Secure Synopsis compilation for November 2024

General Studies-1

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Indian culture will cover the salient aspects of Art Forms, literature and Architecture from ancient to modern times.

Q. "The architecture of ancient Buddhist sites reflects a blend of spiritual and functional design". Analyze the structural and symbolic significance of Buddhist architectural elements, with examples. (15 M)

Introduction

Buddhist sites beautifully combine **spiritual symbolism** with **functional design**, reflecting the core values of the faith and providing for the practical needs of the monastic community.

Body

The architecture reflects a blend of spiritual and functional design."

1. **Symbolism aligned with religious teachings:** Buddhist architecture mirrored the core principles of **enlightenment** and the **path to Nirvana** through symbolic structures.
    - E.g.: **Stupas** at **Sanchi** embody the **journey towards enlightenment,** symbolizing the Buddha's teachings.
2. **Functional spaces for religious and daily life:** The architecture served as **places of worship, education, and monastic living**, addressing the daily needs of monks and pilgrims.
    - E.g.: **Viharas at Nalanda University** were designed to house scholars and provide communal spaces for **learning and meditation**.
3. **Combination of aesthetic and practicality:** Structures were built to serve **both religious functions** and provide practical solutions for the monastic community, such as living quarters, assembly halls, and relic chambers.
    - E.g.: The **Ajanta Caves** were designed for both **residential and religious purposes**, with artistic murals depicting Buddha's life and teachings.

Structural significance of Buddhist architectural elements

1. **Stupas as relic repositories:** Stupas served as sacred chambers for relics of the Buddha and monks, with their circular form enabling circumambulation for worshippers.
    - E.g.: The **Great Stupa at Sanchi**, built by **Ashoka**, provided a focal point for pilgrims, with four cardinal gates for entry.
2. **Chaityas as congregational halls:** Rock-cut **Chaityas** provided large halls for prayer and assembly, featuring vaulted ceilings for improved acoustics, supporting congregational worship.
    - E.g.: **Karle Chaitya** has a high, ribbed roof and a stupa inside, creating an expansive space for devotees.
3. **Viharas for monastic life: Viharas** were residential structures, often arranged around courtyards, providing functional living quarters for monks.
    - E.g.: **Viharas at Nalanda University** housed monks and scholars, **integrating dormitories** with spaces for communal learning.
4. **Rock-cut caves for durability: Rock-cut architecture**, exemplified by the caves at Ajanta, demonstrated engineering innovation, carving sanctuaries directly into cliffs for protection and sustainability.
    - E.g.: The **Ajanta Caves**, carved into the rock face**, provided both religious and residential functions** for monks.
5. **Toranas as ceremonial gateways: Toranas** served as gateways to stupas and temples, demarcating sacred spaces and controlling access.
    - E.g.: The **Toranas at Sanchi** were adorned with intricate carvings symbolizing Buddha's life events and key teachings.

Symbolic significance of Buddhist architectural elements

1. **Stupa as a mandala**: The **stupa** represents the **cosmos** and the journey to enlightenment, with its **circular shape** symbolizing the cycle of life and rebirth.
    - Eg: The **Great Stupa** at Sanchi symbolizes the spiritual path from earth to Nirvana.
2. **Bodhi tree symbolism**: Architectural elements often include the **Bodhi tree**, symbolizing **enlightenment** and spiritual awakening.
    - Eg: The **Bodhi Tree carvings** at Sanchi Torana remind devotees of the Buddha's enlightenment.
3. **Harmika and Chatra as enlightenment symbols**: The **harmika** and **chatra** represent levels of **consciousness** and the attainment of Nirvana, symbolizing **divine protection** and spiritual authority.
    - Eg: The **Chatra** on the Sanchi Stupa symbolizes the Buddha's **spiritual sovereignty.**
4. **Toranas as narrative symbols**: **Toranas** depict the life of the Buddha and serve as visual representations of his **teachings**.
    - Eg: The **Toranas at Sanchi** depict events from the **Buddha's life, reinforcing moral lessons.**
5. **Chaityas as cosmic mountain symbols**: The **vaulted shape** of **chaityas** symbolizes **Mount Meru**, representing the Buddha's spiritual presence and the connection between the physical and divine realms.
    - Eg: **Karle Chaitya's** design evokes **Mount Meru as a metaphor for spiritual ascent.**
6. **Lotus motif as spiritual purity**: The **lotus flower** symbolizes **purity** and spiritual transcendence, reflecting the Buddha's rise above worldly attachments.
    - Eg: **Lotus carvings** at the Ajanta Caves **symbolize spiritual awakening** and the purity of the Buddha's teachings.

Conclusion

Buddhist architecture's **timeless integration of form and function** not only served the practical needs of its followers but also conveyed deep spiritual symbolism. This harmonious blend continues to inspire modern architectural practices, reflecting the enduring relevance of **Buddhist values** in creating spaces that are spiritually meaningful and functionally effective.

Modern Indian history from about the middle of the eighteenth century until the present- significant events, personalities, issues.

Q. Analyze the historical significance of the Ghadar Movement in the context of India's freedom struggle. How did it influence subsequent revolutionary activities against British colonial rule? (10 M)

Introduction

The **Ghadar Movement** of 1913 was one of India's earliest organized revolutionary efforts, mobilizing the Indian diaspora against British colonialism and creating a lasting impact on future anti-colonial struggles.

Body

Historical significance of the Ghadar movement

1. **First overseas revolutionary movement**: The Ghadar Movement united expatriate Indians, setting a precedent for international anti-colonial activities.
    - **E.g.**: Established in **San Francisco, 1913**, by **Lala Har Dayal**, it aimed to inspire Indians globally to fight for freedom.
2. **Secular and anti-colonial ideology**: Promoted secular ideals, uniting Indians across religious lines for a common cause of independence.
    - **E.g.**: **Ghadar's secular foundation** influenced later freedom movements focused on a unified India.
3. **Propaganda and mobilization**: Published the **Ghadar newspaper** to expose British injustices, which inspired local and global resistance.
    - **E.g.**: **The paper was circulated globally**, spreading anti-colonial sentiment among Indians worldwide.
4. **Armed resistance philosophy**: The movement emphasized armed struggle, challenging the notion that India's freedom could be won through peaceful means alone.
    - **E.g.**: **Planned a major uprising in 1915,** with support from revolutionaries like **Rash Behari Bose**.
5. **Encouragement for grassroots rebellion**: The movement inspired peasants and laborers to question colonial rule and consider active resistance.
    - **E.g.**: **Farmers in Punjab began to mobilize**, drawing from the Ghadar ethos, with some attempting local uprisings in 1915.

Influence on subsequent revolutionary activities

1. **Inspired future revolutionary groups**: Its ideology laid the foundation for organizations like **Hindustan Socialist Republican Association (HSRA)**, promoting armed resistance.
    - **E.g.**: **Bhagat Singh** acknowledged the influence of Ghadar's revolutionary ideals on his approach.
2. **Legacy of martyrdom**: Ghadar members' sacrifices became a symbol of resistance, encouraging others to join anti-colonial efforts.

- **E.g.**: Ghadarites like **Kartar Singh Sarabha** became icons for future freedom fighters, symbolizing dedication to independence.

3. **Global revolutionary network**: Established links with other anti-colonial movements, creating an international network of revolutionary support.
    - **E.g.: Formed connections** with groups in **Japan and Germany** during World War I for arms and support.
4. **Foundation for anti-colonial literature**: Inspired writings that condemned colonial rule, which influenced educated youth in India.
    - **E.g.**: Works of **Lala Lajpat Rai** drew from the Ghadar ethos, inspiring youth to join revolutionary activities.
5. **Impacted Indian diaspora's role in freedom struggle**: The movement spurred diaspora communities in other countries to contribute to India's freedom struggle financially and ideologically.
    - **E.g.**: In **Canada and the U.S.**, Indian expatriates became vocal supporters of India's independence post-Ghadar Movement.

Conclusion

The **Ghadar Movement was a catalyst for India's revolutionary zeal**, leaving a legacy that fortified the freedom struggle's intensity. Its message of resilience and sacrifice endures, inspiring future generations to uphold the values of independence and unity.

Q. With reference to 'Amrit Parampara,' discuss how cultural festivals can be used as platforms to revive fading traditional art forms in India. (10 M)

Introduction

India's diverse **cultural heritage** is under threat as many traditional art forms face extinction. **Cultural festivals** like **Amrit Parampara** provide a critical platform to revive these traditions and ensure their continuation in a modern context.

Body

Amrit Parampara – key points

1. **Part of azadi ka Amrit Mahotsav:** Amrit Parampara is part of the broader **Azadi Ka Amrit Mahotsav** initiative, aimed at reviving endangered traditional art forms while commemorating India's 75th independence anniversary.
2. **Reviving endangered arts:** The initiative focuses on showcasing lesser-known art forms, providing visibility and safeguarding their heritage through performances and festivals.
3. **Platform for emerging artists:** Amrit Parampara encourages young artists to showcase their talents and learn from established masters, ensuring the transfer of skills across generations.

4. **Government support:** The **Ministry of Culture** provides essential funding and organizational backing, promoting regional cultural forms on a national scale.
5. **Diverse cultural inclusion:** The initiative covers a wide range of cultural forms, from classical music to tribal and folk arts, celebrating India's vast cultural diversity.

How cultural festivals revive traditional art forms

1. **Exposure and awareness:** Festivals showcase traditional art forms to a wide audience, boosting visibility and raising public awareness.
    - **Eg:** The **Amrit Parampara festival** highlights classical dance forms such as **Kathak** and **Bharatanatyam**, introducing them to newer audiences.
2. **Economic support for artists:** Festivals create revenue streams for artists through performances and exhibitions, securing their livelihoods.
    - **Eg:** The **Surajkund Mela** provides artisans with a platform to sell handcrafted items directly, ensuring financial support for their craft.
3. **Intergenerational knowledge transfer:** These festivals facilitate the teaching of traditional skills from master artists to younger generations, preserving cultural practices.
    - **Eg: Guru Shishya Parampara** events under Amrit Parampara emphasize learning directly from seasoned gurus in fields like classical music.
4. **Innovation and fusion:** Festivals encourage collaborations between traditional and modern artists, keeping art forms relevant and dynamic.
    - **Eg:** The **Serendipity Arts Festival** fosters innovation by promoting collaboration between folk artisans and modern designers.
5. **Cultural identity and pride:** Festivals help strengthen regional and national identities by celebrating local traditions, fostering a sense of pride in heritage.
    - **Eg:** The **Hornbill Festival** in Nagaland showcases tribal arts, helping preserve the cultural identity of the region's indigenous people.
6. **Government and institutional support:** Government-sponsored festivals ensure sustained attention and resources for reviving endangered art forms.
    - **Eg: Sangeet Natak Akademi**'s **Putul Parampara** focuses on reviving traditional puppetry art across various regions.

Conclusion

Cultural festivals like **Amrit Parampara** play a crucial role in reviving India's fading traditional art forms by providing visibility, financial support, and educational platforms. As India modernizes, sustained **government backing** and **public engagement** will be essential in ensuring these traditions continue to thrive.

Q. Analyze the impact of climate-driven vegetation changes on human migration and the rise and fall of dynasties in ancient India (10 M)

Introduction

In ancient India, **climate-driven vegetation changes** profoundly influenced migration patterns and the socio-political dynamics of early civilizations, often determining the stability and decline of dynastic powers.

Body

Impact of climate-driven vegetation changes on human migration

1. **Decline of the Indus valley civilization (c. 1900 BCE)**: Diminished **monsoon activity** led to decreased agricultural productivity and **water scarcity**, prompting large-scale migrations eastward toward the fertile **Ganga-Yamuna plains**.
    - **E.g.: Sediment core studies** near **Mohenjo-Daro** show declining monsoon rainfall, linking it to the drying up of the **Sarasvati River**, which forced migrations .
2. **Eastward settlement shifts**: **Drought** and changing **river courses** in the **Indus Valley** forced communities to relocate to the more stable and agriculturally viable **Ganga basin**, marking a significant settlement shift.
    - **E.g.: Archaeological findings in Rakhigarhi** reveal a shift of Harappan populations to areas near the **Ganga-Yamuna basin**, adapting to more reliable water sources (ASI, Archaeological Survey of India).
3. **Formation of Vedic society**: As the vegetation in the northwestern regions became unsustainable, the **Indo-Gangetic plains** offered a stable environment for developing **agricultural societies**, forming the core of **Vedic culture**.
    - **E.g.: Rigvedic texts** refer to the fertile **Ganga basin**, indicating early Vedic migrations due to favourable vegetation patterns in the region.
4. **Impact on pastoralist movements**: Changes in vegetation impacted grazing lands in northwest India, leading **pastoral communities** to migrate towards more vegetative and stable grazing regions in **northern and central India**.
    - **E.g.: Studies from Rajasthan and the Thar Desert** suggest that as vegetation declined, pastoralist groups adapted by moving towards the **Himalayan foothills** .
5. **Adoption of new crops in Ganga basin**: The arrival of migratory populations introduced new **farming practices** and crop types to the Ganga basin, supported by the fertile land and predictable monsoon patterns.
    - **E.g.: Excavations at Hastinapur** show evidence of early **rice cultivation**, which allowed migrants from the Indus Valley to thrive .

Climate-driven vegetation changes on the rise and fall of dynasties.

1. **Agricultural dependency of dynasties**: Ancient dynasties depended on stable **agricultural output**, making them vulnerable to vegetation changes due to **climate shifts**, directly impacting economic stability.
    - **E.g.:** The **Late Harappan period** saw a **decline in agriculture** in the **Indus region**, weakening dynastic control and leading to regional fragmentation .
2. **Shift in political centers**: As climate-induced changes made the **northwestern regions** less habitable, dynasties emerged in the more fertile **Ganga-Yamuna plains**, marking a significant political shift.
    - **E.g.: Transition from Harappan to Vedic settlements** in the Ganga basin laid the foundation for new dynasties and cultural development in the area .
3. **Adaptation through new agricultural practices**: Early dynastic societies adapted to climate variations by diversifying crops suited to the Ganga basin, strengthening their agricultural foundation.
    - **E.g.: Charred rice remains in the Doab region** suggest that post-Harappan societies diversified crops to withstand varying climate patterns.
4. **Vulnerability to decline due to resource scarcity**: Diminished agricultural resources made dynasties in the northwest vulnerable to decline, weakening their economic and military power.
    - **E.g.:** The **decline of the Harappan Civilization** is linked to the reduced productivity of the **Sarasvati region** due to climate stress, impacting trade and sustenance
5. **Rise of Ganga basin dynasties**: Stable **monsoon patterns** in the **Ganga basin** supported agricultural prosperity, paving the way for early dynasties to establish and consolidate their power.
    - **E.g.: Mahajanapadas** such as **Magadha** thrived due to **abundant resources in the Ganga plains,** which offered a favourable climate and vegetation for sustained governance (History and Archaeology Division, ASI).

Conclusion

Ancient India's migratory shifts and dynastic changes reveal how **climate-driven vegetation patterns** shaped human societies. Recognizing these **historic impacts highlights the enduring influence of environmental factors on social and political stability**, emphasizing the need for environmental resilience in modern society.

Q. Highlight the architectural contributions of the Lodi dynasty and their significance in the evolution of Indo-Islamic architecture. (10 M)

Introduction

The **Lodi dynasty (1451–1526)** pioneered a distinct architectural style that combined simplicity, symmetry, and functionality, bridging the gap between Sultanate and Mughal architectural traditions.

Body

Architectural contributions of the Lodi dynasty

Fig: Sikandar Lodi's tomb at Lodhi Garden

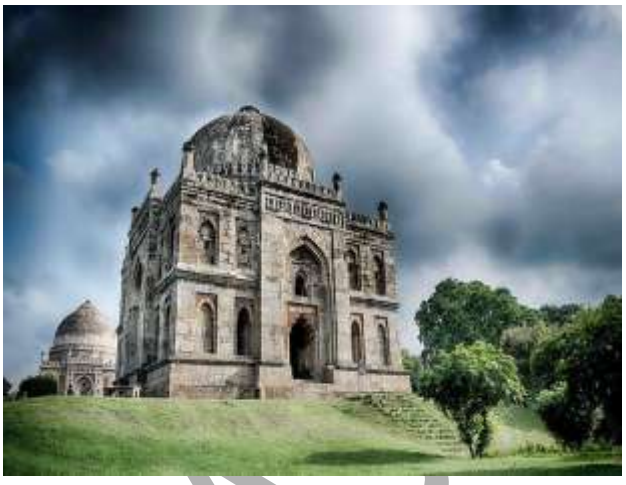


Fig: Shish Gumbad, Lodi Gardens

1. **Octagonal tombs for simplicity and harmony**: The Lodi rulers popularized octagonal tombs, which symbolized symmetry and were designed for visual balance.
    - **Eg**: The tomb of **Sikandar Lodi**, one of the first octagonal tombs with a garden setting in Delhi.
2. **Integration of landscaped gardens with tombs**: Lodi tombs were often surrounded by gardens, emphasizing a spiritual connection to paradise as per Islamic beliefs.
    - **Eg**: The **Lodi Gardens**, Delhi, remains a prime example of their early landscaped tomb architecture.
3. **Low domes and compact proportions**: Lodi structures often featured squat domes to reduce pressure on walls and achieve architectural stability.
    - **Eg**: The **Bara Gumbad** dome in Delhi highlights this innovation.
4. **Use of local materials and simple designs**: They prioritized sandstone and rubble masonry, incorporating clean, geometric patterns and restrained ornamentation.
    - **Eg**: The **Shish Gumbad**, adorned with blue tiles and plain facades.
5. **Focus on mosque architecture with open spaces**: Lodi mosques included spacious courtyards and simpler facades to serve practical and spiritual needs.
    - **Eg**: The **Bara Gumbad Mosque**, an early example of large prayer halls combined with minimalist style.

Significance in the evolution of Indo-Islamic architecture

1. **Transitional architecture bridging Sultanate and Mughal styles**: Lodi innovations laid the groundwork for Mughal architecture, blending Afghan and Indian elements.
    - **Eg**: The **octagonal layout and garden tomb** design influenced **Humayun's Tomb** (1565).
2. **Introduction of Charbagh garden layout**: Their emphasis on gardens as part of tomb complexes evolved into the Mughal **paradise garden** concept.
    - **Eg**: The design of **Lodi Gardens** reflects early Charbagh features.

3. **Simplicity over extravagance**: The Lodi style emphasized functionality and minimalism, moving away from ornate embellishments seen in earlier Sultanate architecture.
    - **Eg**: Structures like **Shish Gumbad** focused on modest aesthetics with practical designs.
4. **Blending Indian craftsmanship with Islamic traditions**: Integrated Indian techniques like intricate stone lattices (**jalis**) with Islamic architectural principles.
    - **Eg**: Use of **jalis** in tomb windows for ventilation and design in Delhi structures.
5. **Regional influence on other Sultanates**: Inspired regional adaptations in the Sharqi and Deccan Sultanates, particularly in tomb and mosque designs.
    - **Eg**: The **Gol Gumbaz** in Bijapur reflects structural ideas originating from Lodi designs.

Conclusion

The **Lodi dynasty's architectural legacy** represents a seamless blend of function, simplicity, and aesthetic appeal. By integrating innovation with tradition, their structures not only defined their era but also paved the way for the grandeur of Mughal architecture.

Q. Analyze the impact of colonial rule on India's perception of its cultural heritage. How has this perception evolved in the post-independence era? (10 M)

Introduction

India's cultural heritage, **a testament to its ancient civilization, faced systematic neglect** and distortion under colonial rule. Post-independence, the nation embarked on a mission to reclaim and celebrate its legacy, transforming heritage into a source of unity and pride.

Body

Impact of colonial rule on India's cultural heritage perception

1. **Eurocentric narrative dominance**: British colonizers promoted the notion that Western art, architecture, and knowledge were superior.
    - **Eg**: **James Mill's History of British India** dismissed India's cultural past as unscientific and stagnant.
2. **Exploitation and destruction of monuments**: Colonial policies often led to neglect or deliberate destruction of heritage structures.
    - **Eg**: The demolition of indigenous structures for building **railway lines** or urban expansions like in Delhi during the **1857 revolt**.
3. **Cultural fragmentation through divide-and-rule**: The colonial government created religious and regional divisions, eroding the shared ownership of cultural heritage.
    - **Eg**: **Partition narratives** ignored the syncretic nature of shared heritage like **Sufi shrines** or composite art forms.

4. **Introduction of Western education**: Indian traditional knowledge systems and vernacular arts were side-lined in favour of English education.
    - **Eg**: Decline of institutions like **Tols** and **Madrasas** in favour of British-style universities such as the **University of Calcutta (1857)**.
5. **Institutionalization of heritage under British control**: While the **Archaeological Survey of India (ASI, 1861)** documented monuments, it was primarily to serve colonial interests, often neglecting local custodianship.
    - **Eg**: **John Marshall's ASI** prioritized **Greco-Buddhist art** over indigenous forms.

Evolution of perception in post-independence era

Post-independence, India made deliberate efforts to restore its cultural pride and heritage, reversing the colonial narrative.

