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Page 01:GS 2 : International Relations

The recent Shanghai Cooperation Organisation (SCO) Summit in Tianjin brought together leaders of 10 member states, including India, China, Russia, and Pakistan, against the backdrop of heightened geopolitical tensions, terrorism concerns, and global economic uncertainties. The Tianjin Declaration condemned terrorism in all its forms, called for ending cross-border movement of terrorists, opposed unilateral sanctions, and emphasized the need for inclusive global governance. For India, the summit was significant not only in highlighting its concerns on terrorism but also in balancing its strategic ties with Russia and navigating strained relations with China and Pakistan.

Key Outcomes of the Summit

SCO heads condemn Pahalgam terrorist attack

Declaration signed and adopted by all members; it called for an end to the 'cross-border movement' of terrorists

They expressed their opposition to 'unilateral coercive measures, including those of an economic nature'

India joined nations in the grouping to condemn the strikes by Israel and the U.S. against Iran, a member state, in June

Vignesh P. Venkitesh
TIANJIN

The 10-member Shanghai Cooperation Organisation on Monday "strongly condemned" terrorism in all its forms and manifestations, including the Pahalgam attack and the attacks on Jaffer Express and Khuzdar in Pakistan.

The Tianjin Declaration, signed and adopted by all members, including India, Pakistan, and Russia, called for an end to "cross-border movement" of terrorists. The declaration reaffirmed the bloc's "firm commitment to fight against terrorism, separatism, and extremism", and stressed the inadmissibility of attempts to use terrorist, separatist, and extremist groups for "mercenary purposes".

The member states also opposed "unilateral coercive measures, including those of an economic nature", that contravene the United Nations charter and principles of the World Trade Organization, in a possible reference to the U.S. tariffs.

Chinese President Xi Jinping, who chaired the meeting of the heads of the member states, in his opening remarks, criticised the "bullying behaviour" in the world order and called upon leaders to "adhere to fairness and justice" while opposing " cold war mentality".

"The shadows of Cold War mentality, bullying, are not dissipating, and there are new challenges that are increasing, not diminishing," said Mr. Xi, who has often used the term "cold war mentality" to refer to the uncertainties over the U.S. tariffs.

'SCO plus' meeting

The declaration at the summit, which focused on strengthening the Global South amid global uncertainties in trade and a "fluid and chaotic global situation", opened by stating that the world was undergoing "profound historical changes that affect all spheres of political, socio-economic, and social relations".

Mr. Xi, who chaired the 'SCO plus' meeting on Monday afternoon, proposed a Global Governance Initiative (GGI), calling on countries to work in concert for a more just and equitable global governance system adhering to sovereign equality, abiding by international rule of law, practicing multilateralism, advocating the people-centered approach, and focusing on taking real actions.

China's Foreign Minister Wang Yi, briefing the press on Monday night, said the SCO encourages all countries to utilise UN mechanisms and multilateral ideals and that global governance should not be attained by unilateral bullying. He also said that Pakistan and Armenia had announced development of diplomatic relationship at the summit.

Announcing that the grouping has decided to merge the statuses given to non-member countries – dialogue partner and observer – to a single partner status, Mr. Wang said that Laos has been accepted as a partner country of the SCO, taking the total strength of the grouping to 27 with 10 members and 17 partners.

Secretary-General of the SCO, Nurlan Yermekbayev, said at the briefing that an agreement was made at the summit to establish an SCO development bank, a long-term ambition of Beijing.

Taking note of Israel's ongoing war on Gaza and the catastrophic humanitarian situation engulfing the Gaza Strip, all the member states expressed "deep concern" and strongly condemned "actions that have led to numerous casualties among the civilian population" in the enclave.India also joined the fellow members of the grouping to strongly condemn the strikes by Israel and the U.S. against Iran, a member state, in June that targeted Tehran's nuclear facilities.

