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EDITORIAL OF THE DAY-10.06.2026

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1. A new phase in India-Nepal relations (TH)

GS Paper II - International Relations / India and its Neighborhood- Relations

Topic - India and its neighbourhood relations; Effect of policies and politics of developed and developing countries on India's interests.

Sub-Topic - Kalapani-Lipulekh-Limpiyadhura Boundary Dispute, Protocol Reconfigurations, Geopolitical Triangular Dynamics (India-China-Nepal), and Cartographic Sovereignty.

1. Introduction

1. Nepal's domestic governance has firmly transitioned into the hands of a younger political generation focused on the future rather than historical grievances. This new leadership is determined to free the country from structural corruption, nepotism, and rigid ideological frameworks, prioritizing pragmatic social and economic development instead.
2. A recent statement by Nepal's Prime Minister Balendra Shah "Balen" has introduced a more rational approach to the long-standing bilateral boundary dispute.
3. By acknowledging that territorial accusations are not one-sided, the new administration has signalled a desire to resolve issues through quiet diplomatic channels. This development offers an opportunity for New Delhi and Kathmandu to move past nationalistic posturing and build a modern, sustainable partnership.

2. Nuanced Reframing of the Boundary Dispute

1. **The Prime Minister's Intervention** - On May 31, during a parliamentary discussion regarding the contested territories of Kalpana, Lipulekh, and Limpiyadhura (areas claimed by both nations), PM Balen Shah limited his intervention to a few minutes.
2. **Acknowledge Mutual Claims** - Shah stated that the territorial issue is not one-sided, noting that while India is accused of encroaching on Nepalese land, Nepal may also be occupying territory claimed by India. He urged both sides to examine the facts objectively and resolve the matter amicably as friends.
3. **Domestic Backlash** - This balanced view was immediately met with protests from inside and outside Nepal's Parliament, despite the Prime Minister's reminder that both sides are actively working to resolve the issue through formal diplomatic channels.

3. Changing Diplomatic Protocols and Shifting Tones

The new administration in Kathmandu has adjusted its diplomatic approach, moving away from the traditional, informal "special relationship" layout to implement stricter protocols -

1. **The Lipulekh Trade Note** - Nepal formally objected to the resumption of India-China trade through the Lipulekh Pass. However, a recent diplomatic note sent by Kathmandu received a constructive response from New Delhi, with both sides agreeing to address the issue via bilateral dialogue.
2. **Kailash Man Sarovar Pilgrimage Dispute** - Nepal's Foreign Ministry reaffirmed its commitment to diplomatic solutions after India rejected Kathmandu's objections to the Kailash Mansarovar Yatra route through Lipulekh. India had described Nepal's territorial claim as "unjustified" and driven by "unilateral artificial enlargement."
3. **The Protocol Realignment** - The new administration has altered standard protocols to signal that India will be treated on par with other sovereign states, rather than receiving automatic, direct access to Nepal's top leadership.
4. **Impact on Senior Visits** - This protocol shift led to the postponement of a visit by the Indian Foreign Secretary to Kathmandu. PM Shah's strict protocol rules mean he does not meet foreign officials ranked below his status, which reshaped the administrative timeline.
5. **The Observer Debate** - Nepalese political observers have questioned whether ignoring India's vital role in Nepal's economic future serves Kathmandu's long-term interests, warning against letting strict protocols or nationalistic rhetoric damage vital ties.

4. Technical Realities and the Third-Party Complication

1. **The Limits of Expert Panels** - The column notes that conventional discussions between diplomats and technical experts may not easily yield a solution, as British-era historical data is frequently self-contradictory.
2. **Cartographic Revisions** - Records show that the British updated their maps using newer technology compared to earlier East India Company baselines. This technical variance complicates modern legal arguments, and the United Kingdom may need to be consulted to clarify historical boundary lines.
3. **The Cartographic Lock** - Finding a practical compromise is difficult because both sides maintain strong territorial claims based on historical maps. Furthermore, Nepal has formalised its position by printing its updated version of the disputed map directly onto its currency notes.
4. **The Chinese Position** - PM Shah's suggestion to include China in a trilateral discussion for a long-term solution risk creating further complications and delays. Conversely, Chinese President Xi Jinping's stated position remains that Nepal should sort out the border issue directly and bilaterally with India—which remains the most practical path forward.