1. **Nationalist revival of heritage**: India's leaders emphasized reclaiming cultural pride to instil national unity.
    - **Eg**: **Jawaharlal Nehru's vision** in **The Discovery of India** highlighted India's composite culture and its continuity.
2. **Strengthening institutional frameworks**: India created organizations like the **Archaeological Survey of India (revitalized in 1947)** and the **Indian National Trust for Art and Cultural Heritage (INTACH, 1984)** to conserve cultural heritage.
    - **Eg**: **ASI-led restoration of Sanchi Stupa (1950s)**.
3. **Constitutional and legal measures**: The Constitution introduced safeguards for heritage protection under **Articles 49 and 51A(f)**, and laws like the **Ancient Monuments and Archaeological Sites and Remains Act (AMASR), 1958** provided legal frameworks.
    - **Eg**: Protection of **Ajanta and Ellora Caves** under AMASR Act.
4. **Cultural revival and state patronage**: post-independence, efforts were made to revive traditional art, dance, and music forms through state patronage and schemes.
    - **Eg**: Establishment of institutions like **Sangeet Natak Akademi (1953)** and **Lalit Kala Akademi (1954)**.
5. **Integration of heritage with development**: India adopted a balanced approach to integrate heritage conservation with modern development.
    - **Eg**: **UNESCO World Heritage Site status** for sites like Fatehpur Sikri (1986) and Jaipur (2019).
6. **Recognition of intangible cultural heritage**: India also focused on preserving oral traditions and performing arts.
    - **Eg**: **Yoga** and **Kumbh Mela** were recognized as UNESCO Intangible Cultural Heritage elements.
7. **Promotion of cultural diplomacy**: Heritage became a soft power tool to enhance India's global standing.

- **Eg**: **International Cultural Relations Programme (1977)** and more recently, the **International Day of Yoga (2014)**.

Conclusion

India's post-independence efforts to reclaim and preserve its cultural heritage reflect a blend of tradition and progress. By **strengthening institutional frameworks, legal measures, and cultural diplomacy**, India continues to ensure its heritage remains a source of inspiration and unity for future generations.

The Freedom Struggle — its various stages and important contributors/contributions from different parts of the country.

Q. Discuss Maulana Abul Kalam Azad's contributions to India's freedom struggle and his role in nation-building after independence. (10 M)

Introduction

Maulana Abul Kalam Azad was a visionary nationalist and a **pioneering leader** whose commitment to **freedom and nation-building** laid the foundation for a unified and progressive India.

Body

Contributions to the freedom struggle

1. **Role in khilafat movement (1920):** Mobilized Indian Muslims, emphasizing **unity with Hindus** in the fight for independence.
   - **E.g.:** His leadership extended beyond religious boundaries, fostering a **shared nationalist vision**.
2. **Leadership in non-cooperation movement:** Championed peaceful protests and **resistance against British rule,** broadening the movement's reach.
   - **E.g.:** Through **Al-Hilal** and **Al-Balagh**, he promoted non-violence and nationalism.
3. **Advocate of Hindu-Muslim unity:** Consistently worked for **communal harmony**, especially during times of religious tension.
   - **E.g.:** His role in the **Lucknow Pact (1916)** was instrumental in forging Hindu-Muslim political cooperation.
4. **Congress president (1940-46):** Led the **Indian National Congress** during pivotal years, opposing partition and endorsing a secular, independent India.
   - **E.g.:** Supported the **Quit India Movement (1942)**, rallying support for independence under his leadership.
5. **Multiple imprisonments for independence:** Endured multiple jail terms, demonstrating his unwavering commitment to freedom.

- **E.g.:** Imprisoned in **1930, 1934**, and during **Quit India Movement**, exemplifying resilience.

Contributions to nation-building

1. **Educational reforms as first education minister:** Laid the foundation for India's **educational infrastructure**, establishing institutions and policies for holistic learning.
    - **E.g.:** Founded the **University Grants Commission (UGC)** and **Indian Institutes of Technology (IITs)** to promote accessible, quality education for all (Source: **Ministry of Education, Government of India**).
2. **Promoting scientific and cultural institutions:** Initiated the **Council of Scientific and Industrial Research (CSIR)**, **Sangeet Natak Akademi**, and **Sahitya Akademi** to encourage science, culture, and the arts.
    - **E.g.:** Established the **Indian Council for Cultural Relations (ICCR)** to promote Indian culture globally.
3. **Champion of secularism and national unity:** Advocated for **communal harmony** in governance, influencing India's secular framework.
    - **E.g.:** His support in the **Constituent Assembly** helped shape **Articles 25-30** on religious freedoms (**Constituent Assembly Debates**).
4. **Promotion of technical education:** Emphasized **practical education** to drive India's economic growth and self-reliance.
    - **E.g.:** Founded the **All India Council for Technical Education (AICTE)** to standardize technical education.
5. **Support for women's and minority education:** Advocated for inclusive educational policies, particularly for **women and minorities**.
    - **E.g.:** Pioneered schemes under **Basic Education** and **Vocational Training** for marginalized groups
6. **Vision for social and economic progress:** Saw education as a tool for **social mobility** and economic independence.
    - **E.g.:** His policies inspired later educational initiatives, like **Sarva Shiksha Abhiyan**.

Conclusion

Maulana Azad's legacy lies in his contributions to an **inclusive, secular, and progressive India**. His vision continues to inspire a nation that values **knowledge, unity, and justice** for all.

Q. Examine the socio-economic factors that led to the Munda Rebellion. How did Birsa Munda's ideology and leadership shape the tribal resistance movement? (10 M)

Introduction

The **Munda Rebellion of 1899-1900**, led by **Birsa Munda**, was a significant tribal uprising that exposed the socio-economic and cultural pressures faced by India's tribal communities under colonial rule. It reflected their struggle for autonomy, land rights, and cultural preservation.

Body

Socio-economic factors leading to the Munda rebellion

1. **Land alienation**: British policies allowed outsiders (Dikus) to gain ownership of tribal lands, dismantling traditional communal land systems and affecting the tribal way of life.
    - E.g.: The **Chotanagpur Tenancy Act** of 1908 was later introduced to protect tribal land ownership after the rebellion (Government of Jharkhand).
2. **Exploitation by moneylenders and zamindars**: Tribal communities fell into debt traps due to high-interest loans from moneylenders, leading to bonded labor and loss of economic independence.
    - E.g.: **Many Mundas were dispossessed of their lands** and forced into servitude under exploitative zamindars (Ministry of Tribal Affairs, 2022).
3. **Forced and unpaid labour (Beth-Begari)**: Colonial authorities and local landlords imposed forced labour, making the Mundas work without payment, which became a critical grievance.
    - E.g.: **Tribals were compelled to work on zamindar-owned** land without wages, fostering deep resentment (Source: "Tribal Movements in India," B. Choudhary).
4. **Religious and cultural suppression**: Missionaries encouraged Christian conversions, undermining tribal customs, creating cultural discontent, and eroding traditional practices.
    - E.g.: **Missionary activities and the imposition of foreign beliefs** were seen as threats to their cultural identity, spurring a revival under Birsa.
5. **Impact of forest laws**: Restrictive forest policies limited tribal access to forest resources essential for their survival, threatening their livelihood.
    - E.g.: The **Forest Act of 1878** restricted hunting and gathering rights, disrupting the Mundas' traditional practices (Source: Tribal Rights and Land Reforms, Ministry of Environment).
6. **Economic marginalization and poverty**: Colonial economic policies marginalized the tribal economy, forcing many Mundas into low-paying jobs and further entrenching poverty.
    - E.g.: **The influx of Dikus led to loss of traditional livelihoods**, leaving the Mundas economically vulnerable.

Birsa Munda's ideology and leadership

1. **Revival of tribal identity and unity**: Birsa promoted a spiritual movement that emphasized traditional beliefs and unity against colonial and external threats, rallying the tribal community.
    - E.g.: **He emphasized worship of Sing Bonga** (Sun God) and opposed conversions, strengthening a common tribal identity.
2. **Demand for self-rule (Munda Raj)**: Birsa's call for self-governance inspired the tribes to resist feudal and colonial authorities, creating a vision of autonomy and justice.
    - E.g.: **His call for Munda Raj united various tribal groups** under a shared vision of freedom from exploitation.
3. **Social and moral reforms**: Birsa encouraged reform within the community, opposing superstitions and promoting clean living, which fostered unity and self-reliance.
    - E.g.: He **urged his followers to avoid alcohol and other vices**, promoting discipline within the community.
4. **Resistance through organized militancy**: Unlike previous passive revolts, Birsa mobilized the Mundas into an organized militant force, targeting colonial symbols of power.
    - E.g.: His **followers attacked police stations and British officials**, challenging the colonial administration's control (Indian Freedom Struggle, Ministry of Tribal Affairs).
5. **Economic upliftment ideals**: Birsa aimed at economic self-sufficiency, urging tribes to reclaim their land and resources, fostering a model of economic independence.
    - E.g.: **He encouraged the Munda people to resist paying taxes** to landlords and reclaim lost lands.
6. **Role as a messiah figure**: Birsa was seen as a divine leader and messianic figure, uniting people under a common religious and social cause that enhanced his influence.
    - E.g.: Known as **Dharti Aba** (Father of the Earth), Birsa's spiritual aura reinforced loyalty and morale among the Mundas.

Conclusion

The Munda Rebellion, driven by socio-economic discontent and led by Birsa Munda's visionary ideology, lef**t an enduring legacy in tribal resistance against exploitation and colonial rule**. His movement remains a powerful symbol of **tribal rights, unity, and autonomy**, influencing tribal activism in India even today.

Q. Discuss the socio-political significance of Rani Lakshmibai's leadership during the revolt of 1857 and its impact on Indian society. (10 M)

Introduction

Rani Lakshmibai, the Queen of Jhansi, stood as a **towering figure of courage and defiance during** the revolt of 1857. Her leadership symbolized resistance to British imperialism, while her actions transcended her era to inspire societal transformation.

Body

Role in the revolt of 1857

1. **Resistance to the Doctrine of Lapse**: She refused to accept the annexation of Jhansi, highlighting her political acumen.
    - Eg: **Her leadership after her husband's death in 1853** set a precedent for defying colonial policies.
2. **Tactical military leadership**: Lakshmibai showcased exceptional strategic planning and courage in the defense of Jhansi and during battles in Kalpi and Gwalior.
    - Eg: **Her alliance with Tantia Tope and escape from Jhansi** to regroup forces demonstrated her tactical brilliance.
3. **Leadership under pressure**: Despite limited resources and betrayal by some local allies, she maintained Jhansi's defense for months against a superior British force.
    - Eg: Her fight **against Sir Hugh Rose in 1858 remains** a milestone in Indian resistance.
4. **Symbol of organized rebellion**: Lakshmibai unified diverse factions of rebels under her leadership, turning Jhansi into a nerve center for the revolt.
    - Eg: **Regional leaders and soldiers across** Bundelkhand supported her leadership during the uprising.

Socio-political significance

1. **Symbol of anti-colonial resistance**: Her defiance became a rallying point against British imperialism, inspiring future uprisings.
    - Eg: Her leadership influenced resistance narratives, such as the **Santhal and Indigo rebellions**.
2. **Breaking gender stereotypes**: As a widow and ruler, she defied patriarchal norms, demonstrating that women could lead in both governance and war.
    - Eg: Her legacy has been celebrated as a **pioneer of women's empowerment** in India.
3. **Fostering regional unity**: She mobilized local leaders, citizens, and soldiers across regions, fostering collective action against British rule.
    - Eg: **Her alliances with leaders in Kalpi and Gwalior** underscored her role in regional unification.
4. **Catalyst for cultural and national identity**: Lakshmibai's resistance reinvigorated Indian cultural pride and national identity.
    - Eg: **The poem "Jhansi ki Rani" by Subhadra Kumari Chauhan** immortalized her in India's freedom narrative.
5. **Promotion of local governance**: Her temporary rule in Jhansi during the revolt showcased effective governance and resource mobilization.
    - Eg: **She reorganized the military and economy** to sustain Jhansi's defence.

Impact on Indian society

1. **Inspiration for future freedom struggles**: Her bravery became a touchstone for freedom fighters in later struggles for independence.
    - Eg: The **Rani of Jhansi Regiment** in Subhas Chandra Bose's INA was named in her honor.
2. **Legacy of nationalism**: Her defiance symbolized the early stirrings of Indian nationalism and influenced movements like the **Swadeshi and Non-Cooperation Movements**.
    - Eg: Her story was recounted in speeches by leaders like **Mahatma Gandhi and Jawaharlal Nehru.**
3. **Role model for women in leadership**: Lakshmibai's story continues to inspire women to take leadership roles across sectors.
    - Eg**: Numerous public institutions and awards** are named after her to honor her courage and leadership.
4. **Strengthening cultural identity**: Her actions rejuvenated India's resistance culture and highlighted the role of local heroes in shaping Indian identity.
    - Eg: **Folk songs and plays continue** to celebrate her in states like Uttar Pradesh and Madhya Pradesh.
5. **Eternalized in historical memory**: Her narrative bridges regional and national struggles, positioning her as a timeless hero.
    - Eg: Celebrated annually on **19th November (her birth anniversary)** as a day of women's empowerment.

Conclusion

Rani Lakshmibai's leadership during the revolt of 1857 was a landmark in Indian resistance, transcending **socio-political barriers and inspiring a unified nationalist identity**. Her legacy continues to echo in modern India, empowering individuals to challenge oppression and strive for equality and justice.

Q. To what extent did Arya Samaj contribute to India's religious and social renaissance during the colonial period? (15 M)

Introduction

The **Arya Samaj**, founded by **Swami Dayanand Saraswati in 1875**, was a pivotal reformist movement focused on reviving **Vedic culture** and addressing regressive practices. It played a significant role in modernizing Hindu society while facing challenges in scope and inclusivity.

Body

Contributions to religious renaissance

1. **Revival of Vedic ideals**: Arya Samaj emphasized **monotheism** and rejected polytheism, idol worship, and rituals, promoting Vedic principles.

- **Eg:** Swami Dayanand's book **'Satyarth Prakash' (1875)** became a cornerstone of its ideology.

2. **Opposition to superstition and blind rituals**: The Samaj campaigned against **astrology**, animal sacrifices, and other superstitions, promoting rational inquiry.
    - **Eg:** Organized **Vedic Yajnas** as simplified, meaningful worship practices.
3. **Reconversion through Shuddhi Movement**: It launched the **Shuddhi Movement** to reconvert those who had converted to other religions, reinforcing Hindu unity.
    - **Eg:** The **reconversion of Malkana Rajputs** in the early 20th century became a notable success.
4. **Critique of sectarianism**: Arya Samaj opposed divisions within Hinduism, advocating **religious unification**.
    - **Eg:** Campaigns against divisive practices like Shaivism and Vaishnavism strengthened the reform agenda.
5. **Promotion of rational spirituality**: It promoted a balance between **faith and reason**, encouraging education and logic in religious practices.
    - **Eg:** Inspired **nationalist leaders like Lala Lajpat Rai**, who adopted Arya ideals for reform.

Contributions to social renaissance

1. **Advancement of women's rights**: Arya Samaj supported **widow remarriage**, opposed child marriage, and promoted women's education.
    - **Eg:** Founded **Kanya Gurukul (1919)** to empower women through learning.
2. **Abolition of caste discrimination**: It rejected **untouchability** and supported inter-caste marriages and dining.
    - **Eg:** Legal recognition of inter-caste marriages conducted by Arya Samaj centers contributed to social integration.
3. **Education for all**: It established **modern educational institutions** combining secular and Vedic learning.
    - **Eg:** The **Dayanand Anglo Vedic (DAV) Schools** established in 1886 educated leaders like **Bhagat Singh**.
4. **Opposition to social evils**: Arya Samaj actively campaigned against **sati**, **dowry**, and other regressive customs.
    - **Eg:** Efforts against dowry inspired reforms in **northern India** (Source: **Radhakrishnan Commission Report**).
5. **Fostering nationalism through reform**: By aligning **social reform with patriotism**, Arya Samaj fueled nationalist sentiments.
    - **Eg:** Leaders like **Lala Lajpat Rai** combined Arya teachings with nationalist activities.

Limitations in religious and social reforms

1. **Regional concentration**: Arya Samaj's influence was largely confined to **northern and western India**, limiting its reach.

- **Eg:** Minimal presence in southern and northeastern regions.

2. **Communal tensions from Shuddhi Movement**: The **reconversion campaigns** occasionally escalated inter-religious tensions.
    - **Eg:** The **Malabar riots (1921)** highlighted resistance to such efforts.
3. **Excessive focus on Vedic revival**: Its emphasis on returning to **Vedic traditions** overlooked the evolution of Hinduism in later periods.
    - **Eg:** Critics like **Rabindranath Tagore** emphasized a broader understanding of Hinduism.
4. **Neglect of inclusivity**: Arya Samaj's reforms did not adequately address the plight of **marginalized communities**, especially Dalits.
    - **Eg:** Limited focus on issues faced by **Dalit women**.
5. **Rigid ideological stance**: Its strong opposition to **idol worship** alienated traditional Hindus, limiting its mass appeal.
    - **Eg:** Orthodox groups like **Sanatan Dharma Sabha** resisted Arya Samaj initiatives.

Conclusion

The **Arya Samaj significantly contributed** to India's **religious and social renaissance**, advocating education, rationalism, and equality. Despite its regional and ideological limitations, its efforts laid the foundation for progressive reforms. To address contemporary challenges, Arya Samaj's principles must evolve to foster **greater inclusivity and adaptability**.

Q.Examine the legacy of Jyotiba Phule in shaping India's socio-political landscape. How have his ideas influenced subsequent reform movements?

Introduction

Jyotiba Phule, a revolutionary reformer, challenged **caste oppression, gender inequality,** and religious orthodoxy in 19th-century India. His visionary ideas shaped early **anti-caste and social equality movements** that influenced India's fight for independence.

Body

Legacy of Jyotiba Phule in shaping India's socio-political landscape

1. **Education for marginalized communities**: Phule emphasized **universal education** for Dalits and women to counter caste hegemony.
    - **Eg**: Established the **first girls' school in Pune (1848)** with **Savitribai Phule**.
2. **Formation of Satyashodhak Samaj**: The organization (1873) promoted **equality and social justice**, rejecting caste-based discrimination.
    - **Eg**: Encouraged Dalits to perform rituals without **Brahmin priests**.
3. **Critique of Brahmanical patriarchy**: He exposed oppressive **religious structures** that justified caste and gender inequality.

    - **Eg**: Authored **"Gulamgiri" (1873)** comparing caste-based exploitation to slavery.
4. **Focus on gender equality**: He campaigned against **child marriage, sati,** and widow exploitation, advocating for **women's rights**.
    - **Eg**: Opened shelters for **widows** and **rape victims** alongside Savitribai Phule.
5. **Economic empowerment of lower castes**: He stressed **agrarian reforms** and economic justice to challenge caste-based oppression.
    - **Eg**: His advocacy influenced later movements for **land redistribution** and **tenant rights**.
6. **Simplification of rituals**: Phule proposed **inclusive ceremonies** that excluded Brahmanical dominance.
    - **Eg**: Introduced **"sarvajanik satyadharma puja"** to foster equality.
7. **Questioning religious orthodoxy**: Phule challenged scriptures legitimizing caste oppression, encouraging **rational inquiry**.
    - **Eg**: Critiqued **Manusmriti** for its caste-based doctrines.
8. **Building a Bahujan identity**: Phule united **Dalits, OBCs,** and other oppressed groups under a collective **Bahujan identity**.
    - **Eg**: His ideals inspired the early **non-Brahmin movements**.

Influence of Phule's ideas on reform movements till the independence era

1. **Influence on Mahatma Gandhi's anti-caste campaigns**: Gandhi's focus on **uplifting Harijans (Dalits)** and his idea of **basic education** echoed Phule's emphasis on equality through education.
    - **Eg**: Gandhi adopted practices like **cleaning toilets** to challenge caste hierarchies.
2. **Impact on Dr. B.R. Ambedkar**: Ambedkar drew extensively from Phule's principles of **education and caste annihilation** to develop his own anti-caste movement.
    - **Eg**: Ambedkar regarded Phule as his **"guru"** and often referred to his works in his speeches.
3. **Justice Party in Tamil Nadu**: Phule's ideology inspired the **Justice Party (1916)**, which fought for **non-Brahmin representation** in administration and education.
    - **Eg**: Introduced **reservation policies** in Madras Presidency for marginalized castes.
4. **Self-Respect Movement**: Periyar's campaign against Brahmin dominance in Tamil Nadu drew from Phule's **anti-Brahmanical stance**.
    - **Eg**: Advocated for **inter-caste marriages** and widow remarriage.
5. **Dalit consciousness in the freedom struggle**: Phule's ideas inspired **Dalit leaders** to assert their rights during the independence movement.
    - **Eg**: Movements like the **Depressed Classes Conference (1920s)** focused on **social reforms** alongside political independence.
6. **Peasant movements and economic justice**: Phule's focus on **agrarian equality** influenced movements like the **Kisan Sabha Movement (1936)** during the independence struggle.

- **Eg**: Tenant farmers in **Bihar** and **Bengal** took inspiration from his vision for economic reforms.

7. **Advocacy for equality in Congress movements**: Leaders like **Pandita Ramabai** and early Congress social reformers adopted Phule's focus on **women's education** and **caste equality**.
    - **Eg**: Congress's **Harijan upliftment campaigns** in the 1920s reflected his influence.
8. **Impact on early constitutional debates**: Phule's emphasis on **equality and education** became foundational for demands of **social justice** in the 1930s.
    - **Eg**: These demands were discussed in platforms like the **Round Table Conferences**.

Conclusion

Jyotiba Phule's ideas ignited a movement for social justice that intertwined with India's independence struggle. His focus on **education, caste annihilation, and gender equality** provided a roadmap for an egalitarian society, inspiring leaders to envision a free India founded on **inclusion and equity**.

Post-independence consolidation and reorganization within the country.

Q. "Jawaharlal Nehru believed that scientific temper was essential for national progress".Analyze how this belief was reflected in his policies, and discuss its relevance for modern India's scientific aspirations. (15 M)

Introduction

Jawaharlal Nehru envisioned scientific temper as the foundation of a rational, self-sufficient India, essential for national progress and global relevance.