The declaration also took note of the political situation in Afghanistan. The members reiterated that the formation of an "inclusive government with broad participation of representatives of all ethno-political groups" of the society is the only way to achieve lasting peace and stability in Afghanistan. All the member states, except India, also reaffirmed their support for China's Belt and Road Initiative.

Mr. Xi, in his opening remarks, pledged to provide ¥2 billion in grants to member countries within this year, and an additional ¥10 billion in loan to member banks of the SCO Interbank Consortium over the next three years. He also said that the group should set up an "SCO development bank" as soon as possible.

(The writer is in China at an invitation from the China Public Diplomacy Association.)

(With inputs from Suhasini Haidar)

Oppose terrorism: PM at SCO summit

TIANJIN

Prime Minister Narendra Modi asked whether "open support" of terrorism by some countries was acceptable, as he spoke at the summit meet of the heads of state of the SCO on Monday. Addressing the meeting chaired by Chinese President Xi Jinping, Mr. Modi said the 'S' in SCO should also stand for security, and mentioned the April 22 Pahalgam terror attack that killed 26 civilians. "We must jointly oppose terrorism in all its forms and colours. This is our duty towards humanity," he said. » PAGE 5

Modi touts peace as he meets Putin

TIANJIN

Prime Minister Narendra Modi met Russian President Vladimir Putin on Monday and stressed the need for a ceasefire in Ukraine. Russian state media reported that the leaders spoke for almost an hour in the vehicle before sitting down for the meeting. "Had an excellent meeting with President Putin... Discussed ways to deepen bilateral cooperation in all sectors," he said in a social media post, adding that the leaders "exchanged views on regional and global developments". » PAGE 5

Power point: Prime Minister Narendra Modi with Chinese President Xi Jinping and Russian President Vladimir Putin in Tianjin on Monday. AMI

1. **Condemnation of Terrorism**
   - The SCO "strongly condemned" recent terror attacks, including the Pahalgam incident in India and strikes in Pakistan.
   - The declaration rejected the use of terrorist and extremist groups for "mercenary purposes" and stressed the need for coordinated action against terror financing and radicalisation.
   - PM Modi reiterated India's stance on "zero tolerance" towards terrorism and questioned the open support provided by some countries (indirect reference to Pakistan).
2. **Geopolitical Balancing**
   - India joined in condemning Israeli and U.S. strikes on Iran, showcasing solidarity with a fellow SCO member.
   - PM Modi also raised connectivity initiatives like Chabahar Port and the International North-South Transport Corridor, aiming to deepen India's linkages with Central Asia while carefully navigating Chinese-led Belt and Road Initiative (BRI), which India has not endorsed.
3. **China's Position**
   - President Xi Jinping criticized "Cold War mentality" and unilateral coercive measures (implicitly referring to U.S. tariffs and sanctions).
   - China proposed a **Global Governance Initiative (GGI)** advocating multilateralism and sovereign equality, seeking to present itself as a leader of the Global South.
   - China pledged ¥2 billion in grants and proposed the establishment of an SCO development bank.
4. **Russia–India Bilateral Engagement**
   - Modi–Putin bilateral underscored the "special and privileged strategic partnership."
   - PM Modi called for an expedited ceasefire in Ukraine, balancing India's ties with Moscow and its credibility as a peace-seeking power.
   - Russia, meanwhile, justified its Ukraine policy by blaming NATO expansion, highlighting the divergence between India's peace emphasis and Russia's narrative.
5. **Other Developments**
   - SCO streamlined observer and dialogue partner categories into a single "partner status," with Laos joining as a partner.
   - Pakistan and Armenia normalized diplomatic relations during the summit.
   - SCO states collectively voiced concern over Gaza's humanitarian crisis.

