

#### d. Why Human Judicial Authority Must Remain Central

- **Adjudication Is Not Mechanical:** The most important principle in the draft rules is that Artificial Intelligence may assist the judiciary, but it cannot replace human judgment. This distinction is essential because adjudication is not a mechanical exercise.
- **Nature of Judicial Reasoning:** A judge does not merely apply rules to facts. Judicial reasoning involves interpretation of law, assessment of evidence, balancing of rights, understanding of context, application of constitutional values and exercise of discretion. These functions require human judgment, ethical reasoning and institutional accountability.
- **Threat to Natural Justice:** If Artificial Intelligence were allowed to influence bail, sentencing, credibility assessment or risk evaluation without clear safeguards, it could undermine natural justice. Natural justice requires fairness, hearing, reasoned decision-making and absence of bias. These principles cannot be reduced to an algorithmic score.
- **Preserving the Human Core:** The draft rules therefore correctly preserve the human core of judicial decision-making.

This principle ensures that efficiency does not override constitutional responsibility.

#### e. Article 21 and Due Process Concerns

- **AI and Personal Liberty:** The use of Artificial Intelligence in courts directly implicates Article 21 of the Constitution, which protects life and personal liberty. Decisions relating to arrest, bail, sentencing, custody, compensation and civil rights can deeply affect individuals.
- **Problem of Opaque Influence:** If an opaque AI system influences such decisions, the affected person may not know how the conclusion was reached. This would weaken the right to a fair hearing and reasoned order. It could also make it difficult to challenge the decision effectively.
- **Example of Risk Scoring:** For example, if an AI tool labels a person as a high flight risk or likely repeat offender, but the basis of that assessment is not disclosed or explainable, the person's liberty may be affected without meaningful due process. This would be constitutionally unacceptable.
- **Due Process Over Convenience:** Thus, the draft rules are significant because they place due process above technological convenience.

This makes judicial AI regulation a constitutional safeguard, not merely an administrative guideline.

#### f. Concern of Algorithmic Bias

- **AI Learns from Data:** Artificial Intelligence systems learn from data. If the data used for training reflects social prejudice, institutional bias or historical inequality, the AI system may reproduce those biases.
- **Indian Social Context:** In India, this concern is particularly serious because society is marked by inequalities based on caste, gender, religion, class, language, region and disability. If AI systems are trained on past legal or policing data without careful safeguards, they may reinforce patterns of discrimination.
- **Risk of Scientific-Looking Prejudice:** For instance, if historical arrest or conviction data reflects biased policing against certain communities, an AI-based risk assessment tool may wrongly treat members of those communities as higher-risk individuals. Such a system would not make justice objective; it would make prejudice appear scientific.
- **Need for Explainability and Audits:** This is why the draft rules prohibit AI-based profiling and risk scoring. They also underline the need for explainable and auditable systems.

Therefore, algorithmic bias must be treated as a serious constitutional and equality concern in judicial technology.

#### g. Opaque AI and the Problem of Accountability

- **Accountability Requires Reasons:** The prohibition on opaque Artificial Intelligence is one of the most important parts of the draft. In judicial systems, accountability requires reasons. Courts must give reasoned orders so that parties understand why they won or lost, and appellate courts can review the decision.
- **Danger of Black-Box Systems:** A black-box AI system threatens this principle. If neither the judge nor the litigant can properly understand how a recommendation was generated, accountability becomes weak.
- **Diffusion of Responsibility:** Responsibility may shift from the judge to the machine, from the machine to the vendor, and from the vendor to the underlying data. This diffusion of responsibility is dangerous in a constitutional court system.
- **Need for Explainable AI:** Judicial accountability cannot survive if the reasoning process becomes technologically hidden. Therefore, the use of Artificial Intelligence in courts must be explainable, auditable and subject to human review.

This makes transparency a core requirement for any AI system used in the judiciary.

#### h. AI-Generated Legal Errors

- **Fake Case Law and Fabricated Outputs:** The draft rules also respond to growing concerns over AI-generated legal errors. There have been instances globally where lawyers and litigants relied on AI-generated case law that did not actually exist. Such errors can mislead courts, waste judicial time and undermine the integrity of legal proceedings.
- **Meaning of Hallucination:** Generative AI systems may produce confident but false outputs. This problem is often described as hallucination, meaning that the system generates incorrect or fabricated information in a convincing form.
- **Harm in Judicial Context:** In the judicial context, such errors are particularly harmful. A wrong citation, fabricated precedent or inaccurate summary of law can affect the course of litigation. Therefore, judges, lawyers and court staff must verify AI-generated outputs before relying on them.
- **Human-in-the-Loop Safeguards:** Human-in-the-loop safeguards are essential. This means that a human authority must review, verify and take responsibility for any AI-assisted output before it enters the judicial process.

Thus, AI-generated legal material must be treated as provisional unless verified by responsible human actors.

#### i. Productive Uses of AI in Courts

- **Distinction Between Administrative and Adjudicatory Uses:** The draft rules do not reject Artificial Intelligence altogether. Instead, they distinguish between permissible administrative uses and impermissible adjudicatory uses.
- **Administrative Efficiency:** Artificial Intelligence can be useful in case listing, scheduling, preparation of cause lists, transcription of proceedings and translation of court records. These functions can reduce administrative burden and improve access to justice.
- **Translation and Inclusion:** Translation is especially important in India's multilingual legal system. Many litigants struggle because legal proceedings and documents are often in languages they do not fully understand. AI-assisted translation, if carefully verified, can improve inclusion.
- **Transcription and Case Flow:** Similarly, transcription tools can create accurate records of hearings and reduce dependence on manual note-taking. Scheduling tools can improve court efficiency by organising case flow better.