5. Proposed Pathways to a Practical Solution

To break the diplomatic deadlock, the authors suggest drawing inspiration from three long-standing pillars of the relationship -

1. **The Multi-Centuries Linkage Continuum** - Drawing on the centuries-old network of cultural, economic, and human ties that link the two societies.
2. **The Open Border Tradition** - Maintaining the unique 1,700-kilometer open border tradition. This arrangement has operated smoothly for generations and was respected in the disputed zones even before the 1962 India-China war.

3. **Institutional Security Trust** – Utilizing the close, trusting institutional relationship between the Indian and Nepalese Armies to help facilitate and support a mutually acceptable, practical solution on the ground.

6. Strategic Policy Imperatives for New Delhi

1. **Moving Beyond Strict Bureaucracy** – Resolving these boundary differences requires a shift in mindset on both sides. India should move past rigid bureaucratic positions that inherit British colonial-era lines from 1947 without accounting for modern neighbourhood dynamics.
2. **Seizing the Reform Window** – The changes in Kathmandu present an opportunity that India should respect and engage with. The authors compare this moment to past leaders like Atal Bihari Vajpayee, noting that Prime Minister Narendra Modi possesses the political authority to make balanced, strategic policy choices that move past conventional diplomatic constraints.
3. **Engaging Alternative Political Leaders** – India has expanded its engagement by hosting visits from key modern leaders, including Rabi Lamichhane (President of Nepal's ruling Rastriya Swatantra Party) and Foreign Affairs Minister Shishir Khanal, to build lines of communication with the new administration.
4. **Reframing Border Encroachments** – Both sides must recognize that border overlap along an open frontier is often a mutual technical phenomenon rather than an act of deliberate territorial aggression, ensuring it does not become a cause for bilateral tension.

Source – <https://www.thehindu.com/news/international/a-new-phase-in-india-nepal-relations/article71080699.ece>

Question

"The emergence of a new political generation in Kathmandu offers an opportunity to transition India-Nepal relations from historical cartographic disputes toward a pragmatic, future-oriented partnership. Elaborate on this statement in light of recent structural and protocol shifts in bilateral diplomacy." (250 Words, 15 Marks)

1. Introduction

India-Nepal relations are entering a new phase defined by a demographic shift in Kathmandu's leadership. Prime Minister Balendra Shah's recent statement that territorial issues are not one-sided represents a practical shift away from traditional nationalistic rhetoric. This opening allows both nations to move past historical boundary disputes and build a modern, sustainable partnership.

2. Elaborating on Structural and Protocol Shifts

The modern relationship faces changing diplomatic dynamics and institutional alignments –

1. **Standardizing Diplomatic Channels** – The new administration has updated its diplomatic protocols, moving away from informal arrangements toward structured, state-level interactions. This is visible in PM Shah's focus on structured, head-of-government meetings and the introduction of formal notes regarding trade routes through the Lipulekh Pass, signalling that Nepal expects to be treated as an equal sovereign partner.
2. **Reframing the Border Dispute** – The dispute over Kalapani, Lipulekh, and Limpiyadhura has historically strained bilateral ties, a friction reinforced by Nepal printing updated maps on its currency. However, the current administration's acknowledgment that border overlap can be a mutual technical issue rather than an act of aggression creates a more constructive environment for dialogue.
3. **Bilateral Resolution Focus** – While there have been suggestions to turn the boundary dispute into a trilateral discussion involving China, Beijing's position—restated by President Xi Jinping—remains that

Nepal must resolve its border issues bilaterally with India. This reinforces the need for a direct, two-way diplomatic track.