Body

Scientific temper as essential for national progress

Nehru considered scientific temper crucial to dismantling colonial legacies, promoting critical thinking, and enabling India's growth as a self-reliant and progressive nation.

1. **Industrial modernization**: A scientific approach was necessary for industrial growth, reducing dependence on colonial economies.
    - E.g.: **Heavy Industries Committee (1945)** focused on building indigenous industrial capacity.

2. **Nation-building**: Science and rationality were seen as unifying forces, promoting national identity and cohesion.
    - E.g.: **Article 51A(h)** of the Constitution promotes the development of a scientific temper among citizens.
3. **Economic independence**: Scientific advancement was key to agricultural, industrial, and technological self-sufficiency.
    - E.g.: Nehru's support for **scientific agriculture** led to initiatives that paved the way for the Green Revolution.

How this belief was reflected in his policies

1. **Establishment of key institutions**: Nehru founded institutions like the **Indian Institutes of Technology (IITs)** and **Indian Council of Scientific and Industrial Research (CSIR)** to drive innovation and build a skilled workforce.
    - E.g.: **IIT Kharagpur** was established in 1951, setting a model for technical education in India.
2. **Space and nuclear programs**: Nehru's support led to the formation of **Indian Space Research Organisation (ISRO)** and **Atomic Energy Commission (AEC)**, crucial for technological self-reliance.
    - E.g.: **ISRO's Mars Orbiter Mission (2014)** showcases the impact of these foundations on India's space success.
3. **Scientific policy resolution (1958)**: This landmark policy underscored science as central to national development, boosting research funding.
    - E.g.: It spurred support for the **Department of Atomic Energy** and long-term scientific investment.
4. **Promotion of scientific temper**: Nehru's advocacy for rational thinking was embedded in the Constitution (Article 51A(h)), emphasizing secularism and modernity.
    - E.g.: His speeches on **reason and progress** are reflected in recent educational reforms promoting inquiry-based learning.
5. **Agricultural universities**: Recognizing agriculture's role, Nehru established research-based universities to advance farming techniques.
    - E.g.: **Agricultural university at Pantnagar (1960)** pioneered research-led farming practices.
6. **Industrial research**: Nehru promoted industrial research to establish self-reliance in manufacturing and technology.
    - E.g.: **Steel plants in Bhilai and Bokaro** were developed with a vision of technological self-sufficiency.

Relevance for modern India's scientific aspirations

1. **Self-reliance in technology**: Nehru's emphasis on indigenous capability underpins initiatives like **Aatmanirbhar Bharat** for technological independence.

- E.g.: Recent push for **domestic defence production** to reduce imports.

2. **Digital and space advancements**: Nehru's scientific infrastructure supports current ambitions in space and digital sectors.
    - E.g.: **Gaganyaan Mission** under ISRO, planned for human spaceflight by 2024.
3. **Agricultural research resilience**: The early focus on agricultural research remains crucial as climate change challenges India's food security.
    - E.g.: **Millets Mission (2023)** in the International Year of Millets to promote resilient crops (UN-FAO).

4. **Stem education focus**: Inspired by Nehru, current policies prioritize STEM education to foster innovation.
    - E.g.: **National Education Policy (2020)** focuses on critical thinking and scientific inquiry.
5. **Boosting research and development (R&D)**: Modern policies align with Nehru's vision, emphasizing R&D to address India's socio-economic issues.
    - E.g.: **Science and Technology Innovation Policy (STIP 2020)** aims to raise R&D spending to 2% of GDP.
6. **Strengthening fundamental duties**: Nehru's inclusion of scientific temper in Fundamental Duties informs present efforts to enhance scientific literacy.
    - E.g.: **Public campaigns** by the Ministry of Science to counter misinformation in society.

Conclusion

Rooted in Nehru's vision, **India's journey toward sustainable, knowledge-driven growth aligns with a global future in science and technology**, positioning India as a leader in innovation.

History of the world will include events from 18th century such as industrial revolution, world wars, redrawal of national boundaries, colonization, decolonization, political philosophies like communism, capitalism, socialism etc.— their forms and effect on the society.

Salient features of Indian Society, Diversity of India.

Q. Discuss the role of tolerance and inclusivity in promoting social harmony within a diverse society. How does the Indian civilization embody these values? (10 M)

Introduction

Tolerance and inclusivity are vital to fostering social harmony, **allowing diverse communities to coexist peacefully** within complex societies like India

Body

Role of tolerance in social harmony

1. **Peaceful coexistence**: tolerance creates an environment where diverse communities can live harmoniously without conflict.
    - **E.g.: Coexistence of multiple religions in Kerala** showcases India's tolerance in action.
2. **Reduces social polarization**: Encourages respect for diverse beliefs, reducing social divides.
    - **E.g.: Article 25 of the Indian Constitution**, which guarantees freedom of religion, reinforces tolerance.
3. **Strengthens democratic principles**: Tolerance upholds freedom of expression and democratic ideals.
    - **E.g.: Mahatma Gandhi's Sarvodaya** emphasized tolerance and inclusiveness in a harmonious society.

Role of inclusivity in social harmony

1. **Integration of marginalized communities**: Inclusivity ensures equal representation, fostering social unity.
    - **E.g.: Reservation policies for SCs, STs, and OBCs encourage educational** and employment opportunities.
2. **Promotes economic stability**: Inclusive development minimizes socio-economic disparities.
    - **E.g.: Skill India Mission (2015) supports marginalized groups**, promoting economic inclusivity.
3. **Reinforces national identity**: Inclusivity in national culture and festivals fosters unity.
    - **E.g.: Celebrations of Diwali, Eid, and Christmas across India** strengthen a shared identity.

Indian civilization as an embodiment of tolerance and inclusivity

1. **Religious pluralism**: Ancient texts like the **Rigveda** embrace the idea of multiple paths to truth-"**Ekam Sat Vipra Bahudha Vadanti.**"

2. **Cultural integration**: Indian history reflects a blend of cultures, like the **Mughal era**, which harmonized Persian and Indian traditions.
3. **Influence of visionary Leaders**: Historical figures like **Ashoka** and **Akbar** promoted tolerance through **Dhamma** and **Din-i-Ilahi**.
4. **Constitutional values**: The **Preamble** of the Indian Constitution enshrines justice, **equality, and fraternity, aligning with India's historical ethos**.

Conclusion

In a globally polarized era, India's values of tolerance and inclusivity strengthen its social **fabric and offer a model of unity in diversity, crucial for building a harmonious and resilient future**.

Role of women and women's organization, population and associated issues, poverty and developmental issues, urbanization, their problems and their remedies.

Q. Examine the social and psychological implications of rising screen time among children in India. How can society and policy interventions address the challenges of screen addiction to promote holistic development? (15 M)

Introduction

With screen time for children in India increasing significantly post-pandemic, concerns about its effects on their social and psychological development are intensifying, prompting a need for balanced interventions.

Body

Social implications of rising screen time

1. **Reduced social interaction**: Excessive screen time decreases face-to-face interactions, hindering social skills development.
    - **E.g.**: A 2024 **NCERT study** found that children with over **3 hours of daily screen time** showed **lower levels of social engagement**.
2. **Weakened family bonds**: Screens often replace family interaction, reducing family cohesion and shared experiences.
    - **E.g.: Families are observed to spend less time on activities** like meals and conversations, impacting emotional connectivity (Indian Academy of Pediatrics, 2023).
3. **Delayed social skills development**: Children increasingly reliant on digital interactions may struggle with in-person social cues and relationships.
    - **E.g.**: **UNICEF** reports that high screen time among adolescents correlates with **delayed emotional regulation**.

4. **Reduced participation in physical activities**: Screen addiction limits time spent in physical activities, leading to sedentary behaviour.
    - **E.g.**: The **Ministry of Health's 2023 report** highlights a 40% decrease in outdoor activities among urban children.

Psychological implications of excessive screen use

1. **Increased anxiety and depression**: High screen time correlates with mental health issues such as anxiety and depression among children.
    - **E.g.**: **Lancet Child and Adolescent Health (2024)** found **a 15% increa**se in **anxiety symptoms** among adolescents with over 4 hours of screen time.
2. **Attention deficit issues**: Prolonged exposure to fast-paced digital content can lead to reduced attention span and concentration levels.
    - **E.g.**: Studies by **AIIMS Delhi (2023)** link excessive screen use to higher ADHD-like symptoms in children.
3. **Sleep disruption**: Screen light exposure affects sleep cycles, leading to insufficient sleep and lower cognitive function.
    - **E.g.**: A **2023 study by the Indian Journal of Pediatrics reported that 60% of children using screens** before bedtime had disturbed sleep patterns.
4. **Impact on self-esteem**: social media use often influences self-esteem, especially in adolescents, due to unrealistic comparisons and cyberbullying.
    - **E.g.**: **NIMHANS (2024)** found that **25% of Indian teens** experience self-esteem issues from excessive social media exposure.

Society and policy interventions to address screen addiction

1. **Parental education programs**: Equip parents with tools to manage children's screen time and promote healthier habits.
    - **E.g.**: **Indian Academy of Paediatrics** recommends workshops for parents on digital management.
2. **School-based digital literacy**: Include digital well-being in curricula to teach responsible screen usage from an early age.
    - **E.g.**: The **Delhi Government** has introduced **digital literacy sessions** in select schools .
3. **Regulated screen time guidelines**: Develop official screen time guidelines based on age and promote them through public campaigns.
    - **E.g.**: **WHO guidelines** suggest screen time restrictions based on developmental stages.

4. **Promotion of physical and social activities**: Encourage outdoor and group activities to balance digital consumption with healthy social interaction.
    - **E.g.**: The **Khelo India** initiative **promotes physical fitness among** children, indirectly reducing screen time.
5. **Incentives for digital detox programs**: Encourage the development of tech-free zones and digital detox programs in schools and communities.
    - **E.g.**: Some schools have started **"Screen-Free Days**" to help children engage in non-digital activities.

Conclusion

Effective management of screen time requires a multi-stakeholder approach involving families, educators, and policymakers. Ensuring a **balanced digital environment will be crucial for the holistic growth** of the next generation, fostering a resilient and well-rounded society.

Q. Examine the major challenges faced by women in digital spaces, especially in the context of AI-generated content? What steps can be taken by tech companies and governments to mitigate this problem? (10 M)

Introduction

The rise of **AI-generated content** has exacerbated the challenges faced by women in digital spaces, leading to new forms of online harassment and privacy violations. This has necessitated urgent action from both **tech companies** and **governments**.

Body

Challenges faced by women in digital spaces, in the context of AI-generated content:

1. **Deepfakes and AI-based manipulation:** AI is being used to create **deepfake videos and images**, targeting women with fabricated content that is often sexual in nature or defamatory.
    - E.g.: **Kamala Harris**, the U.S. Vice President, **faced deepfakes portraying** her in false and damaging contexts during her 2024 presidential run.
2. **Misinformation and disinformation:** AI tools spread **false narratives** or **misogynistic content** designed to undermine women's character and credibility, particularly targeting women in leadership roles.
    - E.g.: **Nikki Haley**, during the Republican primaries, was a victim of **manipulated images and fake news.**
3. **Objectification and sexual harassment:** Women face disproportionate levels of **objectification** and **sexually explicit content** online, amplified by AI's ability to generate realistic fake content.
    - E.g.: The **AI-generated explicit images** of **Italian Prime Minister Giorgia Meloni** circulated widely on social media.

4. **Violation of privacy rights:** AI-generated deepfakes and altered images violate women's privacy, often resulting in significant reputational damage and mental distress.
    - E.g.: **Rumin Farhana**, a Bangladeshi politician, was targeted with deepfake content ahead of elections.

Steps to mitigate the problem by tech companies and governments:

Tech Companies:

1. **Enhanced content moderation:** Companies must invest in **advanced AI detection systems** to flag and remove harmful content proactively before it is widely circulated, with **human oversight** to prevent errors.
    - E.g.: **Meta** (Facebook) **recently announced AI tools to combat deepfakes**, but their implementation remains inconsistent.
2. **Transparency and accountability:** Platforms should provide **clear accountability measures** and report how they handle flagged content, with **transparent audits** of their moderation policies.
    - E.g.: **EU's Digital Services Act (2022)** mandates digital platforms to report content moderation actions.
3. **Ethical AI development:** Tech companies need to ensure that **algorithms** are designed in a way that reduces gender bias and prevents misuse of AI tools for harmful purposes.
    - E.g.: **Google's AI Principles** highlight **responsible use of AI,** but more implementation is needed.

Government Measures:

1. **Stronger legal frameworks:** Governments should implement and enforce **data protection laws** and create specific legal provisions to address AI-generated content abuses, including **deepfake-specific laws**.
    - E.g.: India's **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules 2021** provides a framework for content moderation but lacks stringent AI-specific rules.
2. **AI ethics regulation:** Governments must establish **AI ethics boards** and frameworks that mandate ethical AI development, focusing on preventing gender-based discrimination.
    - E.g.: The **EU's Artificial Intelligence Act** aims to **regulate high-risk AI systems**, particularly in media and surveillance.
3. **Cybersecurity education and awareness:** Governments should initiate **public awareness campaigns** on identifying and reporting deepfake content, especially aimed at vulnerable groups.
    - E.g.: **India's National Cyber Crime Reporting Portal** facilitates easy **reporting of cybercrimes** including those involving AI-generated content.

4. **Fines and penalties:** Tech companies should be held accountable through **monetary penalties** for failing to remove harmful content within stipulated time frames.
    - E.g.: **GDPR in the EU allows for hefty fines** on companies that fail to protect users from data misuse.

Conclusion

A proactive, **multilateral approach** between governments, tech firms, and civil society will ensure the creation of safer digital spaces for women, fostering **ethical AI development** and stronger **online protections**.

Q. "Informal settlements are particularly vulnerable to climate change impacts". Discuss the socio-economic factors that contribute to this vulnerability and suggest ways to address them. (15 M)

Introduction

Informal settlements, characterized by inadequate infrastructure and high population density, are **highly vulnerable to climate change impacts**. With over a billion people living in these areas, they are disproportionately affected by extreme weather events like floods, heatwaves, and storms.

Body

Vulnerability of informal settlements to climate change

1. **Lack of resilient infrastructure**: Informal settlements lack proper drainage, strong building materials, and waste management systems, increasing their vulnerability to extreme weather.
    - **E.g.:** In 2023, heavy rains in **Kampala, Uganda**, led to severe flooding in informal areas, exacerbated by poor drainage and infrastructure.
2. **Location in high-risk zones**: Informal settlements are often situated in environmentally vulnerable areas like floodplains, hillsides, and coastal areas, which face heightened climate risks.
    - **E.g.: Rio de Janeiro's favelas** frequently suffer landslides during the rainy season due to their hillside locations, impacting thousands of residents.
3. **Overcrowding and population density**: High-density living conditions increase risk exposure, limiting space for evacuation and worsening disease spread.
    - **E.g.: Mumbai's Dharavi**, one of the world's densest slums, faced heightened COVID-19 and monsoon challenges due to overcrowded conditions.

Socio-economic factors contributing to vulnerability

1. **Low income and poverty**: Residents have limited income to invest in climate-resilient housing or resources, restricting their adaptive capacity.
    - **E.g.:** According to the **World Bank**, over 60% of informal settlement dwellers in **Sub-Saharan Africa** live below the poverty line, leaving them highly exposed to climate risks.

2. **Limited access to health services**: Poor access to healthcare facilities and sanitation worsens the impacts of climate-induced diseases, especially after extreme events.
    - **E.g.: Dhaka's slums** face annual dengue outbreaks due to stagnant water post-monsoon, with limited health infrastructure exacerbating disease spread.
3. **Unregulated urban growth**: Rapid and unplanned urbanization leads to a lack of basic services like clean water and sanitation, heightening vulnerability.
    - **E.g.:** In **Kenya's Kibera**, unplanned growth has overwhelmed sanitation systems, leading to frequent health crises after flooding events.
4. **Social inequality**: Vulnerable groups, including women, elderly, and children, are more exposed to risks in these settings.
    - **E.g.: UN Women** reports that women in **Manila's informal areas** are more affected by typhoon aftermaths due to limited access to resources and safe spaces.
5. **Lack of legal tenure**: Without property rights, residents are often hesitant to invest in durable infrastructure, making homes more vulnerable.
    - **E.g.: Rio de Janeiro's favelas** see low investment in housing improvement due to the absence of land tenure, increasing risk of structural damage.

Ways to address the vulnerability

1. **Upgrading infrastructure**: Improve basic infrastructure, such as drainage, sanitation, and solid waste management, in informal settlements.
    - **E.g.:** The **Mumbai Climate Action Plan (2022)** includes upgrades to stormwater drainage in vulnerable slum areas.
2. **Community-based climate resilience programs**: Involve local communities in climate resilience measures, awareness campaigns, and emergency response training.
    - **E.g.: Ahmedabad's Heat Action Plan** involves slum residents in heatwave preparedness, reducing health risks in extreme temperatures.
3. **Affordable, climate-resilient housing**: Promote affordable housing built to withstand climate extremes, reducing exposure to hazards.
    - **E.g.:** The **Ethiopian Integrated Housing Development Program** provides affordable, climate-resilient homes for low-income residents in Addis Ababa.
4. **Inclusive urban planning**: Integrate informal settlements into city planning to ensure access to infrastructure, healthcare, and emergency services.
    - **E.g.: Kigali's Urban Master Plan** in Rwanda integrates informal areas, prioritizing access to sanitation and resilient housing.
5. **Financial support and microfinance**: Offer low-interest loans, subsidies, or microfinance to enable residents to upgrade homes and access emergency resources.
    - **E.g.:** The **Slum Dwellers International (SDI)** provides microfinancing for housing improvements in settlements across Asia and Africa.
6. **Increased investment in climate-resilient infrastructure**: Adequate funding is needed to build resilient urban systems, as the **UN estimates** a shortfall **of $4.5 trillion** per year in global urban climate finance.

Conclusion

Addressing climate vulnerability in informal settlements requires a **multi-dimensional, inclusive approach** that integrates infrastructure, financial support, and community resilience. By prioritizing climate resilience in informal settlements, cities can safeguard vulnerable populations and foster more sustainable urban environments.

Q. "Social media significantly impacts adolescents in contemporary society". Analyze whether imposing age restrictions on social media can effectively protect young individuals or if such measures might lead to unintended consequences. (10 M)

Introduction

Social media's influence on adolescents has raised **serious concerns globally**, with debates on whether age restrictions can effectively address its potential harms or lead to unintended consequences.

Body

Role of social media in adolescents' lives

1. **Social connection**: Facilitates peer interaction and community building, aiding in social skills development.
    - **E.g.**: **Pew Research (2023) found 71% of teenagers** feel more connected through social media.
2. **Self-expression and identity formation**: Provides a platform for youth to explore identities and express themselves freely.
    - **E.g.: UNICEF reports (2022)** show that social media fosters **self-identity among 62% of teens.**
3. **Access to information and skill development**: Enables access to vast educational resources, enhancing digital literacy and skills.
    - **E.g.**: **LinkedIn and Facebook offer workshops on digital skills** for young people.
4. **Support for marginalized communities**: Creates safe spaces for marginalized groups to find support and understanding.
    - **E.g.**: **LGBTQ+ communities' benefit from online peer support** networks, as noted by a 2023 UNICEF study.

Potential benefits of imposing age restrictions

1. **Mental health safeguard**: Reduces exposure to content linked with anxiety, depression, and mental health issues among youth.
    - **E.g.**: **WHO (2022) reports a 20% decrease in mental health** risks in youth with limited social media exposure.
2. **Protection from harmful content**: Limits exposure to inappropriate or dangerous content, reducing risks of negative influences.
    - **E.g.**: **The American Psychological Association (2023**) found that social media use **increases exposure to cyberbullying by 30%.**
3. **Reduction in online exploitation**: Helps curb risks of predatory behavior and exploitation targeting young users.

- **E.g.**: A 2023 report by the National Center for Missing & Exploited Children highlighted a **15% rise in online exploitation cases involving youth.**

4. **Prevention of screen addiction**: Controls excessive screen time, supporting better health and offline engagement.
    - **E.g**.: **South Korea's regulations (2021) on digital media** limit screen addiction among minors.

Unintended consequences of age restrictions

1. **Enforcement challenges**: Age verification systems are often bypassed, making restrictions difficult to enforce.
    - **E.g.: U.K. studies (2022) show 30% of teens bypass** age checks with minimal effort.
2. **Digital literacy gaps**: Age bans can limit digital learning, leaving youth unprepared for responsible online interactions.
    - **E.g.**: **Be Internet Awesome** by Google promotes digital safety, emphasizing education over restrictions.
3. **Reduced social inclusion**: Restricting access can isolate teens, preventing them from engaging in important social dialogues.
    - **E.g.**: **UNICEF (2023) notes social media aids inclusivity**, especially for marginalized groups like LGBTQ+ youth.
4. **Risk of alternative platforms**: Bans on major platforms may push youth toward less regulated, potentially more harmful sites.
    - **E.g.**: In countries with restrictions, **teens have turned to niche platforms** with fewer safety controls, increasing risk exposure.

Way forward

1. **Promote digital literacy and awareness**: Introduce comprehensive digital literacy programs in schools to educate youth on safe online practices.
    - **E.g.**: Finland's **Media Literacy Week** trains students in digital safety and critical thinking.
2. **Encourage parental engagement**: Provide resources to help parents monitor and guide their children's social media usage.
    - **E.g.**: The **2017 Child Online Protection Framework** by ITU emphasizes parental roles in digital guidance.
3. **Implement targeted content control**: Focus on restricting harmful content rather than blanket age restrictions, allowing safe and moderated usage.
    - **E.g.**: France's 2022 selective restrictions on content like gambling and violence protect youth without complete bans.