Relevance for India and UPSC Perspective

- **Counter-terrorism**: India successfully highlighted its concerns on cross-border terrorism, gaining multilateral backing in the Tianjin Declaration.
- **Strategic Autonomy**: Balancing act between Russia (Ukraine war), Iran (connectivity and U.S. sanctions), and China (strategic rival, yet SCO partner).
- **Economic Dimensions**: India is cautious of Chinese-led economic initiatives (BRI, SCO Bank) but promotes its own connectivity projects as alternatives.
- **Global Governance**: India supports reforms in multilateral institutions like the UN while navigating SCO's tilt towards China and Russia-led narratives against Western dominance.

Conclusion

The Tianjin SCO Summit underlined both opportunities and challenges for India's regional diplomacy. On one hand, it provided a platform to secure multilateral condemnation of terrorism and to push its connectivity agenda. On the other hand, India had to balance sensitive geopolitical equations—supporting Iran within SCO, maintaining ties with Russia, and resisting Chinese hegemony. Going forward, India's participation in SCO will remain a test of its ability to safeguard national interests, uphold strategic autonomy, and project itself as a responsible voice of the Global South amid turbulent global geopolitics.

UPSC Prelims Practice Question

Ques: Consider the following statements about the Shanghai Cooperation Organisation (SCO):

1. SCO was founded in 2001 at Shanghai with China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan as founding members.

2. India and Pakistan became full members of SCO in 2017.

3. SCO has its permanent secretariat in Beijing, China.

4. SCO has no observer or dialogue partner category.

Which of the above statements are correct?

(a) 1 and 2 only

(b) 1, 2 and 3 only

(c) 1, 3 and 4 only

(d) 2 and 4 only

Ans : b)

UPSC Mains Practice Question

Ques: The SCO has emerged as an important Eurasian grouping seeking to counterbalance Western dominance. Discuss the implications of SCO's positions on terrorism, unilateral sanctions, and connectivity for India's strategic autonomy. (150 Words)

Page 07:GS 1 : Geography

Rivers are dynamic systems that shape landscapes, sustain ecosystems, and support human civilization. Their forms—single-threaded (meandering) or multi-threaded (braided)—directly affect flood risks, erosion patterns, ecosystem services, and resource management. Recent studies by geographers from the University of California, Santa Barbara (Chadwick et al.) and Stanford University (Hasson et al.) have uncovered physical mechanisms that determine why some rivers split while others remain single-threaded, providing fresh insights into river geomorphology and management.

Key Findings from Research

1. **Erosion–Deposition Imbalance**
   - **Single-thread rivers** maintain equilibrium: erosion on one bank is balanced by deposition on the other.
   - **Multi-thread rivers** erode faster than they deposit, leading to widening and splitting into multiple channels.
2. **Fundamental Instability of Multi-thread Rivers**
   - Sub-channels in braided rivers (e.g., Brahmaputra) are unstable, widening and splitting repeatedly over years.
   - This instability challenges conventional assumptions that erosion and deposition are balanced.
3. **Role of Vegetation**
   - Vegetated banks influence how meandering rivers migrate.
   - Vegetation promotes levee formation, controls sinuosity, and alters sedimentary deposits.
   - Unvegetated rivers migrate differently, moving mainly downslope without significant lateral spread.
4. **Methodology**
   - Researchers studied 84 rivers worldwide using **36 years of Landsat satellite data (1985–2021)**.
   - Employed **particle image velocimetry (PIV)** to track erosion and deposition patterns.

Geographers uncover why some rivers stay single while others split

Single-thread and multi-thread rivers feature different flood and erosion risks and ecosystem services. These attributes are becoming more relevant as people cope with more powerful water weather events. As a result, the mechanism that dictates threading has been becoming a research focus

G.B.S.N.P. Varma

Some rivers split up as they flow while some others don't. This riverine phenomenon has intrigued researchers for decades. What determines whether a river flows as a single thread or develops into a multi-threaded system? The question may sound simple but it has become a fundamental issue in river geomorphology, straddling concepts across geology, geography, ecology, and engineering.