3. Pathways to Long-Term Realignment

To build a resilient and lasting partnership, both nations should leverage their unique institutional advantages –

1. **Utilizing Historic Strengths** – Reaching a practical compromise should draw on long-standing pillars – the **1,700-kilometer open border** tradition, centuries of human and economic links, and the close institutional trust maintained between the Indian and Nepalese Armies.
2. **Adopting Flexible Policy Approaches** – New Delhi should look past rigid bureaucratic frameworks inherited from British colonial-era mappings. Following precedents set by leaders like Atal Bihari Vajpayee, India can use its political authority to engage constructively with emerging political groups like the Rastriya Swatantra Party (RSP).

Conclusion

The political transformation in Kathmandu gives India an opportunity to update its neighbourhood policy. By respecting Nepal's protocol shifts, focusing on shared economic and infrastructure goals, and treating boundary management as a mutual technical task, India can move past historical irritants to build a stable, equal, and mutually beneficial sub-Himalayan partnership.

Source – <https://www.thehindu.com/news/international/a-new-phase-in-india-nepal-relations/article71080699.ece>

2. A Tale of Two Popes, An Age-Old Question – Who Benefits from Technological Change? (IE)

GS Paper III – Indian Economy / Science and Technology / Ethics / Sociology

Topic – Effects of liberalization on the economy; Awareness in the fields of IT and Computers/AI; Inclusive growth and issues arising from it; Social empowerment.

Sub-Topic – Political Economy of Artificial Intelligence, Capital vs. Labour in the Digital Age, State-Led Sovereign Wealth Models, Technological Dislocation & Inequality, and Applied Tech-Ethics.

1. Introduction

1. The rapid advancement of Artificial Intelligence (AI) is fundamentally transforming global economies, causing a return of classic Industrial Age arguments regarding the balance of capital and labour.
2. Diverse global figures—including Pope Leo XIV, US President Donald Trump, socialist Senator Bernie Sanders, and Silicon Valley moguls—find themselves grappling with the exact same question – Who should own the wealth generated by AI?
3. The column highlights that the ongoing AI disruption has moved far beyond narrow technical or safety debates.
4. Instead, it has entered a major policy focus regarding structural wealth distribution and the state's role in securing public stakes in the automated digital economy.

2. The Policy Convergence – The Unthinkable US Wealth Shared Stake

The article highlights an unexpected alignment among opposing political spectrums in the United States over public wealth stakes –

1. **The Trump Administration Assessment** – President Donald Trump has actively planned to meet America's leading AI firms at the White House to evaluate a concept that once seemed completely

unthinkable – providing the American public with a direct financial stake in the corporations profiting the most from the AI revolution.

2. **The Sanders Proposal** – Independent Senator Bernie Sanders proposed the creation of an American AI sovereign wealth fund. This public vehicle would be financed by a mandatory, one-time transfer of **50 percent of shares** from the nation's largest AI enterprises.
3. **The Populist–Socialist Overlap** – While coming from completely different ideological worldviews, Trump's populist coalition overlaps with Sanders' core perspective. Trump has explicitly stated that he is not opposed to Sanders' proposal and notes that his administration is actively exploring ways for the public to become formal financial "partners" in the ongoing AI economic boom.

3. Silicon Valley and Corporate Accommodation

1. **Altman's Share Advocacy** – OpenAI Chief Sam Altman has openly advocated for sharing the vast wealth generated by AI-led prosperity. He has proposed mechanisms for the voluntary sharing of a specific percentage of corporate stock, allowing general citizens to gain a direct share in AI-driven wealth creation.
2. **The Scope of Disagreement** – The primary dispute between industry leaders like Altman and political figures like Sanders is not about the underlying principle of sharing wealth, but rather about the exact execution – *how far* and *how fast* public or state ownership of corporate equity should go.
3. **The Corporate Backlash** – This convergence has met sharp resistance from classic capitalist institutions. *The Wall Street Journal*, for instance, has heavily criticized President Trump for entertaining the idea of the federal government taking a direct equity stake in US tech companies. It points out the historical irony of a Republican president demanding state ownership in private corporations.