Conclusion

While age restrictions on social media can offer protection, a balanced approach that **combines digital education, parental involvement, and targeted content regulation is**

more practical in safeguarding adolescents while allowing them to benefit from social media responsibly.

Q. Analyze the challenges posed by the declining Total Fertility Rate (TFR) in India. What measures can be taken to balance demographic trends with sustainable economic growth? (15 M)

Introduction:

India's declining **Total Fertility Rate (TFR)** indicates a shift towards an aging population, impacting the workforce and economic sustainability. This demographic change demands proactive policies to maintain growth and balance.

Body

Declining TFR in India: Key Facts

1. **Rapid decline in TFR**: India's TFR has fallen from **2.6 in 2010 to 1.99 in 2023**, below replacement levels in most states (Source: **NFHS-5**).
2. **Regional variations**: Southern states like **Kerala** and **Tamil Nadu** show TFRs below **1.75**, while a few northern states maintain higher rates.
3. **Urban-rural differences**: Urban areas witness lower fertility rates due to **lifestyle changes**, **economic pressures**, and **career priorities**.
4. **Increased life expectancy**: With **life expectancy** increasing to around **70 years**, the dependency ratio is set to rise, especially in the **elderly population**.

Challenges of declining TFR

1. **Shrinking workforce**: A declining TFR reduces the **working-age population**, impacting productivity and economic growth.
    - **E.g.:** By **2030, India's workforce is expected to decline**, similar to trends in **China** and **Japan**.
2. **Rising dependency ratio**: Lower TFR increases the number of **dependents**, particularly elderly, which strains **healthcare** and **social security systems**.
    - **E.g.: Japan's aging population has led to increased public expenditure** on healthcare.
3. **Potential economic slowdown**: Fewer young workers lead to a slowed economy as **consumer demand** and **innovation** may decline without youth-driven consumption.
    - **E.g.:** Countries in **Europe** have seen slower GDP growth linked to low fertility rates.
4. **Gender and labour force imbalance**: Declining TFR coupled with **low female labor force participation** leads to a limited active workforce.
    - **E.g.:** India's **female labour force participation** rate remains low at around **20%** (Source: **World Bank**).

5. **Social and cultural implications**: With fewer young individuals, **elderly support structures** within families could weaken, shifting the care burden to **public services**.

Measures to balance demographic trends with sustainable growth

1. **Increasing female workforce participation**
    - **Policy support for working women**: Enhanced **maternity leave**, **flexible work arrangements**, and **affordable childcare facilities**.
        - **E.g.: Scandinavian countries** have high female labor force participation due to supportive workplace policies.
    - **Skill development for women**: Initiatives like **Skill India** can offer targeted training for women, increasing employability.
2. **Boosting labor productivity**
    - **Investment in automation and technology**: Industries can adopt **automation** to offset a smaller workforce.
        - **E.g.: Japan** uses **robotics** in manufacturing to counteract its aging population.
    - **Education and skill development**: Focus on **vocational** and **skill training** to build a high-skilled labour force.
        - **E.g.:** The **National Education Policy (NEP) 2020** aims to enhance employable skills in youth.
3. **Social security and healthcare for the elderly**
    - **Universal pension schemes**: Expanding **pension coverage** to all elderly, ensuring economic security in old age.
        - **E.g.:** The **Atal Pension Yojana** provides pension coverage for workers in the informal sector.
    - **Healthcare infrastructure expansion**: Strengthening **geriatric healthcare** and setting up **elder care centers**.
        - **E.g.:** The **National Programme for Health Care of the Elderly (NPHCE)** provides comprehensive care for senior citizens.
4. **Encouraging migration for workforce support**
    - **Internal migration policies**: Promote **urban-rural migration incentives** to balance workforce distribution.
        - **E.g.:** China's **hukou reform** aimed at encouraging rural migration to urban centers.
    - **International migration agreements**: Collaborate with other countries to support skilled Indian migration for **global workforce demand**.
5. **Supporting family-friendly policies**
    - **Incentives for childbearing**: Financial support, **tax breaks**, or **subsidies** for young families to encourage higher fertility.
        - **E.g.: Singapore** offers financial incentives for families with multiple children.
    - **Community-based childcare support**: Providing **affordable and accessible childcare** options to ease the burden on young parents.

        - **E.g.:** Japan's extensive **childcare support systems** have boosted family well-being and birth rates.
6. **Promoting economic diversification**
    - **Developing high-value service sectors**: Focus on sectors like **IT**, **pharmaceuticals**, and **finance** that require fewer workers but generate high productivity.
    - **Rural entrepreneurship and agriculture modernization**: Support **agricultural productivity** and **rural entrepreneurship** to retain a rural workforce.

Conclusion:

India's demographic transition calls for **proactive strategies** to adapt to a declining TFR. With **targeted policies to enhance productivity, labour participation, and social support**, India can leverage its demographic changes for **sustained growth** and **economic resilience**.

Q. Examine the prevalence and impact of violence against marginalized communities, particularly LGBTQIA+ individuals, in urban India. What effective measures can be taken to protect these communities from violence? (15 M).

Introduction

Violence against **marginalized communities** in urban India, especially **LGBTQIA+ individuals**, remains a pervasive challenge. Urbanization and rising visibility have, unfortunately, increased **vulnerability to targeted violence and discrimination** in cities.

Body

Prevalence of violence

1. **High incidence in metropolitan areas:** Urban areas see increased visibility of marginalized groups but also greater instances of **discrimination and violence**.
    - **E.g.:** In a 2024 study by **BMC Public Health**, **78.7% of gay men and 44%** of bisexual men in six cities reported experiencing violence.
2. **Types of violence faced:** Includes **verbal, physical, sexual violence,** and forms of systemic discrimination.
    - **E.g.: Delhi reported the highest prevalence of sexual violence** against men at 44% (Source: BMC Public Health, 2024).
3. **Discrimination due to intersectional identities:** Violence is more prevalent among individuals with intersecting marginalized identities, such as **caste, religion, and income**.

- **E.g.:** The study noted that 84.1% of OBC and 71.6% of SC/ST LGBTQIA+ respondents faced violence.

4. **Legal gaps in protection:** The **Bharatiya Nyaya Sanhita (BNS)** lacks provisions addressing sexual violence against men and transgender individuals, creating a significant legal void.
5. **Societal prejudice and hate crimes:** Persistent **social stigma and hate crimes** contribute to widespread violence against LGBTQIA+ individuals in cities.
    - **E.g.: 2023 NCRB data recorded increasing hate crimes** against LGBTQIA+ individuals, reflecting a need for focused anti-discrimination laws.

Impact of violence

1. **Psychological effects:** High rates of **mental health issues**, including depression and anxiety, arise due to prolonged discrimination.
    - **E.g.:** Studies by **NIMHANS show higher rates of PTSD** among LGBTQIA+ individuals exposed to regular harassment.
2. **Economic and employment discrimination:** Violence and discrimination limit access to **employment opportunities and economic security**.
    - **E.g.:** A **2022 report by Human Rights Watch** highlighted a 50% employment discrimination rate among LGBTQIA+ individuals.
3. **Social exclusion and alienation:** The stigma contributes to **social isolation**, often limiting access to healthcare, housing, and community resources.
    - **E.g.:** According to a **2023 U.N. report**, LGBTQIA+ individuals face 1.5 times higher healthcare discrimination rates.

Effective measures to protect marginalized communities

1. **Inclusive legal frameworks:** Amend laws like the **BNS** to include provisions for male and transgender rape to address these gaps in protection.
    - **E.g.:** The **Justice Verma Committee (2013)** recommended expanding the definition of sexual assault .
2. **Awareness and sensitization programs:** Educate communities and law enforcement on **LGBTQIA+ rights** to reduce stigma and violence.
    - **E.g.:** Initiatives by **Naz Foundation conduct sensitization workshops** for police across India.
3. **Safe reporting mechanisms:** Establish confidential and accessible reporting channels for marginalized groups to report violence safely.
    - **E.g.: Mumbai's "Dial 1919" helpline** offers dedicated support to LGBTQIA+ individuals facing violence.
4. **Supportive public health programs:** Integrate **mental health support** within public health services to address psychological impacts of violence.
    - **E.g.:** The **National Mental Health Programme** has started pilot initiatives for LGBTQIA+ mental health.

5. **Social protection policies:** Develop targeted **employment and housing schemes** for marginalized communities to reduce economic vulnerability.
    - **E.g.: Kerala's LGBTQIA+ Policy (2019)** provides housing and employment support to queer individuals.
6. **School and workplace anti-discrimination policies:** Mandate anti-discrimination policies in **educational institutions and workplaces** to foster inclusive environments.
    - **E.g.: Delhi University's Gender Sensitization Committee** enforces policies to prevent harassment based on gender identity.
7. **Legal aid support services:** Provide dedicated **legal aid** for LGBTQIA+ individuals to ensure access to justice and legal support.
    - **E.g.: Karnataka State Legal Services Authority** recently launched free legal aid clinics for LGBTQIA+ persons.

Conclusion

Protecting marginalized groups in urban India requires **legal reforms, community engagement,** and **collaboration with civil society**. With an inclusive, multi-faceted approach, India can progress towards a society that is safe and supportive for all.

Q. Examine the evolving aspirations of young Indian women in the last decade. How are these aspirations challenging traditional societal structures and norms? (10 M)

Introduction:

The aspirations of young Indian women have seen a transformative shift over the past decade, **reflecting their growing autonomy, education, and participation in the workforce**. This evolution is significantly redefining India's societal landscape.

Body

Evolving aspirations of young Indian women

1. **Higher education and skill development:** Girls now have nearly equal educational attainment as boys, with over **50% of young women completing Class 12 and 26% attaining a college degree** (IHDS, 2022-24).
    - E.g.: **National Sample Survey (2017-18)** highlights rising female enrollment in higher education, with female Gross Enrollment Ratio reaching 27.3%.
2. **Career-oriented goals:** Young women increasingly prioritize professional ambitions, influenced by access to varied career paths and digital skill platforms.
    - E.g.: The **Skill India Mission** and programs like **STEM for Girls India** have spurred young women's involvement in technical fields.

3. **Delayed and selective marriage choices:** The average age at marriage has increased from 18.3 in 2005 to **22 years in 2021** (NFHS-5), with more young women choosing partners based on compatibility.
    - E.g.: **IHDS (2022)** reports 52% of women had a say in partner selection, up from 42% in 2012.
4. **Enhanced financial autonomy:** Many young women are striving for economic independence, particularly through entrepreneurship, due to government support for female-led startups.
    - E.g.: **Women Entrepreneurship Platform (WEP)** by NITI Aayog has fostered a network of over **10,000 female entrepreneurs**.
5. **Increased political and social engagement:** Young women are more politically active, with rising participation in Self-Help Groups (SHGs) and local governance.
    - E.g.: SHG membership among **rural women grew from 10%** in 2012 to **18% in 2022** (IHDS, 2022).

How these aspirations challenge traditional societal structures and norms

1. **Redefining gender roles:** As more women pursue careers, traditional gender expectations within households are changing.
    - E.g.: **MGNREGA** provides equal pay for men and women, influencing rural household dynamics (Economic Survey, 2022-23).
2. **Intra-household decision-making power:** With greater education and income, young women now have more influence in family financial and social decisions.
    - E.g.: The **SHG movement** has empowered rural women to collectively manage household finances.
3. **Changes in marriage norms:** The shift towards later marriages and active participation in partner selection challenges the conventional structure of arranged marriages.
    - E.g.: **NFHS-5 (2019-21)** reports a decline in child marriages and a preference for later unions.
4. **Shift in societal expectations of female mobility:** Increased independence has normalized women's solo travel for education or work, challenging societal restrictions.
    - E.g.: **54% of women** now feel comfortable traveling alone by bus or train, compared to 42% in 2012 (IHDS, 2022).
5. **Demand for equal rights in workforce:** Young women are increasingly vocal about gender equality in professional settings, promoting legal and social reforms.
    - E.g.: **POSH Act (Prevention of Sexual Harassment at Workplace), 2013** has empowered women to address workplace issues effectively.
6. **Increasing participation in governance:** Young women in SHGs and Gram Sabhas are challenging traditional views on women's role in governance.
    - E.g.: **Kerala Kudumbashree Mission** promotes female-led governance, which has inspired similar models across states.

Conclusion

The evolving aspirations of young Indian women are progressively redefining India's social fabric, fostering a society where gender equality and women's agency become the norms. **Ensuring supportive policies can accelerate this shift**, paving the way for an inclusive and empowered future.

Q. "Ragging in educational institutions is a reflection of societal hierarchies and the normalization of bullying". Analyze the socio-cultural roots of ragging in India and suggest measures to address the issue effectively. (15 M)

Introduction

Ragging, often disguised as an initiation ritual, reflects **entrenched societal hierarchies** and the **normalization of power imbalances**. This practice undermines values of equality and dignity, causing lasting harm to students' psychological and social well-being

Body

Ragging as a reflection of societal hierarchies and normalization of bullying

1. **Perpetuation of hierarchies**: Indian society's stratified structures of caste, class, and seniority encourage dominance-based interactions in educational spaces.
    - **Eg. Cases of caste-based ragging** reported in prominent institutions like AIIMS (UGC Report, 2023).
2. **Cultural acceptance of authority**: Ragging is often perceived as a tradition to establish seniority, reflecting societal tolerance for coercive power dynamics.
    - **Eg. Seniors in professional colleges impose** ragging to reinforce a "culture of respect."
3. **Bullying as socialization**: The normalization of bullying as a socialization tool mirrors patterns of initiation rituals in workplaces and communities.
    - **Eg. Studies show 60% of ragging incidents** are justified as "building camaraderie" (NCRB, 2022).
4. **Fear of exclusion**: Peer pressure drives students to comply with or participate in ragging to avoid social ostracization.
    - **Eg. Surveys reveal that 30%** of students fear isolation if they resist ragging (Indian Psychological Society, 2022).

Socio-cultural roots of ragging in India

1. **Historical legacy**: Ragging originated in colonial-era boarding schools where initiation rites fostered hierarchy and discipline.
    - **Eg. Similar practices in military academies** influenced professional college ragging traditions.

2. **Caste and regional prejudices**: Students from marginalized or rural backgrounds are often targeted for their appearance, accent, or social identity.
    - **Eg.** Dalit students face targeted ragging in institutions, as highlighted by the **National Dalit Movement for Justice (2023).**
3. **Gender dynamics**: Ragging often reflects toxic masculinity, where male students are forced to assert their "manliness."
    - **Eg. Sexualized ragging incidents** reported in engineering colleges.
4. **Media glorification**: Films and shows humorously portray ragging as a rite of passage, normalizing such behavior.
    - **Eg. Movies like 3 Idiots and Student of the Year** inadvertently glorify power dynamics.
5. **Lack of institutional accountability**: Weak enforcement of anti-ragging mechanisms emboldens perpetrators.
    - **Eg. A UGC audit (2021) found that 50%** of institutions lacked functional anti-ragging committees.

Measures to address the issue effectively

1. **Strict enforcement of anti-ragging laws**: Ensure compliance with **UGC's 2009 guidelines**, imposing penalties for offenders and negligent institutions.
    - **Eg.** The 24x7 **Ragging Helpline Portal** resolved 95% of reported cases in 2023.
2. **Institutional reforms**: Conduct regular audits of anti-ragging committees, ensure grievance redressal mechanisms, and enforce declarations at admissions.
    - **Eg. IIT Bombay's robust anti-ragging policy** significantly reduced cases.
3. **Counselling and awareness programs**: Organize mental health workshops and anti-ragging awareness campaigns for students and faculty.
    - **Eg**. NIMHANS' mental health interventions in Karnataka colleges.
4. **Promoting positive peer interaction**: Introduce mentorship programs for healthy senior-junior relationships.
    - **Eg. Delhi University's Buddy Program** improved campus dynamics.
5. **Engaging civil society and media**: Collaborate with NGOs for anti-ragging campaigns and regulate media portrayals of ragging.
    - **Eg.** NGO **'SAVE'** actively works on anti-ragging awareness in India.
6. **Technology for surveillance and reporting**: Install CCTV cameras and provide mobile apps for anonymous complaint reporting.
    - **Eg.** UGC's **Anti-Ragging App** facilitates easy reporting and action.
7. **Cultural sensitization workshops**: Conduct inclusion and diversity workshops to promote respect and empathy among students.
    - **Eg. TISS organizes workshops** to foster intercultural understanding in student communities.

Conclusion

Ragging, deeply rooted in societal hierarchies and normalized bullying, poses a significant challenge to equality and inclusivity in educational spaces. A **holistic approach combining legal enforcement, institutional accountability, and cultural transformation** is essential to create safe, supportive learning environments and uphold students' dignity

Q. "Inclusion of Divyangjans is a cornerstone of equitable development". Analyze the challenges faced by Divyangjans in India and critically examine the effectiveness of the Rights of Persons with Disabilities Act, 2016, in addressing these challenges. (15 M)

Introduction

The inclusion of **Divyangjans** is fundamental to equitable development, ensuring their active participation in India's progress. The **Rights of Persons with Disabilities (RPwD) Act, 2016**, serves as a critical framework to address their challenges and promote inclusivity.

Body

Challenges faced by Divyangjans in India

1. **Limited access to education**: Inadequate infrastructure and a lack of trained educators hinder learning opportunities.
    - Eg: Only **61% of disabled children** attend school (UNICEF, 2022).
2. **Barriers to employment**: Workplace discrimination and absence of accommodations reduce job opportunities.
    - Eg: Only **34% of Divyangjans** are in the workforce (Census, 2011).
3. **Healthcare inequities**: Accessibility and affordability of specialized healthcare remain inadequate.
    - Eg: COVID-19 underscored the lack of healthcare facilities for disabled individuals (NCPEDP, 2021).
4. **Physical and digital inaccessibility**: Public spaces and online platforms are not fully accessible.
    - Eg: Only **33% of government buildings** comply with accessibility norms (Sugamya Bharat Abhiyan, 2023).
5. **Social stigma and discrimination**: Stereotypes lead to exclusion from mainstream societal roles.
    - Eg: Divyangjans face bias in employment opportunities (ILO, 2020).

Effectiveness of the Rights of Persons with Disabilities Act, 2016

1. **Expansion of recognized disabilities**: Includes 21 categories, covering mental illness, autism, and rare conditions.
    - Eg: **Acid attack survivors** and **Thalassemia patients** now benefit from the Act.

2. **Enhanced reservation quotas**: Increased reservations in education and jobs from 3% to 4%.
    - Eg: **Delhi University** implements the revised reservation policy for admission.
3. **Focus on accessibility**: Mandates barrier-free infrastructure in public places and transportation.
    - Eg: Accessibility improved at **125 railway stations** under Sugamya Bharat Abhiyan.
4. **Anti-discrimination measures**: Establishes penalties for discriminatory actions and promotes inclusion.
    - Eg: Cases resolved under the Act include **complaints of workplace bias**.
5. **Specialized institutional support**: Sets up bodies like the National Institute of Mental Health Rehabilitation (NIMHR).
    - Eg: **NIMHR in Madhya Pradesh** trains professionals for disability management.

Gaps in implementation

1. **Weak enforcement**: Monitoring mechanisms for ensuring compliance are inadequate.
    - Eg: **State Disability Commissioners** lack sufficient resources (NITI Aayog, 2022).
2. **Limited awareness**: Many Divyangjans remain unaware of their rights and entitlements.
    - Eg: Only **43% of disabled individuals** knew about voting rights (ECI, 2021).
3. **Inadequate funding**: Disability programs receive insufficient financial allocation.
    - Eg: Less than **0.04% of GDP** is allocated to disability welfare (Budget, 2023).
4. **Regional disparities**: Implementation varies across states, leading to uneven benefits.
    - Eg: States like **Kerala** lead in accessibility, while others lag.

What needs to be done

1. **Strengthen monitoring bodies**: Equip State Disability Commissioners with more resources.
2. **Increase funding**: Allocate a larger share of the budget for accessibility and skill development programs.
3. **Enhance awareness**: Conduct grassroots campaigns to educate Divyangjans about their rights.
    - Eg: Use platforms like **All India Radio** for outreach in rural areas.
4. **Leverage assistive technology**: Promote digital tools and devices under the **Accessible India Campaign**.
5. **Adopt best practices**: Learn from Kerala's model of inclusive education and universal design.

Conclusion

The inclusion of Divyangjans is not just a policy imperative but a moral and developmental necessity. Bridging implementation gaps and fostering societal awareness will enable India to transform its **Divyangjan population** into a critical force for achieving **sustainable and inclusive growth**.