Now, geographers at the University of California Santa Barbara (UCSB) have reported in a paper published in *Science* that they have solved the mystery.

By analysing the dynamics of 84 rivers over 36 years using satellite imagery and a novel image processing technique called particle image velocimetry, they say they have discovered the physical mechanism that causes there to be two types of rivers.

"We found that single-thread rivers are characterised by equilibrium between bank erosion and bar accretion – essentially, material lost from one bank is balanced by the material deposited on the other, maintaining a stable width," the study's senior author and and associate professor of geography at UCSB Vamsi Ganti said.

In contrast, he continued, multi-threaded rivers consistently exhibit higher rates of erosion relative to the deposition on the opposite banks, leading to the channel widening and eventually splitting. This imbalance, per the work, is the driving force behind multithreaded rivers.

That is, erosion is what drives the phenomenon of flow splitting in rivers.

'Growing recognition'

The two main types of rivers, single-thread and multi-thread, also feature different flood and erosion risks, ecosystem services, and water resources. These hazards and features are becoming more relevant as people and governments cope with more frequent and more intense water weather events. As a result, the physical mechanism that dictates single- versus multi-threading has been becoming a more important subject of research.

While previous research mostly examined where different types of rivers could be found, Mr. Ganti said, they also focused on how these rivers changed over time.

Many models that try to predict flooding risk assume that the rivers are flowing in streams of a fixed depth and width. This is not the case, and the new study has revealed the consequences of this assumption.

"There is growing recognition that many rivers have historically transitioned from multi-channel to single-channel after human interference," the study's lead author and UCSB Earth Research Institute postdoc Austin Chadwick wrote in an email.

Human interference includes damming, diking, sediment mining, clearing and snagging, and agricultural development.

Vector map

To understand why some rivers flow in a single channel while others split into many threads, the researchers turned to satellites. They studied 36 years of global Landsat images, covering the period from 1985 to 2021. From a worldwide survey of nearly 400 river sections, they chose 84 that were wide enough and moved at a speed suitable for their analysis. These included both single-thread and multithread rivers across different climates, slopes, and water flows.

They used a computer technique called particle image velocimetry, which tracked small changes in images from year to year, letting scientists measure how much a riverbank eroded and how much material accreted on the opposite side. To do this, they converted the satellite pictures into maps showing where land was dry and where it was covered by water.

Then, by comparing thousands of cross-sections of the rivers over time, they generated millions of small vectors that recorded the directions and speeds of erosion and accretion.

Finally, they combined all this data – more than four lakh measurements of erosion versus accretion – to test whether the two processes balanced out. This allowed them to discover the patterns that caused single or multithread rivers.

Plants have a say

For many decades, scientists have believed that single-channeled, meandering rivers needed vegetated banks to form and that plants and meandering rivers coevolved. But in an analysis published recently in Science, Stanford University researchers reported that that idea is based on a misinterpretation of the sedimentary record.

"We show that vegetated river bends move in a different direction than unvegetated river bends, relative to the down-slope direction that the entire river flows," Michael Hasson, the study's lead author and a PhD scholar at Stanford, said.

This renders the sedimentary deposits that unvegetated meandering rivers produce fundamentally different from the deposits of vegetated meandering rivers, even though they have the same form.

While the Chadwick et al. study focused on why rivers became meandering or braided, Hasson et al. examined meandering rivers.

Given a straight valley, Mr. Hasson added, they found vegetated river bends will move outwards toward the sides of the valley whereas unvegetated river bends will move down the valley, without mowing sideways.

"Our interpretation is that vegetation causes this difference in river movement mainly because it causes levees to form, which indirectly limits the sinuosity, a measure of how indirect a river's path is, of the river," Mr. Hasson said. "In turn, sinuosity controls how and where bends migrate."