Thus, the correct approach is not to ban Artificial Intelligence, but to use it where it improves efficiency without compromising fairness.

#### j. Need for Institutional Oversight

- **Importance of an Apex Body:** The proposal for a full-time apex body at the Supreme Court is important. AI adoption in the judiciary cannot be left to fragmented experimentation by individual courts or vendors. A central oversight body can create standards, approve tools, conduct audits, monitor risks and ensure compliance.
- **Need for Multi-Disciplinary Composition:** Such a body should not consist only of judges. It should include technologists, cybersecurity experts, data protection specialists, legal scholars, court administrators and civil society inputs. This diversity is necessary because Artificial Intelligence raises technical, legal, ethical and social questions.
- **Functions of Oversight Body:** The oversight body should also frame guidelines on procurement, data use, auditability, explainability, cybersecurity, vendor accountability, grievance redressal and periodic review of AI tools.

This institutional mechanism is essential to ensure that AI adoption remains uniform, accountable and constitutionally safe.

#### k. Privacy and Data Protection

- **Sensitive Nature of Judicial Data:** Courts handle highly sensitive personal data. This includes information relating to family disputes, criminal allegations, financial records, medical conditions, children, sexual offences and personal identity. The use of AI in courts therefore raises major privacy concerns.
- **Compliance with DPDP Act:** The draft rules rightly require compliance with the Digital Personal Data Protection Act, 2023. Data must be processed only for lawful and limited purposes. It must be protected against misuse, unauthorised access and profiling.
- **Vendor-Related Risks:** Particular caution is needed where court data is shared with private technology vendors. Data localisation, anonymisation, access controls, cybersecurity audits and strict contractual safeguards should be mandatory.
- **Rights-Based View of Judicial Data:** Judicial data is not an ordinary administrative resource. It is connected with rights, reputation and dignity.

Therefore, privacy protection must be built into judicial AI systems from the design stage itself.

#### 1. Access to Justice and the Digital Divide

- **Risk of Digital Exclusion:** AI adoption should not widen the digital divide. Rural litigants, poor citizens, linguistic minorities, persons with disabilities and digitally disadvantaged groups may struggle if court systems become excessively technology-dependent.



- **Need for Inclusive Design:** AI-enabled court services must therefore be inclusive. They should support Indian languages, accessible interfaces, assisted filing, help desks and offline support. Technology should reduce barriers to justice, not create new ones.
- **Risk of Unequal Advantage:** If AI tools are available only to well-resourced lawyers or urban litigants, they may deepen inequality in the legal system. Therefore, access must be built into the design of judicial AI from the beginning.

This makes inclusive access a core part of technological justice reform.

### m. Way Forward

- **Keep AI Assistive, Not Adjudicatory:** Judicial reasoning, sentencing, bail decisions, credibility assessment and final outcomes must remain human judicial functions. Artificial Intelligence should support, not substitute, the judge.
- **Mandate Explainability and Auditability:** Courts should use only those AI systems whose functioning can be explained, audited and reviewed. Black-box systems should have no place in judicial decision-making processes.
- **Ensure Human-in-the-Loop Safeguards:** All high-risk uses of Artificial Intelligence must require mandatory judicial oversight and independent review. No AI-generated output should be used without human verification.
- **Prevent Algorithmic Bias:** AI tools should be tested for bias based on caste, gender, religion, language, disability, region and economic status. Bias audits should be periodic and independent.
- **Protect Personal Data:** AI use in courts must comply with privacy, consent, purpose limitation, data minimisation and data security norms. Sensitive judicial data should receive the highest level of protection.
- **Create Strong Institutional Oversight:** The proposed apex body should include judges, technologists, cybersecurity experts, data protection specialists, lawyers, court administrators and civil society inputs. Its role should include standard-setting, approval, audit and accountability.
- **Train Judges, Lawyers and Court Staff:** Judicial actors must understand both the usefulness and limits of Artificial Intelligence. Training should cover verification, ethical use, data protection, bias risks and detection of AI-generated errors.
- **Ensure Inclusive Access:** AI systems must support Indian languages, persons with disabilities, rural litigants and digitally disadvantaged groups. Technology should make justice more accessible and not more exclusive.

A responsible way forward must therefore combine constitutional safeguards, technical audits, human oversight, privacy protection and inclusive design.

### Conclusion

The draft Supreme Court rules mark an important step towards responsible Artificial Intelligence governance in the judiciary. They rightly permit AI use for administrative efficiency while prohibiting it in core judicial functions such as sentencing, risk scoring, witness profiling and credibility assessment.

The central principle is clear. Artificial Intelligence may assist the judiciary, but it cannot replace human judgment, constitutional reasoning or judicial accountability. In a constitutional democracy, efficiency is important, but justice must remain transparent, fair, humane and accountable.

Thus, the future of judicial AI in India must be guided by the constitutional values of fairness, reasoned decision-making, privacy, equality and human dignity.

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