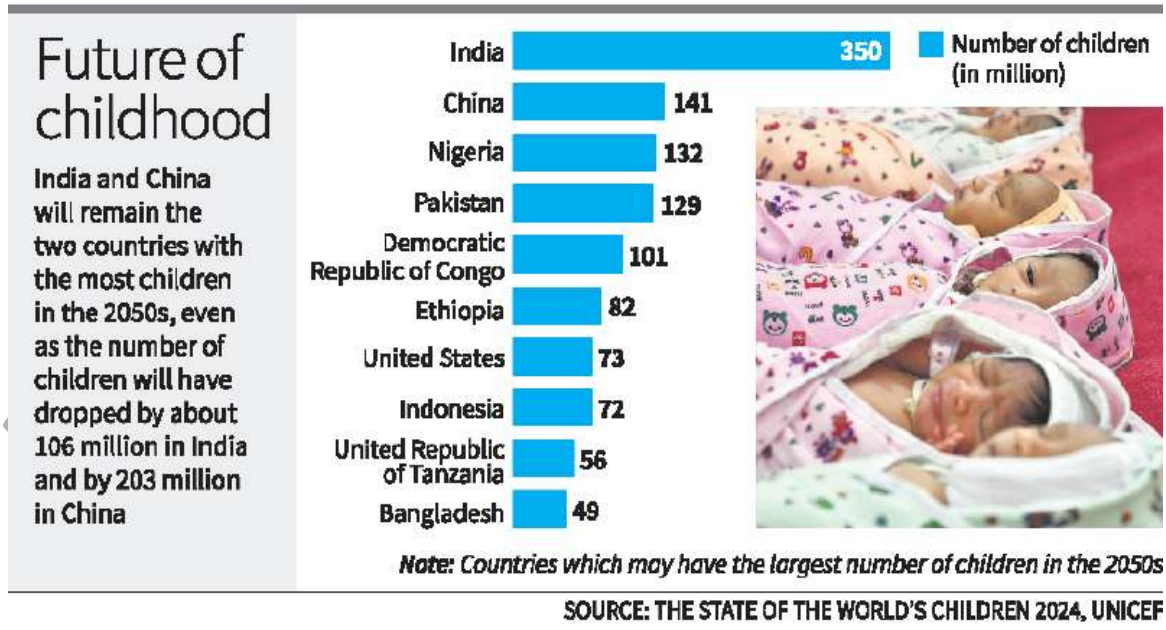
Q. "Regions with the highest child populations are also the least prepared to address climate risks". Discuss this paradox and suggest actionable solutions. (15 M)

Introduction

Regions like **South Asia and Sub-Saharan Africa**, home to the world's largest child populations, face an acute **paradox of vulnerability** where growing child populations coexist with inadequate capacity to mitigate climate risks. Addressing this imbalance is crucial for global sustainability and child welfare.

Body

Paradox: High child populations and inadequate climate risk preparedness



1. **Demographic burden**: Rapid population growth in regions like Sub-Saharan Africa strains resources, limiting investment in climate adaptation.
    - **Eg**: **Nigeria is projected to have over 100 million** children by 2050 but lacks robust climate policies (UNICEF, 2023).
2. **Limited infrastructure**: Poor physical and social infrastructure reduces the ability to respond to climate crises like floods and droughts.

- **Eg**: Only **26% of people in low-income countries** have access to the Internet, hindering disaster response (UNICEF, 2024).

3. **High climate vulnerability**: Developing regions are more prone to climate-induced events like extreme weather, compounding the risks for children.
    - **Eg**: **Mozambique** faces frequent cyclones, displacing children and disrupting basic services (UNEP, 2023).
4. **Weak governance**: Political instability and inadequate policy frameworks undermine climate resilience and long-term planning.
    - **Eg**: **Sudan's governance challenges** have hindered adaptation to desertification and floods.
5. **Poverty and inequality**: Widespread poverty reduces the capacity of families to recover from climate shocks, disproportionately affecting children.
    - **Eg**: In **Bangladesh**, 31% of the population lives below the poverty line, exacerbating post-cyclone recovery (World Bank, 2022).

Impact of the paradox on children

1. **Health vulnerabilities**: Increased exposure to air pollution, malnutrition, and waterborne diseases impacts children's physical development.
    - **Eg**: **Malaria cases** are rising due to mosquito breeding in warmer climates (WHO, 2023).
2. **Educational disruption**: Climate events like floods and droughts lead to school closures and reduced learning opportunities.
    - **Eg**: Since 2022, **400 million students** faced school closures due to extreme weather (UNICEF, 2024).
3. **Psychosocial stress**: Frequent displacement and disasters result in anxiety and trauma in children, affecting their mental well-being.
    - **Eg**: **Cyclone Amphan** in **India and Bangladesh** displaced over **2.4 million** children in 2020 (UNICEF).
4. **Intergenerational poverty**: Limited access to healthcare, education, and secure environments perpetuates cycles of poverty.
    - **Eg**: **Sub-Saharan Africa faces a 40% risk** of children inheriting poverty due to climate impacts (UNDP, 2023).
5. **Migration and exploitation risks**: Climate-induced displacement exposes children to trafficking and exploitation.
    - **Eg**: **Rohingya children** displaced by floods in refugee camps face heightened exploitation risks (UNHCR, 2023).

Actionable solutions to address the paradox

1. **Invest in climate-resilient infrastructure**: Build flood-resistant schools, hospitals, and shelters to safeguard children during disasters.
    - **Eg**: **Bangladesh's Cyclone Shelters Project** integrates schools into cyclone-resilient infrastructure.

2. **Strengthen child-focused policies**: Develop climate adaptation plans prioritizing children's health, education, and safety.
    - **Eg**: **UNICEF's Child Resilience Framework** offers a roadmap for child-centric adaptation strategies.
3. **Expand social protection programs**: Provide direct support like cash transfers and healthcare access to vulnerable families.
    - **Eg**: India's **PM Garib Kalyan Yojana** includes nutritional and educational benefits for children in disaster-prone areas.
4. **Leverage technology for climate education**: Use digital tools to educate children on climate change and disaster preparedness.
    - **Eg**: Kenya's **Shujaaz Platform** uses storytelling to teach youth about climate resilience.
5. **Enhance global cooperation and funding**: Increase international climate finance to support vulnerable regions with high child populations.
    - **Eg**: The **Green Climate Fund** allocates resources for adaptation in developing countries like Ethiopia.

Conclusion

Addressing this paradox demands a **child-centric approach to climate resilience** that **combines investment, innovation, and global collaboration**. As the regions with the largest child populations hold the key to future global stability, prioritizing their well-being is a moral and strategic imperative.

Q. Analyze the unintended social consequences of restrictive child policies, including their effect on marginalized communities. (10 M)

Introduction

Restrictive child policies like the two-child norm, aimed at population control, have had **unintended social consequences**, particularly impacting marginalized communities. These consequences often highlight the gaps between policy intentions and ground realities.

Body

Unintended social consequences of restrictive child policies

1. **Declining sex ratio**: Increased preference for male children has led to **gender-biased sex selection** and a declining sex ratio.
    - **Eg: The sex ratio at birth in Haryana** dropped to **880:1000** between 2003 and 2005 due to pre-natal sex determination.
2. **Rise in illegal practices**: Couples often resort to **concealing births or divorcing partners** to circumvent legal disqualifications under the two-child norm.

- **Eg:** Cases in **Rajasthan and Haryana** where elected representatives disowned children to retain positions (Source: Population Foundation of India).

3. **Child abandonment**: Fear of disqualification has led to the abandonment of additional children, particularly girls, disrupting their social and psychological well-being.
    - **Eg:** Studies by **IIPS (2020) found higher instances** of abandoned girl children in rural areas under restrictive policies.
4. **Impact on women's health**: Policies have increased pressure on women to bear **male children within two pregnancies**, leading to repeated abortions and compromised reproductive health.
    - **Eg: NFHS-5** reported an **increase in unsafe abortions** in states with stringent norms.
5. **Skewed demographic structure**: Declining fertility rates in states like Andhra Pradesh have resulted in **ageing populations**, reducing the working-age group and economic productivity.
    - **Eg: Andhra Pradesh's TFR** indicates long-term workforce challenges

Effects on marginalized communities

1. **Exclusion from political participation**: Marginalized groups with higher fertility rates face **disqualification from local elections**, reducing their representation in governance.
    - **Eg: Women and tribal candidates in Odisha and Chhattisgarh** reported higher disqualifications under the norm.
2. **Increased vulnerability to poverty**: Restrictive policies often deprive marginalized families of **government benefits** if they exceed the child limit.
    - **Eg:** Denial of **ration cards** and welfare schemes to families with more than two children in states like Uttar Pradesh.
3. **Perpetuation of gender inequality**: Marginalized women bear the brunt of these policies, facing **domestic violence or desertion** for failing to meet societal preferences for male heirs.
    - **Eg:** Studies by **NHRC (2022)** indicate a rise in gender-based violence in policy-affected regions.
4. **Disruption of cultural practices**: Indigenous and tribal communities with traditionally large families are forced to **alter cultural norms**, leading to **loss of identity** and social cohesion.
    - **Eg: Tribal groups in Madhya Pradesh** protested against restrictive norms for infringing on their cultural values.
5. **Limited access to reproductive healthcare**: Marginalized communities often lack access to **contraceptives and family planning services**, leading to unsafe practices under restrictive norms.
    - **Eg:** The **NFHS-5** reported a **lower contraceptive prevalence rate** in SC/ST populations compared to the general population.

Conclusion

Restrictive child policies often yield **counterproductive outcomes**, particularly for marginalized communities, highlighting the need for **inclusive, empowerment-based approaches** to population stabilization. Policies must prioritize **education, healthcare, and economic development** over coercive measures to address these challenges effectively.

Q. "India's urban population is projected to double over the next three decades". Discuss the challenges posed by this urban expansion, particularly in terms of infrastructure financing and governance. (15 M)

Introduction

India's urban population is expected **to rise from 400 million to 800 million by 2050**, presenting both immense opportunities and formidable challenges. The key lies in addressing infrastructure deficits and governance inefficiencies to ensure sustainable urban growth.

Body

Challenges posed by urban expansion

1. **Inadequate urban infrastructure**: Urban infrastructure is under severe strain, with increasing gaps in housing, water supply, sanitation, and transport.
    - **Eg**: According to the **World Bank (2023)**, India **requires ₹70 lakh crore** by 2036 for urban infrastructure, while current investments fall short by over 70%.
2. **Limited municipal finances**: Municipal revenues have stagnated at 1% of GDP, limiting cities' ability to finance infrastructure projects.
    - **Eg**: **Fifteenth Finance Commission** highlighted inefficiencies in property tax collection, contributing only **0.15% of GDP**.
3. **Strain on housing and services**: Rising population will increase demand for affordable housing, electricity, and clean water, leading to informal settlements.
    - **Eg**: Over **17% of urban India** resides in slums (Census 2011), a figure projected to grow.
4. **Environmental degradation and climate vulnerability**: Urbanization exacerbates issues like deforestation and urban heat islands, making cities more climate-vulnerable.
    - **Eg**: **IPCC Report (2021)** warns of rising sea levels threatening cities like Mumbai.

Challenges in infrastructure financing

1. **Dependence on state and central transfers**: ULBs rely on external funds for 44% of revenues, reducing financial autonomy.
    - **Eg**: **Fifteenth Finance Commission** allocated ₹1.21 lakh crore for ULBs, but utilization remains low.

2. **Decline in PPP investments**: Public-private partnerships in urban infrastructure have reduced due to low financial viability.
    - **Eg**: **PPP investments fell** from ₹8,353 crore in 2012 to ₹467 crore in 2018.
3. **Poor revenue generation**: Inefficient property tax collection and low cost recovery undermine ULB revenues.
    - **Eg**: **Bengaluru and Jaipur** collect only 5%-20% of potential property tax revenue (World Bank, 2018).
4. **Lack of innovative financing mechanisms**: Instruments like municipal bonds and land value capture remain underutilized.
    - **Eg**: **Municipal bonds raised only ₹3,840 crore** between 2017-2022, far below their potential.

Governance challenges

1. **Weak institutional capacity**: ULBs lack trained personnel and technology for planning and implementation.
    - **Eg**: Only **50% of capital expenditure budgets** were spent in Hyderabad and Chennai (World Bank, 2022).
2. **Fragmented planning and poor coordination**: Multiple agencies managing urban infrastructure create inefficiencies.
    - **Eg**: **Delhi** has over 15 agencies handling water, transport, and sanitation.
3. **Lack of citizen participation**: Absence of community engagement reduces accountability in urban governance.
    - **Eg**: **Limited public involvemen**t in schemes like **AMRUT** has impacted implementation effectiveness.

Way forward

1. **Strengthen municipal finances**: Empower ULBs with financial autonomy through better property tax collection and innovative financing tools like municipal bonds.
    - **Eg**: **Ahmedabad's success with municipal bonds** raised ₹200 crore in 2017 for urban projects.
2. **Adopt integrated planning**: Establish unified command structures for urban governance to enhance coordination.
    - **Eg**: **Creation of a Metropolitan Planning Committee for Mumbai** to ensure cohesive urban development.
3. **Boost PPP models**: Revive public-private partnerships by providing viability gap funding and clear project frameworks.
    - **Eg**: **Viability gap funding** for metro rail projects under the **Smart Cities Mission**.
4. **Leverage digital public infrastructure (DPI)**: Use technology like GIS mapping and real-time monitoring for efficient urban management.
    - **Eg**: **Bhopal Smart City Project uses IoT for waste** and water management.

5. **Focus on capacity building**: Train ULB personnel in modern urban management techniques and enhance administrative efficiency.
    - **Eg**: Capacity-building programs under the **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**.

Conclusion

India's urban expansion provides a unique opportunity to drive inclusive and sustainable development. By addressing financing gaps, strengthening governance, and adopting innovative solutions, Indian cities can emerge as models of resilience and growth for the 21st century.

Q. "Gender-based violence persists as a significant societal issue despite progress in women's education and empowerment". Discuss the root causes and suggest ways to address this issue. (15 M)

Introduction

Despite advancements in education and empowerment, **gender-based violence (GBV)** remains a systemic issue in India, reflecting persistent societal inequalities. According to the **NCRB 2022**, crimes against women rose by **15.3%** compared to 2021, indicating that progress in certain areas has not eradicated violence.

Body

Gender-based violence despite progress in education and empowerment

1. **Rising literacy but limited autonomy**: While women's literacy has reached **77%**, decision-making in households and workplaces remains limited, curtailing true empowerment.
    - **Eg:** Only **25% of women** in rural areas have decision-making power over major purchases.
2. **Economic independence overshadowed by violence**: Working women face harassment at workplaces and at home, discouraging financial autonomy.
    - **Eg:** Cases of sexual harassment reported under the **POSH Act, 2013**, have risen steadily.
3. **Improved awareness but persistent violence**: Awareness campaigns have led to better reporting, yet deep-seated patriarchal attitudes sustain GBV.
    - **Eg: NCRB 2022** recorded over **4.05 lakh cases** of crimes against women, up from 3.5 lakh in 2021.
4. **Urban-rural divide in empowerment**: Rural women face more societal restrictions and gender disparities despite SHG participation.
    - **Eg: 49% of rural women** have no control over their income (**NFHS-5**).

Root causes of gender-based violence

1. **Patriarchal norms**: Gender roles and male dominance perpetuate control over women, making violence a tool of subjugation.
    - **Eg: Honor killings, where societal norms oppose women's autonomy** in marriage, are prevalent in states like Haryana and Uttar Pradesh.
2. **Weak enforcement of laws**: Delays in justice and low conviction rates embolden offenders.
    - **Eg: Conviction rate for rape cases was only 29.8%** in 2021 (**NCRB**).
3. **Economic dependency**: Women dependent on male family members for finances are more vulnerable to abuse.
    - **Eg:** In rural India, women often lack independent access to household income.
4. **Social stigma and underreporting**: Fear of social ostracization leads to unreported cases, leaving many victims without justice.
    - **Eg: 70% of GBV cases remain unreported** due to fear of family backlash (**UN Women**).
5. **Lack of education on gender equality**: Schools and communities fail to address gender sensitization from a young age.
    - **Eg:** Many girls drop out of school due to unsafe environments and societal discouragement.
6. **Digital abuse and cybercrime**: Increased internet usage has led to rising online harassment and cyberstalking.
    - **Eg: NCRB 2022** recorded over **19,000 cases of cybercrimes targeting women**.

Ways to address gender-based violence

1. **Strengthen legal deterrents**: Implement fast-track courts and stricter penalties for GBV cases.
    - **Eg:** The **Justice Verma Committee (2013)** recommended enhanced punishment and speedy trials for rape cases.
2. **Economic empowerment of women**: Promote vocational training, microfinance, and employment schemes to reduce dependency.
    - **Eg:** Programs under the **Deendayal Antyodaya Yojana** have empowered women in rural areas through SHGs.
3. **Community and grassroots awareness**: Grassroots campaigns must focus on engaging men and breaking patriarchal norms.
    - **Eg:** The **Nayi Chetna campaign (2024)** aims to tackle GBV through SHG-led village awareness drives.
4. **Improved education and sensitization**: Introduce gender equality topics in school curricula and train educators to challenge stereotypes.
    - **Eg:** Kerala's **Gender Park Initiative** has been successful in promoting awareness through schools.
5. **Technology-driven solutions**: Expand access to safety apps and digital reporting platforms for women.

- **Eg:** Apps like **Himmat Plus** have improved women's access to timely help in emergencies.

Conclusion

Addressing gender-based violence requires a **multi-pronged approach**, combining legal, economic, and societal reforms. **Empowering women, raising awareness, and ensuring community participation** can pave the way for a safer, more equitable society where women live with dignity and freedom.

Q. "Child marriage is not just a violation of human rights but a significant impediment to the empowerment of women". Discuss the multi-dimensional approach needed to address this practice effectively. (15 M)

Introduction

Child marriage not only violates the **human rights of girls** but also undermines their access to education, health, and economic opportunities, perpetuating cycles of gender inequality and poverty.

Body

Child marriage-A violation of human rights and an impediment to empowerment

1. **Denial of education**: It disrupts the education of girls, limiting their potential for self-reliance and economic participation.
    - **Eg**: According to **UNICEF (2023)**, 60% of child brides in India drop out of school.
2. **Health risks**: Early pregnancies lead to higher maternal mortality rates and poor health outcomes.
    - **Eg**: India's **maternal mortality rate (MMR)** is 103 per 1,00,000 live births (SRS 2022), with child brides contributing significantly.
3. **Intergenerational poverty**: Child marriage perpetuates poverty cycles as uneducated mothers are less likely to invest in their children's futures.
    - **Eg**: The **World Bank (2023)** links child marriage to an 8% reduction in GDP in low- and middle-income countries.
4. **Violation of agency and choice**: It denies women their right to choose their partner or pursue personal goals.
    - **Eg**: The **National Family Health Survey (NFHS-5)** reports that 23% of Indian women aged 20–24 were married before 18.
5. **Gender-based violence and abuse**: Child brides are more vulnerable to domestic violence, sexual abuse, and exploitation, perpetuating cycles of trauma.
    - **Eg**: **UN Women (2023)** highlighted that child brides face **70% higher rates of intimate partner violence** than women married as adults.

Multi-dimensional approach to address child marriage effectively

A. Legal interventions

1. **Strengthening laws**: Strict implementation of **Prohibition of Child Marriage Act, 2006**, and raising the legal marriage age to 21.
    - **Eg**: Rajasthan registered **4,000 cases of child marriage prevention** in 2023 due to improved enforcement mechanisms.
2. **Effective reporting mechanisms**: Promote platforms like the **Child Marriage Free Bharat Portal** for easy reporting and tracking.

B. Educational and awareness initiatives

3. **Promoting education**: Ensure universal access to secondary education for girls, reducing dropout rates.
    - **Eg**: The **Beti Bachao Beti Padhao** campaign has increased girls' enrollment in secondary schools by **14% (PIB, 2023)**.
4. **Behavioural change programs**: Community-based awareness campaigns to challenge cultural acceptance of child marriage.
    - **Eg**: UNICEF's **'Kishori Shakti Yojana'** has empowered adolescent girls with life skills training.

C. Economic empowerment

5. **Skill development**: Provide vocational training and entrepreneurship opportunities for young girls to enhance economic independence.
    - **Eg**: The **National Rural Livelihood Mission (NRLM)** has trained **10 lakh women in 2023**, improving financial autonomy.
6. **Conditional cash transfer schemes**: Incentivize delayed marriages through programs like **'Apni Beti Apna Dhan'** in Haryana.

D. Community and societal engagement

7. **Role of local governance**: Involve **Panchayati Raj institutions** in preventing child marriages through active monitoring.
    - **Eg**: The **Karnataka Gram Panchayat Child Marriage Monitoring Committees** have significantly reduced cases in rural areas.
8. **Civil society partnerships**: Collaborate with NGOs for grassroots-level advocacy.
    - **Eg**: **Girls Not Brides**, an international network, works extensively in India for community-level interventions.

E. Technology and digital platforms

9. **Leveraging digital tools**: Use portals like **Child Marriage Free Bharat** to streamline awareness and reporting.

- **Eg**: Rajasthan launched a **digital helpline in 2024**, receiving over **5,000 reports** within a year.

10. **Data-driven policymaking**: Use AI and data analytics to identify vulnerable regions and allocate resources effectively.

Conclusion

Eliminating child marriage requires a **convergence of legal, educational, and societal efforts**, underpinned by innovative solutions and political will. By empowering girls through education and opportunities, India can truly realize the vision of a **Viksit Bharat by 2047**, ensuring a future of equality and dignity for all.

Q. How does the Urban Infrastructure Development Fund aim to enhance urban infrastructure in smaller cities? Analyze its potential impact on local governance and basic service delivery. (10 M)

Introduction

Urbanization in Tier 2 and Tier 3 cities faces significant challenges due to inadequate infrastructure and financing. The Urban Infrastructure Development Fund (UIDF), provides a stable funding mechanism to bridge this gap and improve basic urban services.