4. Historical Parallel – Pope Leo XIII and Rerum Novarum (1891)

To contextualize this digital disruption, the text draws a deep parallel with the First Industrial Revolution –

1. **The 1891 Baseline** – In 1891, Pope Leo XIII issued the landmark papal encyclical ***Rerum Novarum*** (*Of New Things*). This document served as the Catholic Church's foundational religious response to the rise of modern industrial capitalism.
2. **The Industrial Paradox** – Europe was then facing the full social impacts of the Industrial Revolution. Mechanized factories had generated unprecedented wealth, but they had simultaneously triggered massive social dislocation, stark inequality, and severe labour unrest. This environment gave a radical edge to early socialist movements.
3. **The Middle Path** – *Rerum Novarum* rejected both unrestrained laissez-faire capitalism and revolutionary state socialism. Instead, Leo XIII defended the core dignity of labour, supported workers' legal right to organize, and emphasized the strict moral obligations of capital owners. This text became a pillar of modern Catholic social teaching.

5. Modern Re-emergence – Pope Leo XIV and Magnifica Humanitas (2026)

1. **The Modern Encyclical** – One hundred and thirty-five years later, Pope Leo XIV has deliberately invoked his predecessor's legacy by issuing the first encyclical of his pontificate, titled **Magnifica Humanitas**.
2. **The 21st Century Challenge** – While the 19th century was defined by tensions between capital owners and human workers, Leo XIV argues that the 21st century confronts a entirely new challenge – the direct relationship between human beings and highly intelligent machines that threaten to take over their livelihoods.

3. **The Threat of Unrestrained AI** – Magnifica Humanitas warns that AI allowed to expand without clear moral restraint will concentrate unprecedented wealth and power into the hands of a few dominant corporations. This concentration risks widening societal inequality and leaving behind millions of workers who lack access to the automated economy.
4. **The Core Social Threat** – The Pope emphasizes that the primary danger of AI is not merely technological, but deeply social—leading to the exclusion of millions from the prosperity generated by these new machines.

6. Technology, Dislocation, and the American Mood

1. **The Corporate Job Squeeze** – These global ethical concerns are playing out in an American job market already anxious about automation. Major technology corporations are actively cutting thousands of worker positions even as they pour billions of dollars into advanced AI development.
2. **Public Anxiety** – Public surveys confirm that a majority of citizens fear AI will permanently shrink future employment opportunities while deepening economic inequality. This worker anxiety is actively reshaping mainstream public and political debate.

7. Way Forward – Forging a New Social Compact

1. **Moving Beyond Safety Regulation** – The global policy debate regarding AI must move past its narrow focus on international security and basic safety regulations. It must actively address the distribution of wealth and the management of power in an age dominated by intelligent machines.
2. **Acknowledging Market Failure** – The emerging political consensus between populists, socialists, and tech leaders shows an understanding that the AI revolution is far too consequential to be left to free markets alone.
3. **Learning from the Welfare State** – The first and second industrial revolutions did not produce a fair social compact overnight; it required decades of severe conflict to eventually give rise to the modern Western welfare state.
4. **The New Equilibrium** – Politics has always been about managing the natural tension between tech-driven wealth creation and structural inequality. The story of AI represents the latest chapter in society's long-term struggle to forge a sustainable balance between the interests of corporate capital and the welfare of human society.

Source – <https://indianexpress.com/article/opinion/columns/pope-leo-xiv-inequality-sam-altman-trump-bernie-sanders-10731080/>

Question

"The expansion of Artificial Intelligence (AI) is shifting the global governance debate from technical safety regulations to the political economy of wealth distribution and state-led capital equity.

Elaborate on this statement by drawing parallels between the disruptions of the Industrial Age and the modern AI revolution." (250 Words, 15 Marks)

1. Introduction

The rapid advance of Artificial Intelligence (AI) is transforming global economic structures, bringing back classic arguments regarding the balance of capital and labor. As tech firms reduce headcounts while investing billions into automation, the policy focus is shifting. The core debate has expanded from narrow technical safety regulations to a fundamental question of political economy – who should own and share the massive wealth generated by intelligent machines?