Insights for India

Chadwick et al. considered three stretches of the Ganga, near Patna, Farakka, and Palsey (Bangladesh). For the Brahmaputra, they examined stretches near Bahadurabad (Bangladesh), Pandu (India), Pasighat (India), and one further upstream in the Himalaya.

The Brahmaputra is a classical braided river, Mr. Ganti said. The team also found that the Brahmaputra's threads eroded their banks fast.

"The shape of their channels is fundamentally unstable," Mr. Chadwick said of these threads. "The subchannels are prone to widen and split over years and decades, because the flow laterally erodes riverbanks faster than it deposits along them."

The find went against the conventional wisdom that erosion and deposition are in equilibrium.

"It is very surprising and intriguing that multi-thread rivers laterally erode faster than they deposit," Mr. Chadwick said.

In sum, the study has unravelled "a new sort of way that rivers can maintain their form, which is fuelled not by equilibrium but instead cycles of instability as sub-channels repeatedly widen and split over time."

"This fundamental instability is an important consideration for river management."

Reducing flood risk

Mr. Chadwick also said that along multi-thread rivers like the Ganga and the Brahmaputra, the rating curves used to measure river flows must be updated more frequently in order as the channels change their shape.

The problem in India is that in many parts, braided river sections have been artificially confined to single channels using built embankments, Akshay Kadu, a hydrologist at Stantec, a global engineering design and consulting company, said. He wasn't involved in the studies.

Another implication of the findings is that multi-channel rivers require significantly less space and time to return to their natural state, leading to lower restoration costs.

So, Mr. Kadu added, nature-based solutions such as removing artificial embankments, restoring the river's connection with its natural floodplains, creating vegetated buffer zones along riverbanks, reactivating abandoned channels, and building wetlands in braided sections can significantly lower the risk of flooding in adjacent areas.

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The Kamali River (known as Ghaghara in India) bifurcates in Nepal. SHERPARNJI (CC BY-SA)

> There is growing recognition that many rivers have historically transitioned from multi-channel to single-channel after human interference
>
> AUSTIN CHADWICK
> UCSB EARTH RESEARCH INSTITUTE

Insights for India

- **Brahmaputra River**: A classic braided river, prone to rapid bank erosion and unstable channels.
- **Ganga River (Patna, Farakka, Paksey stretches)**: Sections show multi-threading tendencies with significant channel shifts.

- **Human Interference**: Damming, embankments, and land-use changes often force rivers into single channels, increasing flood risks.

Implications

1. **Disaster Management**
   - Multi-thread rivers have **higher flood risks** due to instability.
   - India's flood management strategies need frequent updates of river flow measurements (rating curves).
2. **River Restoration & Nature-based Solutions**
   - Removing artificial embankments.
   - Restoring natural floodplains.
   - Creating vegetated buffer zones.
   - Reconnecting abandoned channels.
   - Constructing wetlands in braided sections.
3. **Policy and Governance**
   - Current flood models assume fixed river widths and depths, which is misleading.
   - Policies must integrate dynamic river morphology.
   - Restoration of natural river processes can reduce long-term costs and flood vulnerability.

Conclusion

The new research highlights that **river morphology is governed by instability cycles rather than equilibrium**. For India, where rivers like the Ganga and Brahmaputra support millions but also cause devastating floods, understanding the mechanisms of river threading is crucial. Integrating geomorphological insights with sustainable, nature-based river management strategies can help balance development needs with disaster risk reduction, ensuring long-term ecological and societal resilience.