Body

Role of UIDF in enhancing urban infrastructure

1. **Stable financing for infrastructure**: Uses **priority sector lending shortfalls** to ensure a predictable fund for infrastructure projects.
    - **Eg**: UIDF's outlay of **Rs. 2,481 crore** (till **2025-26**) targets projects like **sewerage** and **stormwater drainage**.
2. **Targeted focus on smaller cities**: Prioritizes **Tier 2 and Tier 3 cities** where urban infrastructure deficits are most acute.
    - **Eg**: **Municipal Corporations** and **Urban Local Bodies (ULBs)** are the key implementing agencies.
3. **Basic service improvement**: Supports critical infrastructure like **water supply, sanitation, and solid waste management**.
    - **Eg**: Improved **water distribution systems** in smaller towns under UIDF can reduce inequity in access.
4. **Capacity building of ULBs**: Aims to empower **urban local bodies** by enabling better planning, execution, and resource utilization.
    - **Eg**: Convergence with **smart city initiatives** to train municipal staff.

Potential impact on local governance

1. **Empowering ULBs**: Encourages **decentralized planning and execution** by local governments.
    - **Eg**: States like **Rajasthan** have leveraged UIDF to fund **ULB-driven solid waste projects**.
2. **Increased accountability**: Monitoring mechanisms like **real-time geo-tagging** improve transparency and reduce fund misuse.
    - **Eg**: UIDF projects are tracked through the **National Housing Bank** portal.
3. **Public-private collaboration**: Creates opportunities for **PPP models**, ensuring efficient service delivery.
    - **Eg**: Integrated **waste management systems** in **Gujarat** under similar frameworks.

Potential impact on basic service delivery

1. **Enhanced quality of life**: Improved **sewerage and water supply systems** directly impact health and living standards.
    - **Eg**: UIDF funding for **stormwater drains** in coastal cities can mitigate **urban flooding risks**.
2. **Economic growth**: Better infrastructure attracts **investments** and promotes small businesses.
    - **Eg**: Towns in **Tamil Nadu** with improved water infrastructure have seen higher **industrial activity**.
3. **Environmental sustainability**: Focuses on **eco-friendly urban solutions** like solid waste management and water recycling.
    - **Eg**: Solid waste **composting projects** under UIDF in **Kerala** improve waste reuse.

Conclusion

The UIDF is a pivotal initiative to bridge urban infrastructure gaps in smaller cities. **With effective implementation and capacity building of ULBs,** it can ensure inclusive urban development while laying the foundation for climate-resilient and economically vibrant cities.

Effects of globalization on Indian society.

Q. "Globalisation has brought with it rapid lifestyle changes that have reshaped health outcomes in India". Critically analyze the link between globalisation and the increase in non-communicable diseases. (15 M)

Introduction

Globalisation **has transformed economies, but it has also reshaped lifestyles,** significantly impacting health outcomes in India. The rapid rise in **non-communicable diseases (NCDs)** is a testament to the complex influence of globalisation on public health.

Body

Globalisation and rapid lifestyle changes

1. **Dietary shifts**: Increased availability of processed foods high in sugar and fats due to multinational food corporations.
    - E.g.: **Growth of fast-food chains** in India has led to a sharp rise in calorie-dense food consumption (Source: NFHS-5).
2. **Sedentary lifestyle**: Shift from traditional to office-based jobs, reducing physical activity levels.
    - E.g.: **Urban areas have seen** a **27% increase** in sedentary jobs since 2010 (World Bank, 2022).
3. **Increased work stress**: Globalised work culture promotes long hours and night shifts, affecting physical and mental health.
    - E.g.: **IT sector workers report high levels** of **stress and sleep disorders** due to night shifts (Indian Council of Medical Research, 2021).
4. **Rise in tobacco and alcohol consumption**: Global marketing has increased consumption of tobacco and alcohol among youth.
    - E.g.: **India saw a 30% rise in alcohol consumption** among youth between 2015-2020 (WHO Global Status Report on Alcohol and Health, 2022).

Link between globalisation and the increase in non-communicable diseases

1. **Obesity and diabetes**: Western diets high in refined sugars have led to a surge in obesity and diabetes.
    - E.g.: **Diabetes prevalence in India** has reached **17.5%** among adults, especially in urban areas (IDF Diabetes Atlas, 2023).
2. **Cardiovascular diseases (CVDs)**: Sedentary lifestyles, poor diets, and stress increase the risk of heart diseases.
    - E.g.: **CVDs now cause 30% of all deaths in** India, with urban populations at greater risk (Global Burden of Disease Report, 2022).
3. **Mental health issues**: Work-related stress, isolation, and societal pressure increase anxiety and depression.

- E.g.: **Mental health disorders affect 1 in 7 Indians**, worsened by lifestyle changes due to globalisation (Lancet Report, 2021).

4. **Hypertension**: High salt intake and stress contribute to rising hypertension levels.
    - E.g.: **Hypertension now affects 28% of adults** in India, with low awareness and control rates (NFHS-5).
5. **Increased urbanization and pollution**: Rapid urbanization has led to air pollution, contributing to respiratory and cardiovascular diseases.
    - E.g.: **Delhi and Mumbai** consistently rank among the most polluted cities globally (IQAir 2023).

Positive impact of globalisation on health

1. **Improved access to healthcare**: Globalisation has led to better healthcare infrastructure and treatments, improving life expectancy.
    - E.g**.: India's life expectancy** rose to **70.2 years** in 2022, partly due to medical advancements (WHO).
2. **Increased health awareness**: Global media and campaigns have raised awareness of health issues, promoting preventive care.
    - E.g.: **WHO's "25 by 25" global NCD** reduction campaign emphasizes lifestyle changes and health screening.
3. **Advancements in telemedicine**: Telemedicine has enabled wider access to medical services, especially in rural areas.
    - E.g.: **eSanjeevani**, India's national telemedicine service, has provided over 10 million consultations (Ministry of Health, 2023).
4. **Promotes physical activity awareness**: Global fitness trends have raised awareness about the importance of physical activity, leading to increased participation in fitness activities.
    - E.g.: India's **fitness industry grew by 20%** in the past decade, with increasing numbers joining gyms, yoga, and wellness programs (ASSOCHAM, 2022).

Conclusion

To curb the growing health burden of NCDs, India must balance globalisation's benefits with proactive public health measures, such as **lifestyle education, preventive healthcare, and stronger regulations** on unhealthy foods and work conditions. This integrated approach can help India leverage globalisation while safeguarding public health.

Q. Examine how the flexibility provided by work-from-home (WFH) has influenced societal patterns such as housing preferences and family dynamics in India. (10 M)

Introduction

The adoption of **work-from-home (WFH)** post-COVID-19 has transformed societal patterns, particularly influencing housing choices and family relationships in India, reflecting both opportunities and challenges.

Body

Impact on housing preferences

1. **Shift to suburban and rural areas**: WFH has allowed people to move away from urban centers to peripheral or rural areas for affordability and better living conditions.
    - **Eg.**: Knight Frank India (2023) reported a **15% rise in suburban housing demand** post-pandemic.
2. **Demand for larger homes**: Families now prefer homes with additional rooms or workspaces to support remote work needs.
    - **Eg.**: Real estate developers in Bengaluru and Pune noted a surge in **3-BHK and work-friendly designs** (JLL India, 2024).
3. **Stabilization of urban rental markets**: Reduced need for proximity to workplaces has moderated rental costs in major cities.
    - **Eg.**: Rental prices in **Mumbai suburbs dropped by 10% in 2023**.
4. **Emergence of co-living spaces**: Professionals, especially millennials, have shown preference for WFH-friendly co-living arrangements with shared amenities.
    - **Eg.**: **Stanza Living** recorded a **20% rise in co-living demand** in Tier-1 cities (2024).
5. **Reverse migration to Tier-2 cities**: Employees relocating to hometowns have fueled growth in smaller cities' housing markets.
    - **Eg.**: **NASSCOM (2023)** reports a **30% rise in reverse migration** to cities like Jaipur and Indore.

Impact on family dynamics

1. **Strengthened familial bonds**: More time at home has improved family relationships and involvement in daily routines.
    - **Eg.**: **CII-FMS survey (2024)** shows 68% of respondents reporting improved family engagement.
2. **Blurred work-life boundaries**: Lack of physical separation between work and personal life has increased stress and conflicts.
    - **Eg.**: A **LinkedIn India survey (2023)** found 62% of employees reporting higher work-life imbalance during WFH.
3. **Shifting gender roles**: WFH has encouraged men to take on more domestic responsibilities, challenging traditional gender norms.
    - **Eg.**: **UN Women India (2023)** reported **28% of men participating more in household chores** post-WFH adoption.
4. **Educational impact on children**: Parents working from home contribute more to children's academics, though juggling work and parenting remains difficult.

- **Eg.**: **ORF (2023) noted increased parental involvement** in education during remote work.

5. **Reduced viability of joint families**: Increased demand for privacy and dedicated workspaces has created logistical and emotional tensions in joint households.
    - **Eg.**: **Anecdotal reports from urban areas** suggest rising preference for nuclear setups .

Conclusion

The flexibility of WFH has reshaped societal patterns by creating opportunities for **affordable housing** and **family bonding**, while also exposing challenges like stress and work-life imbalance. Policies supporting **better urban planning** and **workplace flexibility frameworks** are critical to leveraging WFH's full potential.

Social empowerment, communalism, regionalism & secularism.

Salient features of world's physical geography.

Q. How do the unique characteristics of ice giants like Uranus and Neptune challenge our current understanding of planetary science? Discuss. (10 M)

Introduction

Ice giants like **Uranus and Neptune** exhibit unique features such as unusual magnetic fields, potential subsurface oceans, and extreme atmospheric conditions, which challenge traditional models of planetary formation and evolution.

Body

Unique characteristics of ice giants like Uranus and Neptune

1. **Non-dipolar magnetic fields**: Their magnetic fields are tilted and offset from the planet's center, indicating complex internal structures.
    - **Eg**: NASA's **Voyager 2 (1986)** found Uranus's magnetic field tilted by **59 degrees** and significantly offset.
2. **Potential subsurface oceans**: Recent studies suggest hidden oceans of supercritical fluids like water and ammonia beneath their icy mantles.

- **Eg**: **Proceedings of the National Academy of Sciences (2024)** highlighted subsurface oceans explaining magnetic anomalies.

3. **Unusual axial tilt**: Uranus's tilt at **98 degrees** causes extreme seasonal variations and distinct climatic behaviors.
    - **Eg**: Uranus experiences **42 years of sunlight** at one pole followed by **42 years of darkness**.
4. **High methane concentration**: Methane absorbs red light, giving the planets their blue hue and driving unique weather patterns.
    - **Eg**: Neptune's **Great Dark Spot (1989)** demonstrated extreme winds over **2,000 km/h**.
5. **Extreme internal pressure**: High pressures create exotic ices and unusual compounds like superionic water.
    - **Eg**: The **diamond rain hypothesis** suggests methane turning into diamonds under intense pressure.

Challenges to current understanding of planetary science

1. **Incomplete models of planetary formation**: Their compositions challenge the **solar nebula theory**, which predicted gas giants dominating icy regions.
    - **Eg**: The **Nice Model (2005)** was revised to explain their distant orbits.
2. **Gaps in understanding magnetic field generation**: Offset magnetic fields suggest unconventional **dynamo processes** in their interiors.
    - **Eg**: Uranus's field likely originates from an ionic fluid layer, not the core dynamo.
3. **Diverse planetary evolution**: Their unique features indicate dynamic histories, possibly involving collisions or perturbations.
    - **Eg**: The **large impact hypothesis** explains Uranus's tilt and reduced internal heat.
4. **Limited exploration**: Most current knowledge relies on data from **Voyager 2 (1986)**, highlighting the need for more missions.
    - **Eg**: NASA's proposed **Uranus Orbiter and Probe Mission (2031)** aims to address these gaps.
5. **Astrobiological potential**: Subsurface oceans could support extremophile-like life forms, challenging assumptions about habitability.
    - **Eg**: On Earth, **hydrothermal vents** harbour life despite harsh conditions.

Conclusion

The peculiarities of Uranus and Neptune challenge our planetary science paradigms, offering opportunities to refine existing theories. Future missions like NASA's **Uranus Orbiter and Probe** will be crucial for unravelling these mysteries and enhancing our understanding of similar exoplanetary systems.

Distribution of key natural resources across the world (including South Asia and the Indian sub-continent); factors responsible for the location of primary, secondary, and tertiary sector industries in various parts of the world (including India).

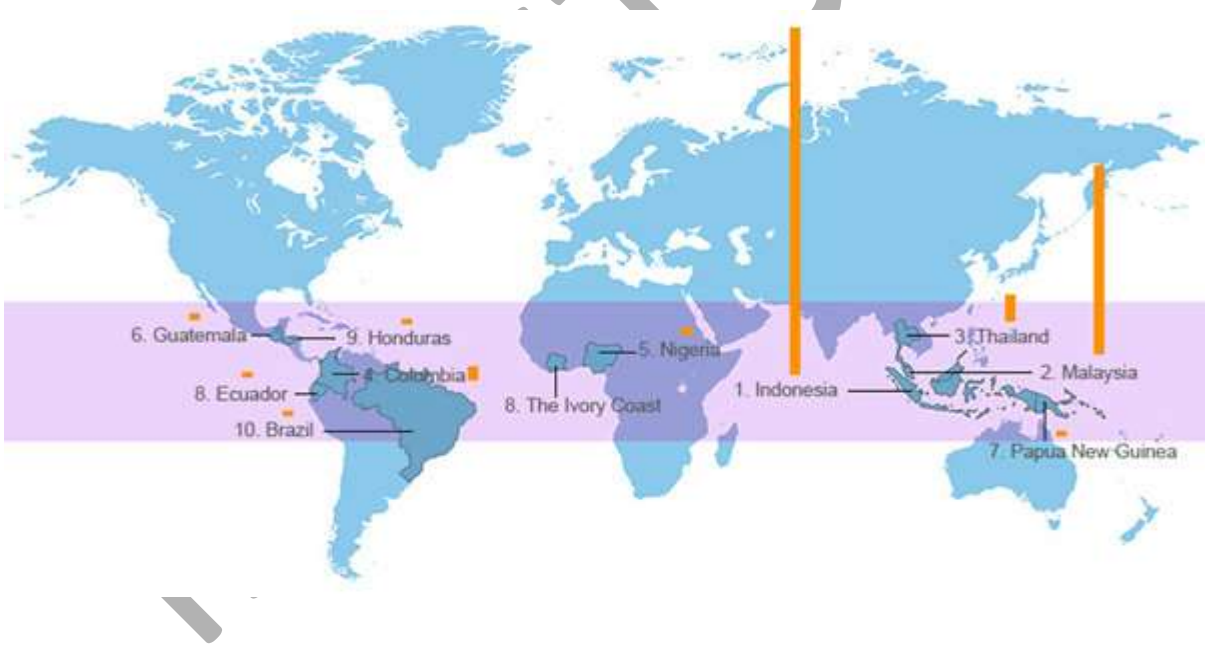
Q. Examine the geographical distribution of palm oil production globally, highlighting the factors responsible for its concentration in specific regions. (10 M)

Introduction

Palm oil, a key global agricultural commodity, is **primarily produced in tropical regions due to its climate requirements.** This concentration has significant implications for economic growth and environmental conservation.

Body

Geographical Distribution of Palm Oil Production



1. **Southeast Asia**: **Indonesia** and **Malaysia** dominate global production, accounting for approximately **85%** of the world's palm oil due to favorable tropical climates and government support.
    - **E.g.:** According to the **USDA (2023)**, Indonesia alone contributes nearly **60%** of global palm oil production.
2. **Africa**: Countries like **Nigeria, Ghana, and Côte d'Ivoire** are increasing production, leveraging the oil palm's origins in West Africa and suitable environmental conditions.
    - **E.g.: Nigeria is the largest producer in Africa**, producing around **1 million metric tons** in 2022 (FAO).

3. **Latin America**: **Colombia** and **Brazil** are emerging producers, focusing on expanding palm oil cultivation to diversify agricultural output and increase exports.
    - **E.g.: Colombia's production** exceeded **1.6 million metric tons** in 2022, positioning it as the largest producer in Latin America.

Factors responsible for concentration in specific regions

1. **Tropical climate requirements**: Palm oil thrives in regions with high rainfall and temperatures between 24-32°C, which are abundant in Southeast Asia, West Africa, and Latin America.
    - **E.g.:** The **humid equatorial climate** of Borneo supports large-scale plantations in Malaysia and Indonesia.
2. **Economic policies and government incentives**: National policies encouraging palm oil expansion, subsidies, and export incentives have driven growth, especially in Southeast Asia.
    - **E.g.:** The **Indonesian Palm Oil Platform (InPOP)** supports sustainable palm oil production and economic benefits.
3. **Abundant land and labor**: These regions often have large tracts of arable land and a workforce skilled in agricultural production, making it feasible for extensive palm oil cultivation.
    - **E.g**.: **Indonesia** has over **10 million hectares** under oil palm cultivation (Indonesia Ministry of Agriculture, 2022).
4. **Growing global demand**: High demand for palm oil in food, cosmetics, and biofuels motivates countries to focus on it as a high-value cash crop, especially in developing economies.
    - **E.g.: Global palm oil demand** is projected to reach **90 million metric tons by 2030** (OECD-FAO, 2022).
5. **Historical cultivation origins**: Oil palm is native to West Africa, giving countries like Nigeria a long history of cultivation and traditional knowledge in its management.
    - **E.g.: Nigeria was a leading global producer** before Southeast Asia's rise in the 1970s.

Conclusion

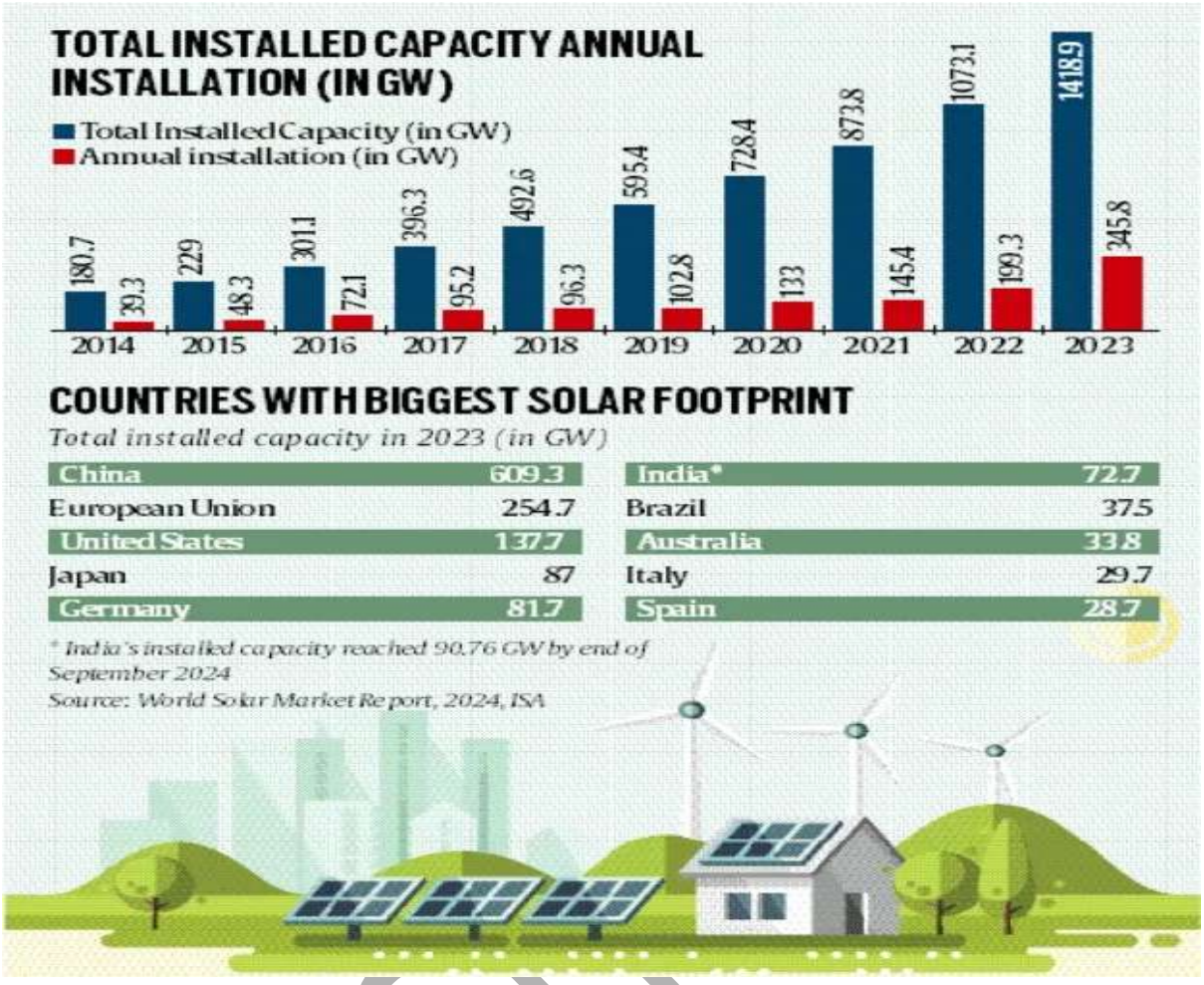
Palm oil production, though economically beneficial**, poses serious environmental challenges**. Moving towards sustainable practices and diversifying agricultural priorities can help these regions balance growth with ecological conservation.

Q. Examine the role of the International Solar Alliance (ISA) in promoting solar energy adoption in the Global South and discuss the geographical barriers that hinder its progress. (10 M)

Introduction

The International Solar Alliance (ISA**), initiated by India and France in 2015**, strives to **expand solar energy adoption across sunny regions of the world**, particularly in the Global South, to address energy needs and climate challenges.