2. Historical Parallels of Technological Dislocation

The intersection of rapid tech adoption and widening wealth gaps mirrors the challenges of the First Industrial Revolution –

1. **The 19th-Century Lesson** – As Pope Leo XIII detailed in his 1891 encyclical **Rerum Novarum**, the rise of mechanized factories generated immense wealth but also created deep social dislocation, labor unrest, and extreme inequality.
2. **The 21st-Century Reality** – Today, as Pope Leo XIV notes in **Magnifica Humanitas**, the friction is no longer just between capital owners and human workers, but between humanity and intelligent machines. Unrestrained automation risks concentrating economic power within a handful of mega-corporations, creating a severe social threat where millions are excluded from the prosperity generated by new tech.

3. The Shift Toward State Equity and Wealth Distribution

Because the AI revolution is too far-reaching to be left to market forces alone, unique policy responses are emerging across the political spectrum –

1. **Sovereign Public Stakes** – In the US, a rare alignment has appeared between socialist proposals (such as Senator Bernie Sanders' 50% equity-transfer AI wealth fund) and populist executive reviews under President Donald Trump to give citizens a direct financial stake in leading AI firms.
2. **Corporate Participation** – Even industry leaders like Sam Altman support this direction, backing voluntary stock-sharing mechanisms to distribute AI-generated returns back to the public.
3. **Building a Modern Welfare State** – Just as the labor conflicts of the Industrial Age eventually led to the creation of the modern Western welfare state, the AI boom demands a new social compact. This requires shifting state focus from simple corporate tax rules to direct, public equity models.

Conclusion

Technology naturally generates wealth, but without proper management, it can lead to deep societal inequality. The AI revolution represents the newest chapter in society's long-term effort to balance corporate interests with public welfare. By looking past basic safety regulations to design inclusive wealth-sharing mechanisms and public equity models, modern governance can ensure that the automation boom supports broad human prosperity rather than narrow capital concentration.

Source – <https://indianexpress.com/article/opinion/columns/pope-leo-xiv-inequality-sam-altman-trump-bernie-sanders-10731080/>

3. Semiconductor Manufacturing and India's Energy Challenge (BL)

General Studies Paper – General Studies Paper III – Science and Technology

Topic – Semiconductor Manufacturing in India

Sub-Topic – Water-Energy Nexus

Introduction

Semiconductors have emerged as the backbone of the modern digital economy, powering everything from smartphones and automobiles to artificial intelligence and defence systems. While India has launched ambitious initiatives to develop a domestic semiconductor ecosystem, chip manufacturing requires highly reliable electricity, uninterrupted power supply, and substantial water resources. Therefore, India's semiconductor ambitions must be closely aligned with its energy and infrastructure policies.

1. Why Semiconductors Matter

Strategic Importance

1. Semiconductors are critical for electronics, telecommunications, defence, AI, and emerging technologies.
2. They have become a key determinant of technological sovereignty and economic competitiveness.

Economic Significance

1. Semiconductor manufacturing can generate high-value investments.
2. Supports growth of electronics manufacturing and advanced industries.
3. Strengthens India's position in global value chains.

2. Energy Requirements of Semiconductor Manufacturing

Need for Uninterrupted Power Supply

1. Semiconductor fabrication plants (fabs) operate continuously and cannot tolerate power interruptions.
2. Even brief voltage fluctuations can damage production processes and lead to significant losses.

High Energy Intensity

1. Chip manufacturing requires massive amounts of electricity.
2. Advanced fabrication facilities consume power comparable to medium-sized cities.

Quality of Power Matters

1. Stable frequency and voltage are essential.
2. Reliability is as important as availability of electricity.

3. Water-Energy Nexus in Chip Manufacturing

Large Water Consumption

1. Semiconductor production requires ultra-pure water (UPW).
2. Water is used extensively for cleaning wafers and manufacturing components.

Energy Cost of Water Treatment

1. Producing ultra-pure water requires energy-intensive treatment processes.
2. Reliable water infrastructure is therefore critical for semiconductor ecosystems.

Sustainability Concerns

1. Water stress can affect long-term viability of semiconductor hubs.
2. Efficient recycling and conservation systems are necessary.

4. Challenges Before India

Power Reliability Issues

1. Voltage fluctuations and transmission losses remain concerns in some regions.
2. Continuous power supply standards required by semiconductor industries are still evolving.