UPSC Prelims Practice Question

Ques: The Brahmaputra River in India is considered a braided river because:

1. It exhibits multiple channels that constantly shift.

2. It maintains equilibrium between erosion and deposition.

3. Its channels are fundamentally unstable and prone to widening and splitting.

Select the correct answer using the code below:

A. 1 only

B. 2 only

C. 1 and 3 only

D. 1, 2 and 3

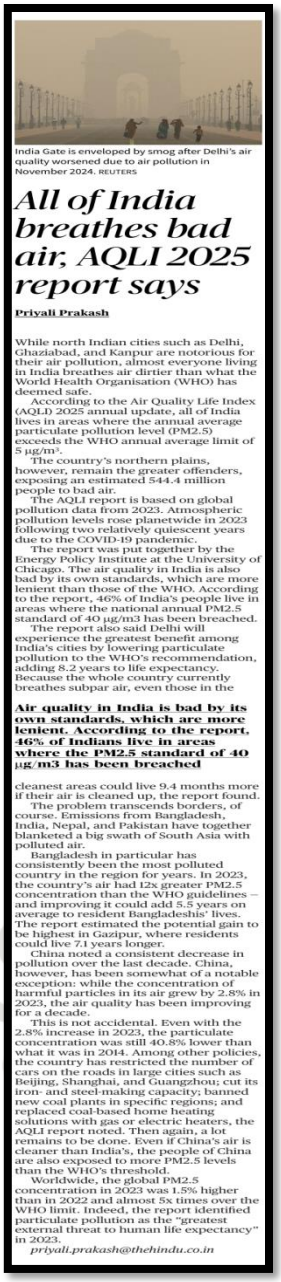
Ans: c)

UPSC Mains Practice Question

Ques: "Erosion–deposition imbalance is the key driver of river morphology." Analyse in the context of braided rivers like the Brahmaputra.(150 Words)

Page : 07 :GS 3: Environment

Air pollution has emerged as one of the gravest public health and environmental challenges of the 21st century. The **Air Quality Life Index (AQLI) 2025 report** by the Energy Policy Institute at the University of Chicago underscores that the entirety of India's population is exposed to levels of **particulate matter (PM2.5)** beyond the **World Health Organisation (WHO) safe limit** of 5 µg/m^3. The findings highlight how deteriorating air quality directly translates into loss of life expectancy and calls for urgent, sustained interventions.



India Gate is enveloped by smog after Delhi's air quality worsened due to air pollution in November 2024. REUTERS

All of India breathes bad air, AQLI 2025 report says

Priyali Prakash

While north Indian cities such as Delhi, Ghaziabad, and Kanpur are notorious for their air pollution, almost everyone living in India breathes air dirtier than what the World Health Organisation (WHO) has deemed safe.

According to the Air Quality Life Index (AQLI) 2025 annual update, all of India lives in areas where the annual average particulate pollution level (PM2.5) exceeds the WHO annual average limit of 5 µg/m³.

The country's northern plains, however, remain the greater offenders, exposing an estimated 544.4 million people to bad air.

The AQLI report is based on global pollution data from 2023. Atmospheric pollution levels rose planetwide in 2023 following two relatively quiescent years due to the COVID-19 pandemic.

The report was put together by the Energy Policy Institute at the University of Chicago. The air quality in India is also bad by its own standards, which are more lenient than those of the WHO. According to the report, 46% of India's people live in areas where the national annual PM2.5 standard of 40 µg/m3 has been breached.

The report also said Delhi will experience the greatest benefit among India's cities by lowering particulate pollution to the WHO's recommendation, adding 8.2 years to life expectancy. Because the whole country currently breathes subpar air, even those in the

Air quality in India is bad by its own standards, which are more lenient. According to the report, 46% of Indians live in areas where the PM2.5 standard of 40 µg/m3 has been breached

cleanest areas could live 9.4 months more if their air is cleaned up, the report found.

The problem transcends borders, of course. Emissions from Bangladesh, India, Nepal, and Pakistan have together blanketed a big swath of South Asia with polluted air.

Bangladesh in particular has consistently been the most polluted country in the region for years. In 2023, the country's air had 12x greater PM2.5 concentration than the WHO guidelines – and improving it could add 5.5 years on average to resident Bangladeshis' lives. The report estimated the potential gain to be highest in Gazipur, where residents could live 7.1 years longer.