Body



Role of ISA in promoting solar energy adoption

1. **Facilitating financial resources**: ISA mobilizes international finance to support solar projects in developing regions, encouraging investment through risk mitigation.
    - **E.g.**: ISA's **Solar Risk Mitigation Initiative** collaborates with the World Bank to ease funding for solar projects in high-risk regions.
2. **Capacity building and training**: ISA partners with local institutions to build a skilled workforce for solar technology deployment, enhancing local capacity.
    - **E.g.**: The **STAR (Solar Technology and Applications Resource) Centers** in Africa and Asia support skill development and technical expertise in solar.
3. **Policy and regulatory support**: ISA assists member countries in developing solar-friendly policies, power purchase agreements, and regulatory frameworks to boost investor confidence.
    - **E.g.**: **ISA has aided Cuba** in structuring policies for its first 60 MW ISA-backed solar project.
4. **Technology transfer and innovation**: ISA promotes sharing of solar technologies and innovative practices among member states, advancing deployment capabilities.
    - **E.g.**: Through partnerships with France and Australia, ISA supports **technology transfers and innovation in solar power** solutions for developing countries.

5. **Supporting localized solar applications**: ISA encourages off-grid solar applications to enhance energy access in remote, rural areas with limited infrastructure.
    - **E.g.**: **Off-grid solar initiatives** in **rural Kenya** have expanded energy access, improving local livelihoods and reducing reliance on non-renewable sources.

Geographical barriers hindering ISA's progress

1. **Inadequate infrastructure**: Many developing countries lack essential transmission and grid infrastructure for integrating large-scale solar projects.
    - **E.g.**: In **sub-Saharan Africa, limited grid infrastructure hampers** solar expansion (African Development Bank, 2022).
2. **Policy and regulatory instability**: Frequent policy changes and lack of regulatory clarity in certain countries discourage long-term solar investments.
    - **E.g.**: **Sudan's shifting energy policies** have led to stalled renewable energy projects, affecting ISA's initiatives.
3. **Challenging environmental conditions**: Regions with high solar potential often face environmental challenges like extreme heat, dust, or high humidity, which reduce solar panel efficiency.
    - **E.g.**: In the **Middle East**, **dust accumulation on panels** can reduce solar **efficiency by up to 30%** (IRENA, 2023).
4. **Dependence on imported solar equipment**: Many ISA member countries rely on imported solar equipment, creating logistical and supply chain barriers.
    - **E.g.**: Over **80% of solar panels** in ISA-supported projects are **imported from China**, raising concerns over supply stability.
5. **Dispersed and remote populations**: Countries with widely dispersed rural populations face logistical challenges in delivering solar power solutions across vast and remote areas.
    - **E.g.**: In **Ethiopia**, **scattered rural settlements** make centralized solar projects difficult, necessitating off-grid solutions (UNDP, 2023).

Conclusion

While the ISA has played a pivotal role in advocating for solar energy, **overcoming geographical barriers like infrastructure deficits, environmental challenges, and policy instability** will be crucial to its long-term success in enhancing sustainable solar adoption globally.

Q. Discuss the role of Integrated Manufacturing Clusters (IMCs) in transforming regional economies and fostering industrial development. What geographical factors influence the selection of IMC locations in India? (15 M)

Introduction:

Integrated Manufacturing Clusters (IMCs) are key drivers in transforming regional economies, enhancing industrial capacity, and promoting balanced development across India's diverse landscape.

Body

Role of IMCs in Transforming Regional Economies

1. **Employment generation and skill development:** IMCs create large-scale employment opportunities and skill-building programs, uplifting local communities and promoting inclusive growth.
    - E.g.: **IMC Gaya** is projected to create over 1,09,000 jobs, fostering regional employment .
2. **Infrastructure development:** IMCs improve regional infrastructure, including roads, power, and water, catalyzing economic activities and connectivity.
    - E.g.: **Delhi-Mumbai Industrial Corridor** has brought advanced infrastructure to otherwise underdeveloped regions.
3. **Promotion of local industries:** IMCs support local manufacturing, bringing new technologies and market access, enhancing regional industries.
    - E.g.: IMCs promote sectors like **agri-food processing** and **handicrafts**, aligning with the "Make in India" initiative.
4. **Attracting investment and FDI:** IMCs offer "plug-and-play" facilities and ease of business, attracting domestic and foreign investment into less-developed areas.
    - E.g.: The **National Industrial Corridor Development Programme** aims to attract global investments by providing seamless operational infrastructure.

Role of IMCs in fostering industrial development

1. **Encouraging cluster-based growth:** IMCs provide centralized hubs for related industries, driving efficiencies and competitive advantages in production.
    - E.g.: IMCs include facilities like **Common Effluent Treatment Plants (CETPs)**, reducing operational costs for industries.
2. **Enhancing export capacity:** IMCs streamline production and logistics, strengthening India's position as an export hub and reducing trade costs.
    - E.g.: IMCs along the **Amritsar-Kolkata Industrial Corridor** have proximity to ports, boosting exports to Southeast Asia.
3. **Supply chain integration:** IMCs integrate suppliers, manufacturers, and distributors, enhancing supply chain resilience and reducing lead times.
    - E.g.: **Chennai-Bengaluru Industrial Corridor** is a model for efficient supply chain management with reduced logistics costs.

Geographical factors influencing IMC locations

1. **Transport connectivity:** Proximity to highways, ports, and railways is critical for reducing logistics costs and improving access to markets.
    - E.g.: IMC Gaya's location near **NH-19** and **NH-22** ensures easy connectivity for goods and raw materials.

2. **Resource availability:** Access to raw materials, water, and energy sources is essential for sustainable industrial activities.
    - E.g.: **Visakhapatnam-Chennai Industrial Corridor** was selected for its access to energy and mineral resources.
3. **Labour supply:** Locations with a skilled or trainable workforce are preferred for ensuring long-term labour supply to industries.
    - E.g.: IMCs in states like **Tamil Nadu** leverage a skilled workforce, particularly in manufacturing.
4. **Environmental viability:** IMCs are selected with consideration for environmental factors, ensuring compliance with sustainable practices.
    - E.g.: IMCs incorporate **Green Infrastructure**, such as stormwater drainage and solid waste management systems, for eco-friendly development.
5. **Market proximity:** Locations near large domestic markets reduce distribution costs and increase consumer access.
    - E.g.: **Delhi NCR's IMC** benefits from its proximity to one of India's largest consumer bases.
6. **Government support and policy:** Areas with favourable industrial policies, incentives, and ease of doing business rank higher in IMC selection.
    - E.g.: **National Industrial Corridor Development Programme (NICDP)** supports states with conducive business environments.

Conclusion

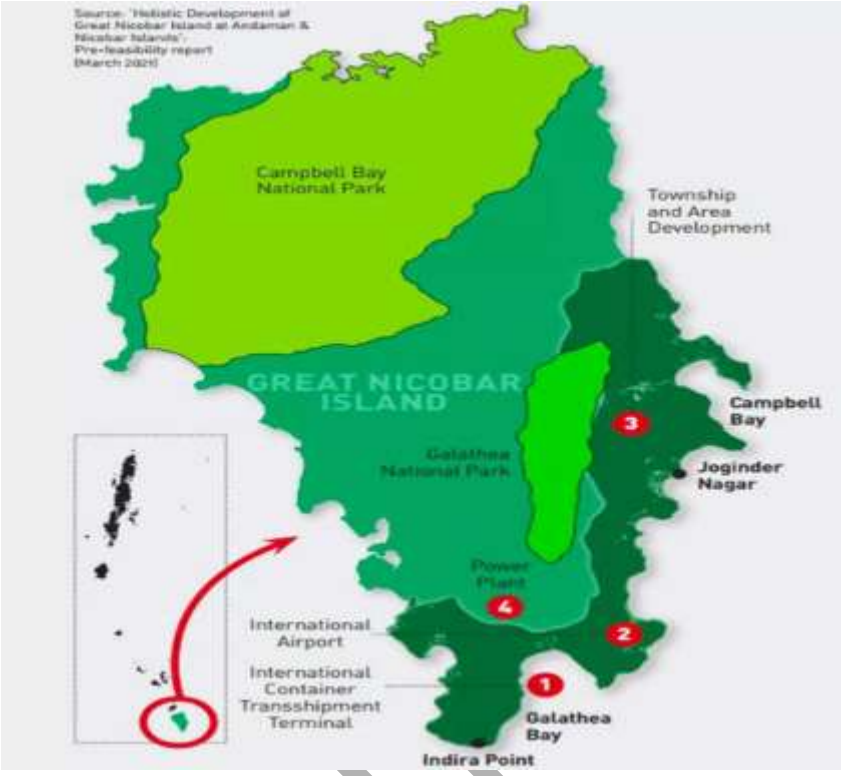
IMCs, when developed with strategic geographical insights and sustainable practices, will be **instrumental in propelling India's industrial ambitions**, establishing the nation as a resilient manufacturing hub for the future.

Q. Examine the potential of the Great Nicobar Island project in boosting India's maritime economy and enhancing connectivity in the Indo-Pacific region. (10 M)

Introduction

The **Great Nicobar Island**, located in the **southeastern Bay of Bengal**, is strategically positioned near the **Malacca Strait**, a vital global trade route. The proposed infrastructure under the **Great Nicobar Island project**, including a **trans-shipment port**, aims to boost **India's maritime economy** and integrate the island into **regional and global connectivity networks**.

Body



Role in boosting India's maritime economy

1. **Strategic trans-shipment hub**: The proposed **International Container Trans-shipment Terminal (ICTT)** will enable direct handling of cargo, reducing India's dependency on ports like Colombo and Singapore.
    - **Eg:** India loses **75% of its trans-shipment cargo** to foreign ports, costing significant revenue.
2. **Proximity to key trade routes**: Its location near the **Malacca Strait**, which handles **25% of global trade**, positions it as an ideal hub for international maritime trade.
    - **Eg:** The island is equidistant from **Colombo, Port Klang (Malaysia)**, and **Singapore**, offering significant logistical advantages.
3. **Maritime economy and employment**: The development of port infrastructure, along with logistics and ancillary services, will boost employment opportunities in the region.
    - **Eg:** Similar initiatives like the **Jawaharlal Nehru Port Trust (JNPT)** have demonstrated high economic returns.
4. **Energy infrastructure for maritime operations**: The **450 MVA gas and solar-based power plant** will provide sustainable energy for port and trade-related activities.

Enhancing connectivity in the Indo-Pacific region

1. **Geostrategic advantage near Malacca Strait**: The island's position allows India to monitor and influence the busiest shipping lanes connecting the **Indian and Pacific Oceans**.
    - **Eg:** Control over the **Malacca Strait** is critical for the movement of oil and goods between West Asia and East Asia.
2. **Integration into Indo-Pacific trade networks**: The ICTT will link India to Southeast Asia, promoting faster trade and integration with ASEAN nations.
    - **Eg:** Proximity to **Indonesia and Malaysia** facilitates regional connectivity under India's **Act East Policy**.
3. **Countering regional threats**: Developing the island enhances India's maritime security against challenges posed by **China's Belt and Road Initiative** and activities in the **Coco Islands**.
    - **Eg: Infrastructure here strengthens** India's presence in the **Bay of Bengal** and deters Chinese naval incursions.
4. **Facilitating regional trade agreements**: Great Nicobar can support frameworks like **Indian Ocean Rim Association (IORA)** and **QUAD economic initiatives**, enhancing India's strategic partnerships.
5. **Support for disaster management and logistics**: The development of the international airport can make the island a regional hub for **humanitarian assistance and disaster relief (HADR)** operations.

Conclusion

The **Great Nicobar Island project** is a pivotal initiative combining **economic growth with geostrategic imperatives**. By capitalizing on its location, India can strengthen its maritime economy, reduce dependency on foreign ports, and enhance connectivity in the Indo-Pacific. Sustainable implementation, with attention to ecological balance, will ensure long-term benefits for India's strategic and economic objectives.

Q. "Indian agriculture stands at a crossroads with pressing challenges". How does the National Mission on Natural Farming (NMNF) aim to tackle these issues and usher in sustainable practices? (15 M)

Introduction

Indian agriculture faces pressing challenges like environmental degradation, high input costs, and unsustainable practices. The National Mission on Natural Farming (NMNF), launched in **2024**, seeks to address these issues by promoting chemical-free, eco-friendly farming in mission mode.

Body

Challenges in Indian agriculture

1. **Soil degradation**: Excessive use of chemical fertilizers has depleted soil fertility.

    - **Eg**: **Soil organic carbon content** in India has dropped to **0.3-0.4%**, far below the desired **0.8-1%** (Source: ICAR).
2. **Water overuse and pollution**: Chemical runoff from fertilizers and pesticides pollutes water bodies, while water-intensive farming depletes resources.
    - **Eg: Groundwater in Punjab** is depleting at **1.5 feet annually**, affecting agricultural sustainability.
3. **Climate vulnerability**: Unpredictable climate events like floods, droughts, and heatwaves disrupt crop production.
    - **Eg**: The **2023 IMD report** noted that **20% of districts in India** are drought-prone.
4. **High input costs and farmer distress**: Reliance on expensive inputs burdens farmers financially and poses health risks from chemical exposure.
    - **Eg**: **According to the 2022 NCRB report**, **6,000 farmer suicides** were linked to debt from high input costs.

Role of NMNF in tackling these issues

1. **Restoring soil health**: Promotes natural inputs like **Jeevamrit** and **Beejamrit** to improve soil microbial activity.
    - **Eg**: NMNF aims to set up **10,000 Bio-input Resource Centres** to provide natural farming inputs.
2. **Reducing input costs**: Focuses on replacing costly chemical inputs with locally sourced organic alternatives.
    - **Eg**: Farmers in Gujarat practicing **Zero Budget Natural Farming (ZBNF)** reduced input costs by **Rs. 10,000/acre**.
3. **Improving water use efficiency**: Techniques like mulching and mixed cropping help conserve water.
4. **Promoting biodiversity**: Encourages multi-cropping and pest-resistant farming systems to restore ecological balance.
    - **Eg**: **Sikkim**, **India's first organic state**, saw improved pest resistance and ecosystem health.
5. **Enhancing climate resilience**: Prepares farmers for climate shocks like floods, droughts, and erratic rainfall.
    - **Eg**: NMNF targets **15,000 clusters** in climate-sensitive Gram Panchayats.

NMNF and ushering sustainable practices

1. **Rejuvenating ecosystems**: Focuses on reducing chemical dependency to restore soil carbon and biodiversity.
    - **Eg**: NF areas **reported higher soil carbon levels** and increased microbial diversity.
2. **Market linkages and certification**: Offers simplified certification and branding for natural farming produce to boost farmer incomes.

- **Eg**: The mission aims to engage **1 crore farmers** and facilitate market access by **2026**.

3. **Capacity-building for farmers**: Empowers farmers with knowledge through model farms, Krishi Vigyan Kendras, and **30,000 Krishi Sakhis**.
    - **Eg**: Farmers trained in **Rajasthan's NF model** reported a **20% increase in yields**.
4. **Convergence with existing schemes**: Aligns with initiatives like **Namami Gange** to create organic farming corridors.
    - **Eg**: **Focused implementation** in the **Ganga basin** aims to address water and soil pollution.
5. **Support for small and marginal farmers**: Promotes affordable, sustainable farming methods to reduce financial stress.
    - **Eg**: Andhra Pradesh's **ZBNF model** reached over **5 lakh small farmers** and reduced dependency on chemicals.

Conclusion

The NMNF represents a paradigm shift in Indian agriculture, combining traditional knowledge with scientific practices. By addressing **key challenges, it provides a sustainable and scalable solution for improving rural livelihoods, conserving resources, and ensuring food security** for future generations.

Important Geophysical phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc., geographical features and their location-changes in critical geographical features (including water-bodies and ice-caps) and in flora and fauna and the effects of such changes.

Q. "Illegal sand mining has emerged as a major threat to river ecosystems in India". Analyze the factors driving illegal sand mining and its implications for sustainable river management. (15 M)

Introduction

Illegal sand mining threatens the **ecological balance of India's rivers**, jeopardizing both **environmental sustainability** and **livelihoods**, making it a pressing issue for **sustainable river management**.

Body

Factors driving illegal sand mining:

1. **Urbanization and infrastructure growth:** The increasing pace of **urbanization** and infrastructure projects under the **National Infrastructure Pipeline (NIP)** have escalated the demand for construction sand.
    - **E.g.: Delhi** and **Bengaluru** have witnessed an **increase in construction projects**, resulting in a surge in sand mining to meet the demand.
2. **Weak regulatory framework: Inadequate laws** and weak enforcement of mining regulations have allowed illegal sand mining to thrive.
    - **E.g.:** Loopholes in the **Mines and Minerals (Development and Regulation) Act, 1957** have enabled the continuation of illegal operations in states like **Tamil Nadu** and **Uttar Pradesh**.
3. **High profit margins: Low costs** and **high demand** for sand make it a profitable business, attracting illegal operators.
    - **E.g.:** In **Tamil Nadu**, **sand mafias generate millions** annually due to the highly profitable nature of the trade.
4. **Lack of cheap alternatives:** There is a significant gap in the availability of **affordable alternatives** to natural river sand, leading to over-reliance on it for construction purposes.
    - **E.g.: Manufactured sand (M-sand)**, though promoted, **is still not widely available** at competitive rates, which drives continued illegal extraction.
5. **Essential role of sand in ecosystems:** Sand plays a critical role in **river ecosystems**, acting as a natural **aquifer recharge zone** and **sediment stabilizer**, making it difficult to stop mining without viable alternatives.
    - **E.g.:** In river systems like the **Ganga**, **sand regulates water flow, maintains habitat stability, and supports aquatic life**, highlighting its ecological importance.

Implications for sustainable river management:

1. **Riverbed degradation:** Illegal mining causes **lowered riverbeds**, altering natural flow patterns, reducing water-holding capacity, and increasing flood risk.
    - **E.g.:** The **Yamuna River** has faced **severe degradation due** to unregulated sand mining, increasing flood risk in **Delhi**.

2. **Loss of biodiversity:** The **destruction of habitats** in river ecosystems results in significant biodiversity loss, particularly of endangered species.
    - **E.g.:** Sand mining in the **National Chambal Sanctuary** threatens the endangered **gharial** and **Gangetic dolphin** populations.
3. **Groundwater depletion:** Sand acts as a **natural filter**, aiding in **groundwater recharge**. Removing it disrupts this process, leading to water scarcity.
    - **E.g.:** In **Tamil Nadu**, **declining groundwater levels** have been linked to excessive sand extraction, exacerbating water shortages, as flagged by the **Central Ground Water Board (CGWB)**.
4. **Increased erosion and infrastructure damage: Riverbank erosion** resulting from sand removal weakens surrounding infrastructure and farmland.
    - **E.g.:** Erosion along the **Sutlej River** in **Punjab** has led to the destruction of homes and farmland.
5. **Increased flood risks:** Altered **river morphology** due to mining reduces the river's ability to absorb excess water, increasing **flood vulnerability**.
    - **E.g**.: **Extensive sand mining** in **Kerala** has heightened **flood risks** in coastal and riverine areas.

Solutions to address illegal sand mining:

1. **Enhanced monitoring and surveillance:** Technological tools like **satellite imagery** and **drones** can help monitor illegal activities and improve law enforcement.
    - **E.g.: Maharashtra** has deployed **drones for monitoring sand mining** operations, leading to increased regulation of illegal activities.
2. **Stricter regulation and heavier penalties:** Strengthening laws and increasing penalties will deter illegal mining.
    - **E.g.:** The **Mines and Minerals (Development and Regulation) Amendment Act, 2023** introduces stricter penalties and regulations to control sand mining.
3. **Promoting alternatives:** Encouraging the use of **manufactured sand (M-sand)** and **construction waste recycling** can reduce dependence on river sand.
    - **E.g.: Kerala** promotes the use of **M-sand** as a sustainable alternative to natural sand, reducing environmental impacts.
4. **Community-based monitoring:** Empowering **local communities** and **Gram Panchayats** to monitor and report illegal activities will foster local accountability.
    - **E.g.:** Villagers in **Assam** and **Meghalaya** have been **instrumental in reporting and stopping illegal** sand mining in their regions.

5. **River restoration projects:** Efforts to **restore degraded river ecosystems** by regulating sand extraction and replenishing sand deposits will help regain ecological balance.
    - **E.g.:** The **Narmada River Restoration Project** (2022) focuses **on restoring the river's flow and biodiversity**, which have been severely impacted by sand mining.