Infrastructure Gaps

1. Need for integrated industrial ecosystems around semiconductor facilities.
2. Supporting infrastructure such as logistics, transmission networks, and storage systems require strengthening.

Cost Competitiveness

1. High energy costs increase manufacturing expenses.
2. Competing semiconductor nations often provide reliable and affordable industrial power.

Dependence on Imported Inputs

1. Critical materials, equipment, and technologies remain import-dependent.

2. Energy insecurity can further weaken competitiveness.

5. Global Best Practices

East Asian Experience

1. Countries such as South Korea and Taiwan developed dedicated industrial infrastructure for semiconductor clusters.
2. Reliable electricity and water supply became foundational components of industrial strategy.

Integrated Planning

1. Energy, water, transport, and industrial policies were developed together.
2. Governments ensured long-term resource security for manufacturers.

6. Importance of Green Energy

Clean Manufacturing

1. Global technology firms increasingly seek low-carbon supply chains.
2. Renewable energy can improve sustainability credentials.

Long-Term Energy Security

1. Solar, wind, storage technologies, and green hydrogen can diversify energy sources.
2. Reduces dependence on imported fossil fuels.

Competitive Advantage

1. Sustainable manufacturing can enhance India's attractiveness for global investments.

7. Government Initiatives

India Semiconductor Mission (ISM)

1. Supports development of semiconductor and display manufacturing ecosystems.
2. Provides incentives for fabrication and packaging facilities.

Infrastructure Development

1. Promotion of semiconductor clusters and industrial corridors.
2. Focus on strengthening manufacturing ecosystems.

Renewable Energy Expansion

1. Large-scale investments in solar and renewable energy capacity.
2. Supports future industrial energy requirements.

8. Way Forward

Develop Dedicated Semiconductor Zones

1. Establish industrial clusters with assured power and water supply.
2. Create integrated semiconductor manufacturing ecosystems.

Improve Grid Reliability

1. Modernize transmission and distribution infrastructure.
2. Ensure high-quality uninterrupted electricity supply.

Strengthen Water Management

1. Promote water recycling and reuse systems.
2. Develop sustainable water infrastructure for industrial hubs.

Align Energy and Industrial Policies

1. Coordinate semiconductor, energy, and infrastructure planning.
2. Adopt long-term strategies for resource security.

Promote Green Manufacturing

1. Encourage renewable energy integration in semiconductor facilities.

2. Develop sustainable industrial practices.

Conclusion

India's semiconductor ambitions depend not only on financial incentives and technological capabilities but also on reliable energy and water infrastructure. A globally competitive semiconductor ecosystem requires synchronized planning across energy, industry, water management, and logistics sectors. By building resilient infrastructure and ensuring resource security, India can strengthen its position in the global semiconductor value chain and advance its technological self-reliance.

Source – <https://www.thehindubusinessline.com/opinion/semiconductor-energy-questions/article71081979.ece>

Question

Q. Semiconductor manufacturing is not merely a technological challenge but also an energy and infrastructure challenge. Examine the significance of reliable energy supply for India's semiconductor ambitions and suggest measures to create a globally competitive semiconductor ecosystem. (250 Words)

Introduction

Semiconductors are critical components of the modern economy and are increasingly viewed as strategic assets. India's efforts to build a domestic semiconductor ecosystem require not only technological expertise and investment but also reliable energy and water infrastructure.

Importance of Reliable Energy for Semiconductor Manufacturing

Continuous Production Requirements

1. Semiconductor fabrication plants operate continuously and require uninterrupted power.
2. Even minor voltage fluctuations can damage production and increase costs.

Energy-Intensive Processes

1. Chip manufacturing consumes large quantities of electricity for fabrication, cooling, and water purification.
2. Stable power supply is essential for maintaining product quality.

Global Competitiveness

1. Reliable and affordable energy reduces production costs.
2. Attracts global investors seeking predictable manufacturing environments.

Key Challenges

Infrastructure Constraints

1. Power quality and transmission reliability remain uneven across regions.
2. Water-intensive manufacturing requires robust resource management.