Conclusion

A holistic approach involving **stringent law enforcement**, **innovative technologies**, and **community involvement** is critical to address illegal sand mining and ensure the **sustainable management** of India's river ecosystems for future generations

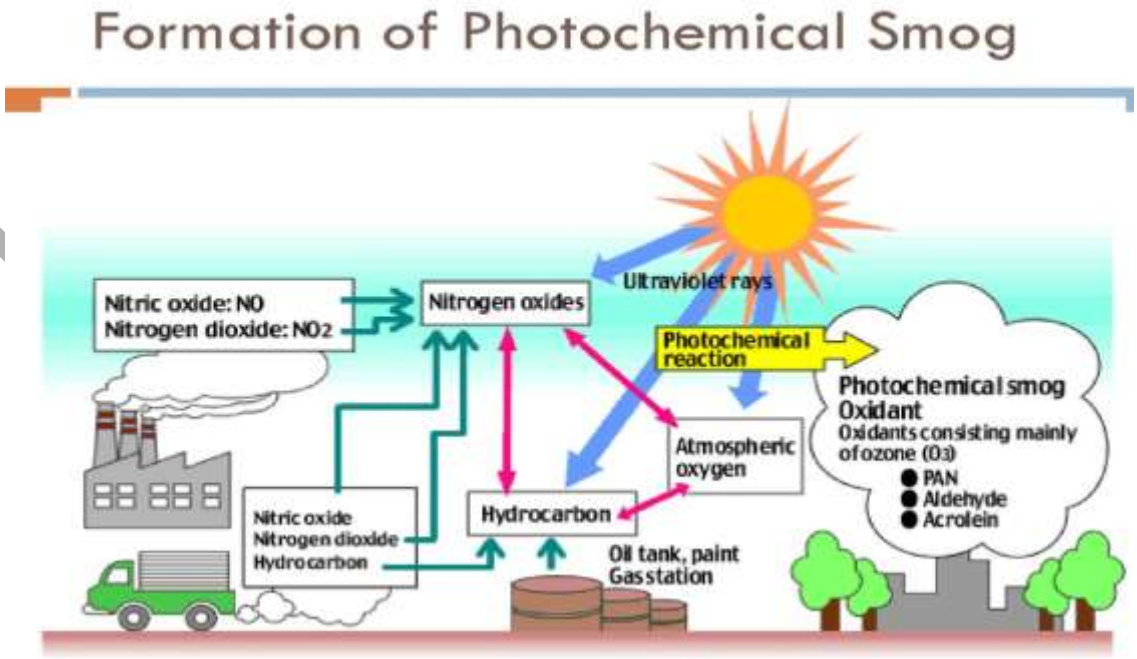
Q. Explain the process of smog formation. Examine the factors that contribute to severe smog episodes in India, especially in North Indian cities. Suggest measures for effective management and mitigation. (15 M)

Introduction

Smog, a harmful air pollutant, forms from complex interactions of pollutants under specific atmospheric conditions, affecting public health and the environment, especially in urban and industrial areas.

Body

Process of smog formation



1. **Photochemical smog formation**: This type of smog, also called **"summer smog,"** occurs when **nitrogen oxides (NOx)** and **volatile organic compounds (VOCs)** react under sunlight, producing ground-level **ozone (O3)** and other harmful secondary pollutants.
    - This process is accelerated by high temperatures and sunlight, commonly affecting urban areas with heavy traffic and industrial activity.
    - **E.g.: Delhi** experiences photochemical smog spikes during winter due to vehicular emissions and high levels of NOx, resulting in harmful ozone accumulation (WHO Report, 2021).
2. **Sulphurous smog formation**: Also known as **"London smog"** or **"winter smog,"** this type forms primarily due to **sulphur dioxide (SO2)** emissions from coal combustion, which combines with particulate matter and moisture to create thick, dense fog laden with sulfuric pollutants.
    - It is more likely to occur in colder months when coal and biomass burning are prevalent.
    - **E.g.:** Areas around **Singrauli, Madhya Pradesh**, experience sulfurous smog due to nearby coal-based thermal power plants, especially in winter when fuel combustion increases (CPCB Annual Report, 2022).

Factors contributing to severe smog episodes in north india

1. **Stubble burning**: Seasonal crop residue burning in **Punjab and Haryana** releases large quantities of particulate matter, worsening smog in neighboring states.
    - **E.g.:** NASA satellite data showed a 10% rise in stubble burning incidents in Punjab in **2021**.
2. **Temperature inversion**: Cold winter temperatures create an inversion layer, trapping pollutants close to the ground, intensifying smog levels.
    - **E.g.: Delhi's smog crisis peaks in November due to inversion layers** that lock pollutants (IMD Report, 2020).
3. **High vehicular emissions**: Growing urbanization and vehicle density contribute significantly to emissions, adding **NOx** and **PM2.5** into the atmosphere.
    - **E.g.:** Delhi registered over **11 million vehicles** in 2021, accounting for nearly **40% of NOx emissions** (Ministry of Road Transport & Highways, 2021).
4. **Industrial emissions**: Thermal plants and factories in Northern India, especially around NCR, release sulphur and nitrogen oxides, contributing to smog.
    - **E.g.:** Over **30% of Delhi's smog** is attributed to industrial emissions from NCR, as per the **CPCB's 2022 analysis**.
5. **Geographical factors**: North India's landlocked geography restricts air flow, causing pollutant build-up in urban centers.
    - **E.g.:** The **Himalayan barrier** prevents dispersion, trapping pollutants in the Indo-Gangetic Plain (National Geophysical Research Institute, 2021).

Measures for effective management and mitigation

1. **Policy interventions**: Enforcement of **National Clean Air Programme (NCAP)** aims for a 20-30% reduction in PM2.5 levels by 2024, with targeted policies for high-pollution cities.
    - **E.g.: NCAP's Clean Air Action Plans** for 122 cities focus on vehicular and industrial emission controls (MoEFCC, 2021).
2. **Technological solutions**: Installation of **smog towers**, real-time air quality monitoring, and early warning systems can help reduce smog impacts.
    - **E.g.:** Delhi installed **two smog towers** in Connaught Place and Anand Vihar in **2021** to filter air in high-traffic areas .
3. **Stubble management solutions**: Government subsidies for machines like **Happy Seeders** and promotion of alternatives to stubble burning can prevent residue-based pollution.
    - **E.g.: Punjab's subsidy** on **Happy Seeders** reduced stubble burning by 30% in 2022, as per the **Ministry of Agriculture**.
4. **Public awareness campaigns**: Programs like **Swachh Vayu Sarvekshan** focus on community engagement to reduce vehicle use and promote cleaner practices.
    - **E.g.: Awareness drives** in NCR resulted in a **15% increase in carpooling** during peak smog periods in **2022** (MoEFCC).
5. **Vehicular emission norms**: The implementation of **BS-VI emission standards** in 2020 reduced sulphur content in fuel by 80%, helping curb vehicular emissions.
    - **E.g.:** Post-BS-VI implementation, Delhi reported a **14% drop in vehicular NOx emissions** (Central Pollution Control Board, 2021).

Conclusion

An integrated approach involving **strong policy enforcement, advanced technology, and public engagement** is essential to mitigate severe smog episodes in North India, ultimately improving air quality and public health in affected regions.

Q. Assess the socio-economic and environmental challenges posed by glacier retreat in high-altitude regions, with a focus on vulnerable communities. (10 M)

Introduction

The retreat of glaciers in high-altitude regions, driven by climate change, **poses severe socio-economic and environmental challenges, threatening communities** that rely on these glaciers for essential resources like water, agriculture, and livelihoods.

Body

Socio-economic challenges

1. **Water scarcity for agriculture**: Glacier melt is essential for irrigation in arid mountain areas, directly impacting food security.

- **E.g.: According to a 2021 IPCC report**, high-altitude regions face a projected 30-40% decrease in glacial runoff by 2050, affecting irrigation in regions like the Indus Basin.

2. **Livelihood losses**: Reduced glacial runoff limits water availability for agriculture, livestock, and hydroelectric power, affecting economic stability.
    - **E.g.: Hydropower projects in Nepal** face reduced output, impacting local energy access and economic activities.
3. **Migration and displacement**: Resource scarcity due to glacial loss forces communities to migrate, disrupting social and cultural life.
    - **E.g.: Mountain villages in Ladakh** have seen increased migration as water sources dwindle with glacial retreat.

Environmental challenges

1. **Impact on river systems**: Glacier loss reduces river flow in dry seasons, disrupting downstream ecosystems and biodiversity.
    - **E.g.: The Indus River Basin** relies on glacial runoff to sustain agriculture and biodiversity across Pakistan and India.
2. **Increased natural disasters**: Glacier retreat can trigger glacial lake outburst floods (GLOFs), which are highly destructive.
    - **E.g.: In 2021, the Uttarakhand flood** resulted from a GLOF, causing significant damage to life and infrastructure.
3. **Loss of biodiversity**: Changes in water flow and temperature affect species adapted to high-altitude ecosystems.
    - **E.g.: Snow leopards and other endemic species** in the Himalayas face habitat loss due to changing glacial landscapes (WWF Report, 2022).

Vulnerability of local communities

1. **Cultural and heritage loss**: Indigenous practices and cultural heritage tied to glacial environments face erosion with glacier retreat.
    - **E.g.: Sherpa communities** in the Himalayas experience loss of cultural identity as glacier landscapes recede.
2. **Health risks**: Glacier loss and resulting water scarcity lead to sanitation challenges, increasing the spread of diseases.
    - **E.g.: WHO reports** indicate a rise in waterborne diseases in mountainous areas with reduced glacier runoff.
3. **Limited adaptation resources**: Remote high-altitude communities often lack resources for adaptation and climate resilience.
    - **E.g.: UNDP's adaptation initiatives** face logistical challenges in reaching remote mountainous regions.

Conclusion

With glaciers continuing to retreat, **enhancing climate resilience, sustainable water**

management, and local adaptation strategies are essential to secure the future of vulnerable high-altitude communities and ecosystems.

Q. Explain the concept of radiative forcing and examine the role of CO2 in contributing to global warming compared to other greenhouse gases. (10 M)

Introduction

Radiative forcing (RF) measures the imbalance in Earth's energy system caused by greenhouse gases (GHGs) and other factors. Among these, **CO2** is the most significant contributor, responsible for nearly **70% of global warming** since the Industrial Revolution.

Body

Concept of radiative forcing

1. **Definition**: RF quantifies the **net energy change** in the atmosphere due to external drivers, directly linking emissions to temperature rise.
    - **Eg.** Defined by the **IPCC (AR6, 2021)** as the imbalance between incoming solar radiation and outgoing infrared radiation.
2. **Role in global warming**: A **positive RF traps more heat**, while negative RF leads to cooling. GHGs, primarily **CO2**, cause sustained positive RF.
    - **Eg.** RF from **CO2 has reached 2.1 W/m²** above pre-industrial levels (IPCC AR6, 2021).

Role of CO2 in radiative forcing

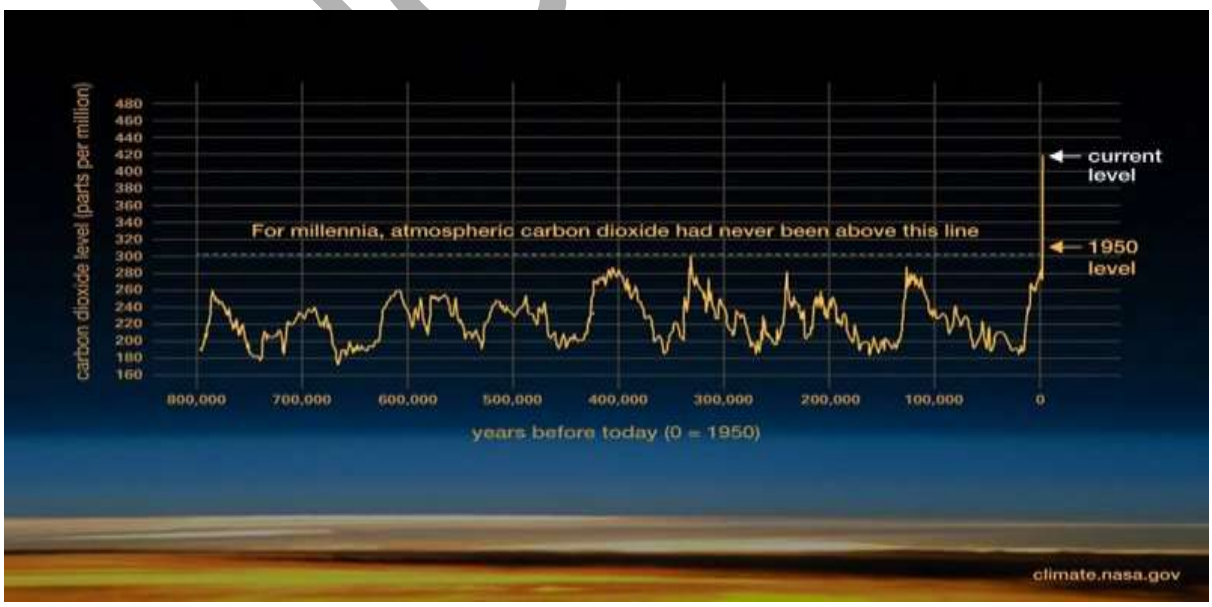


Fig:- The graph, based on the comparison of atmospheric samples contained in ice cores and more recent direct measurements, shows the rise of atmospheric CO2 since the Industrial Revolution. (Credit: NASA)

1. **High atmospheric concentration**: **CO2 is the most emitted GHG** due to fossil fuel combustion, contributing to **79% of GHG emissions in 2022**.
    - **Eg.** CO2 levels have risen from **280 ppm (1750)** to **421 ppm (2023)** (NOAA).
2. **Longevity**: **CO2 remains in the atmosphere for centuries**, unlike CH4 (10-12 years) or water vapor (10 days).
    - **Eg.** 40% of emitted CO2 remains in the atmosphere for **100 years**, 10% for **10,000 years** (Union of Concerned Scientists).
3. **Cumulative impact**: CO2's **sustained emissions amplify its warming potential**.
    - **Eg.** Over **1.5 trillion tonnes of CO2** have been emitted since **1850** (IEA, 2022).
4. **Primary emission source**: Industrialization and reliance on **fossil fuels** have made CO2 the dominant contributor.
    - **Eg.** India's projected **4.6% rise in CO2 emissions in 2024** reflects the industrial growth trajectory (Global Carbon Project, 2024).

Comparison with other greenhouse gases

1. **Potency vs Contribution**: Gases like **CH4 and HFCs are more potent** but contribute less due to lower concentrations and shorter lifespans.
    - **Eg.** CH4 is **80 times more potent** than CO2 over 20 years but contributes only **20% to global warming** (Global Carbon Budget, 2022).
2. **Global warming potential (GWP)**: CO2 has a **GWP of 1**, compared to CH4 (28-36) and HFCs (up to 12,400), but its **sheer volume makes it dominant**.
    - **Eg.** Methane from agriculture and **oil leaks like the 2022 Nord Stream pipeline incident** has significant short-term impacts.
3. **Abundance**: **CO2's high atmospheric concentration ensures greater cumulative impact.**
    - **Eg.** CO2 accounts for over **85% of total GHG emissions** (IEA, 2022).
4. **Primary emission sectors**: CO2 is linked to **energy and industry**, sectors difficult to decarbonize, unlike CH4 (agriculture) or N2O (fertilizers).
    - **Eg. 36.8 billion tonnes of CO2** were emitted in 2022, primarily from fossil fuels (Global Carbon Budget).
5. **Mitigation feasibility**: Reducing CO2 requires **systemic energy transitions**, while CH4 reductions are more sector-specific.
    - **Eg.** The **Global Methane Pledge (2021)** aims to cut CH4 emissions by **30% by 2030**.
6. **Interconnection of gases**: **CH4 oxidizes into CO2**, while CO2 drives feedback loops, such as increased **water vapor.**
    - **Eg. Rising temperatures** enhance the **water vapor feedback**, amplifying CO2-driven warming.

Conclusion

CO2 dominates global warming due to its abundance, longevity, and cumulative impact, making it the **primary focus of climate mitigation efforts.** Addressing CO2 emissions through **renewable energy, carbon capture, and afforestation** is crucial for achieving long-term climate stability.

Q. Discuss the geographical and ecological factors that contribute to the perennial pollution of urban rivers in India. Suggest strategies to restore and sustainably manage India's rivers. (15 M)

Introduction

Urban rivers in India are mirrors of urbanization's unchecked pace, struggling under pollution caused by geographical constraints and ecological imbalance. The **Yamuna in Delhi** and the **Muskaan Nadi in Patna** stand as alarming examples.

Body

Geographical factors contributing to pollution

1. **Urban expansion into floodplains**: Cities encroach on natural floodplains, narrowing river channels and reducing their flow.
    - **Eg.**: **Delhi NCR's encroachment on Yamuna floodplains**.
2. **Unregulated sand mining**: Excessive sand mining disturbs riverbeds, increasing sedimentation and turbidity.
    - **Eg.**: **Illegal sand mining in the Chambal River**, impacting flow and aquatic life.
3. **Altered river hydrology**: Dams, canals, and diversions disrupt the natural flow, reducing rivers' capacity to dilute pollutants.
    - **Eg.**: **Tehri Dam** reducing the Ganga's flushing capacity downstream.
4. **Dense industrial corridors**: Many rivers flow through industrial hubs where untreated effluents are discharged.
    - **Eg.**: **Kanpur tanneries** contributing to Ganga's toxic load.
5. **Improper drainage systems**: Inadequate separation of stormwater and sewage overwhelms river systems.
    - **Eg.**: **Mumbai's Mithi River**, overwhelmed by urban runoff and sewage.

Ecological factors contributing to pollution

1. **Loss of riparian vegetation**: Encroachments and deforestation reduce the riverbank's ability to filter pollutants.
    - **Eg.**: **Loss of mangroves along the Ulhas River in Maharashtra**.
2. **Reduced ecological flow (e-flow)**: Over-extraction for agriculture and drinking water leaves rivers with insufficient discharge.

- **Eg.**: **Yamuna's e-flow in Delhi** is just **1% of its original flow during non-monsoon periods**.

3. **Unregulated solid waste dumping**: Urban solid waste, especially plastics, clog rivers and disrupt ecosystems.
   - **Eg.**: **Ganga accumulates 3,000 tonnes of plastic daily** (WWF, 2023).
4. **Sewage and nutrient inflow**: Excess untreated sewage and agricultural runoff lead to eutrophication and oxygen depletion.
   - **Eg.**: **Frequent fish kills in Bengaluru's Bellandur Lake**.
5. **Biodiversity loss**: Declining aquatic species reduces the rivers' self-cleaning ability.
   - **Eg.**: Disappearance of **Ganges dolphins** due to Ganga pollution.

Strategies for restoration and sustainable management

1. **Decentralized sewage treatment**: Establish compact, localized sewage treatment plants (STPs) to reduce untreated discharge into rivers.
   - **Eg.**: **64 new STPs planned under Namami Gange** (2023).
2. **Mandatory ecological flow (e-flow)**: Enforce policies ensuring rivers maintain sufficient flow to dilute pollutants.
   - **Recommendation**: **NITI Aayog's CWMI report**, emphasizing e-flow management.
3. **Stringent industrial discharge monitoring**: Implement real-time monitoring and penalties for industrial effluent release.
   - **Eg.**: **CPCB's effluent monitoring systems** on Ganga basin industries.
4. **Community-led river management**: Foster local participation in cleanup and conservation initiatives to ensure accountability.
   - **Eg.**: **Miyawaki forests along Adyar River, Chennai**.
5. **Integrated River Basin Management (IRBM)**: Adopt a holistic approach to manage upstream and downstream pollution sources.
   - **Eg.**: Inspired by **EU's Water Framework Directive**, focusing on basin-wide solutions.

Conclusion

India's rivers need an integrated, future-ready approach that combines **technological solutions**, **policy reforms**, and **community participation**. Only then can rivers reclaim their role as ecological and cultural lifelines.

Q. Analyze the impact of frequent earthquakes on urban planning and infrastructure development in India, and evaluate the role of seismic microzonation in mitigating associated risks. (10 M)

Introduction

India, being located on multiple **tectonic plates**, is prone to **frequent earthquakes**, with nearly **60% of its landmass** vulnerable to seismic activity. These events significantly challenge **urban planning** and demand effective tools like **seismic microzonation** to mitigate risks.

Body

Source: Maps of India

Impact of frequent earthquakes on urban planning and infrastructure development

1. **Increased vulnerability of urban centers**: High **population density** and unplanned urban growth amplify earthquake risks.
    - **Eg**: The **2001 Bhuj earthquake** highlighted the risks of poor building quality in rapidly urbanizing areas.
2. **Need for earthquake-resistant infrastructure**: Frequent seismic activity necessitates specialized **design and materials** in construction.
    - **Eg**: **Bureau of Indian Standards (BIS)** codes for **earthquake-resistant buildings** in zones III, IV, and V.
3. **Stress on disaster-resilient urban planning**: Earthquake risks demand integrated planning for **open spaces, evacuation routes,** and safe structures.
    - **Eg**: **Delhi Development Authority** incorporates seismic considerations in its master plans.
4. **Economic implications of retrofitting**: Frequent earthquakes compel **retrofitting** of critical infrastructure, increasing costs.
    - **Eg**: Retrofitting of **schools and hospitals in Kashmir Valley** after the 2005 earthquake.

5. **Impact on housing policies**: Earthquake-prone regions need affordable and **resilient housing policies**, especially for low-income groups.
    - **Eg**: The **Pradhan Mantri Awas Yojana** in Uttarakhand incorporates **seismic safety features** post-2013 floods.

Role of seismic microzonation in mitigating risks

1. **Localized risk assessment**: Seismic microzonation identifies **soil conditions, fault lines,** and ground response, aiding better urban planning.
    - **Eg**: Completed for **Delhi, Kolkata**, and other major cities to ensure safe construction practices.
2. **Guidance for critical infrastructure**: Helps design infrastructure like **hospitals, schools,** and highways in high-risk zones.
    - **Eg**: Application in **metro rail projects** in Delhi and Bengaluru to avoid vulnerable areas.
3. **Enhanced disaster preparedness**: Supports **state and district-level disaster management plans** by identifying high-risk zones.
    - **Eg**: **Guwahati's microzonation study** informed local emergency response frameworks.
4. **Reduction in economic losses**: Provides data for **pre-emptive mitigation**, minimizing damage during earthquakes.
    - **Eg**: Application of findings in urban planning reduced losses during the **2015 Nepal earthquake**.
5. **Supporting real-time monitoring systems**: Integrates with **seismic monitoring networks** to provide real-time alerts for high-risk areas.
    - **Eg**: Microzonation studies in **Gangtok** guide early warning systems in the Himalayan region.

Conclusion

Frequent earthquakes pose significant challenges to India's **urban development**, demanding a **proactive approach to planning**. Integrating **seismic microzonation** with **disaster-resilient urban policies** is crucial to ensure safer cities and reduce economic and human losses in the future.