Sustainability Concerns

1. Rising energy demand may increase dependence on fossil fuels.
2. Environmental sustainability is becoming a major consideration for global supply chains.

Measures Required

Strengthen Energy Infrastructure

1. Modernize power transmission and distribution systems.
2. Ensure dedicated high-quality power supply for semiconductor clusters.

Promote Renewable Energy

1. Integrate solar, wind, storage technologies, and green hydrogen.
2. Encourage low-carbon manufacturing ecosystems.

Improve Water Security

1. Invest in ultra-pure water facilities and recycling systems.
2. Adopt efficient industrial water management practices.

Integrated Industrial Planning

1. Align semiconductor, energy, logistics, and infrastructure policies.
2. Develop world-class semiconductor manufacturing clusters.

Conclusion

Reliable energy and water infrastructure are indispensable for semiconductor manufacturing. A coordinated strategy combining technological capability, infrastructure development, and sustainable resource management will be crucial for achieving India's semiconductor self-reliance and global competitiveness.

Source - <https://www.thehindubusinessline.com/opinion/semiconductor-energy-questions/article71081979.ece>

4. Rising Seas, Stronger Cyclones and the Future of the Blue Planet (TP)

General Studies Paper - General Studies Paper III – Disaster Management

Topic - Climate Change and Global Warming

Sub-Topic - Coastal Ecosystems and Biodiversity

Introduction

Oceans cover over 70% of the Earth's surface and play a vital role in regulating climate, supporting biodiversity, producing oxygen, and sustaining livelihoods. However, climate change, rising sea levels, ocean warming, acidification, and marine pollution are placing unprecedented pressure on marine ecosystems. These threats not only endanger ocean health but also have significant ecological, economic, and social consequences.

1. Importance of Oceans

Climate Regulation

1. Oceans absorb a large share of global heat and carbon dioxide emissions.
2. They act as a natural buffer against climate change.

Biodiversity Reservoirs

1. Marine ecosystems support millions of species.
2. Coral reefs, mangroves, and seagrass beds provide critical habitats.

Economic Significance

1. Oceans support fisheries, tourism, maritime trade, and coastal livelihoods.
2. Form the foundation of the global blue economy.

Food and Livelihood Security

1. Billions of people depend on marine resources for nutrition and employment.
2. Coastal communities are particularly dependent on ocean ecosystems.

2. Rising Sea Levels

Causes

1. Thermal expansion of seawater due to global warming.
2. Melting of glaciers and polar ice sheets.

Impacts

1. Coastal erosion and land loss.

2. Increased flooding and saltwater intrusion into freshwater sources.
3. Threats to coastal settlements, infrastructure, and agriculture.

Vulnerable Regions

1. Low-lying coastal zones, islands, and delta regions face the highest risks.

3. Increasing Intensity of Cyclones

Ocean Warming and Cyclones

1. Warmer ocean temperatures provide more energy to tropical cyclones.
2. Cyclones are becoming more intense and destructive.

Consequences

1. Greater damage to lives, property, and infrastructure.
2. Increased economic losses and displacement of populations.

Impact on Coastal Communities

1. Fisheries, tourism, and local economies suffer major disruptions.
2. Recovery becomes more difficult with repeated extreme events.

4. Ocean Acidification

Causes

1. Oceans absorb large quantities of atmospheric carbon dioxide.
2. Carbon dioxide reacts with seawater, increasing acidity.

Ecological Impacts

1. Damages coral reefs and shell-forming organisms.
2. Disrupts marine food chains and biodiversity.

Long-Term Consequences

1. Reduced productivity of marine ecosystems.
2. Threats to fisheries and food security.

5. Marine Pollution Crisis

Plastic Pollution

1. Millions of tonnes of plastic enter oceans annually.
2. Plastic waste accumulates in marine ecosystems and food chains.

Other Sources of Pollution

1. Industrial effluents and chemical contaminants.
2. Oil spills and untreated sewage discharge.

Ecological Consequences

1. Harm to marine species through ingestion and entanglement.
2. Degradation of habitats and ecosystem health.

6. Threats to Coastal and Marine Ecosystems

Coral Reefs

1. Coral bleaching due to rising ocean temperatures.
2. Loss of biodiversity hotspots.

Mangroves and Coastal Wetlands

1. Destruction from urbanisation and climate impacts.
2. Reduced protection against storms and coastal erosion.

Fisheries

1. Declining fish stocks due to habitat degradation and overexploitation.

2. Adverse impacts on coastal livelihoods.

7. Blue Economy and Sustainable Ocean Governance

Sustainable Resource Use

1. Promote responsible fisheries and marine resource management.
2. Balance economic development with conservation.

Coastal Resilience

1. Restore mangroves, coral reefs, and coastal ecosystems.
2. Strengthen nature-based solutions for disaster risk reduction.

International Cooperation

1. Enhance global efforts for marine conservation and climate action.
2. Implement commitments under SDG 14 and international ocean agreements.

8. Way Forward

Accelerate Climate Action

1. Reduce greenhouse gas emissions.
2. Promote renewable energy and low-carbon development pathways.

Strengthen Marine Conservation

1. Expand marine protected areas.
2. Improve monitoring and enforcement mechanisms.

Combat Marine Pollution

1. Reduce plastic consumption and improve waste management.
2. Encourage circular economy approaches.

Build Coastal Resilience

1. Invest in climate-resilient infrastructure.
2. Strengthen early warning systems and disaster preparedness.

Promote Scientific Research

1. Enhance ocean observation and climate monitoring systems.
2. Support evidence-based policymaking.

Conclusion

The health of oceans is inseparable from the health of the planet. Rising sea levels, stronger cyclones, ocean acidification, and marine pollution threaten ecosystems, economies, and human well-being. Protecting the blue planet requires urgent climate action, sustainable ocean governance, ecosystem restoration, and global cooperation to ensure a resilient future for present and future generations.

Source - <https://dailypioneer.com/news/rising-seas-stronger-cyclones-and-the-fight-for-our-blue-planet>

Question

Q. Climate change is transforming the world's oceans through rising sea levels, ocean warming, and increasing extreme weather events. Examine the implications of these changes on marine ecosystems and coastal communities. Suggest measures for sustainable ocean governance. (250 Words)

Introduction

Oceans play a crucial role in regulating climate, supporting biodiversity, and sustaining livelihoods. However, climate change has intensified ocean warming, sea-level rise, acidification, and extreme weather events, posing significant threats to marine ecosystems and coastal populations.

Implications of Climate Change on Oceans

Ecological Impacts

1. Rising temperatures cause coral bleaching and biodiversity loss.
2. Ocean acidification affects shell-forming organisms and marine food chains.
3. Degradation of mangroves, seagrasses, and coastal wetlands reduces ecosystem resilience.

Impact on Coastal Communities

1. Sea-level rise increases flooding, coastal erosion, and saltwater intrusion.
2. Stronger cyclones cause large-scale damage to lives, infrastructure, and livelihoods.
3. Fisheries and tourism sectors face growing economic losses.

Food and Livelihood Security

1. Declining fish stocks affect nutrition and employment.
2. Vulnerable coastal populations face heightened climate risks.

Measures for Sustainable Ocean Governance

Climate Mitigation

1. Reduce greenhouse gas emissions through low-carbon development.

Ecosystem Restoration

1. Conserve coral reefs, mangroves, and coastal wetlands.
2. Expand marine protected areas.

Pollution Control

1. Reduce plastic waste and strengthen marine waste management systems.

Coastal Resilience

1. Promote climate-resilient infrastructure and early warning systems.

International Cooperation

1. Strengthen implementation of SDG 14 and global marine conservation frameworks.

Conclusion

Protecting ocean ecosystems is essential for climate stability, biodiversity conservation, and sustainable development. A combination of climate action, ecosystem restoration, pollution control, and effective ocean governance is necessary to secure the future of the blue planet.

Source - <https://dailypioneer.com/news/rising-seas-stronger-cyclones-and-the-fight-for-our-blue-planet>