China noted a consistent decrease in pollution over the last decade. China, however, has been somewhat of a notable exception: while the concentration of harmful particles in its air grew by 2.8% in 2023, the air quality has been improving for a decade.

This is not accidental. Even with the 2.8% increase in 2023, the particulate concentration was still 40.8% lower than what it was in 2014. Among other policies, the country has restricted the number of cars on the roads in large cities such as Beijing, Shanghai, and Guangzhou; cut its iron- and steel-making capacity; banned new coal plants in specific regions; and replaced coal-based home heating solutions with gas or electric heaters, the AQLI report noted. Then again, a lot remains to be done. Even if China's air is cleaner than India's, the people of China are also exposed to more PM2.5 levels than the WHO's threshold.

Worldwide, the global PM2.5 concentration in 2023 was 1.5% higher than in 2022 and almost 5x times over the WHO limit. Indeed, the report identified particulate pollution as the "greatest external threat to human life expectancy" in 2023.

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Key Findings of the Report

1. **All of India Affected**
   - 100% of India's population lives in areas exceeding WHO's PM2.5 limits.
   - 46% of people live in regions even above India's more lenient national standard of 40 µg/m^3.
2. **Regional Disparities**
   - **Northern Plains** (Delhi, Ghaziabad, Kanpur, etc.) are the worst affected, with **544 million people** exposed to hazardous air.
   - Delhi alone could gain **8.2 years in life expectancy** if air quality met WHO norms.
3. **Life Expectancy Impact**
   - Poor air quality reduces life expectancy across India.
   - Even in the cleanest regions, reducing PM2.5 to WHO standards could add **9.4 months** to lives.
4. **South Asian Neighbourhood**
   - Air pollution transcends borders: emissions from **India, Pakistan, Nepal, and Bangladesh** collectively blanket the region.
   - **Bangladesh** remains the world's most polluted country, with PM2.5 levels 12x WHO limits; improving it could add **5.5 years** to life expectancy.
5. **China's Case**
   - Despite a 2.8% rise in 2023, China's PM2.5 levels are **40.8% lower than in 2014**, due to aggressive policies:
     - Vehicle restrictions in major cities.
     - Coal-to-gas/electricity shift in heating.
     - Cutting steel capacity and banning new coal plants in certain regions.
6. **Global Trends**
   - Global PM2.5 rose by **1.5% in 2023**.
   - On average, global air is **~5x dirtier** than WHO's recommended limit.
   - The report identifies **air pollution as the greatest external threat to human life expectancy** in 2023, ahead of other risks like conflict and infectious disease.

Implications for India

- **Public Health**: Chronic exposure leads to respiratory illnesses, cardiovascular diseases, and premature deaths.
- **Economic Costs**: Reduced productivity, higher healthcare expenditure, and loss of demographic dividend.
- **Governance Challenge**: Requires coordination between central, state, and municipal bodies across multiple sectors (transport, power, industry, agriculture).

- **Regional Diplomacy**: Calls for transboundary cooperation in South Asia, since pollution disperses across borders.
- **Learning from China**: India can replicate success by focusing on structural changes—renewable energy, curbing coal, public transport expansion, and strict industrial norms.

Conclusion

The AQLI 2025 report is a wake-up call: **air pollution is silently shortening Indian lives**. With almost half of the population living in areas breaching even national standards, India must prioritize a **multi-pronged clean air strategy**—transitioning to renewable energy, enforcing emission controls, promoting sustainable mobility, and strengthening regional cooperation. Without urgent action, the economic and human costs of dirty air will undermine India's development trajectory and public health security.

UPSC Prelims Practice Question

Ques :The Air Quality Life Index (AQLI) is published by:

A) World Health Organization (WHO)

B) United Nations Environment Programme (UNEP)

C) Energy Policy Institute at the University of Chicago (EPIC)

D) World Bank

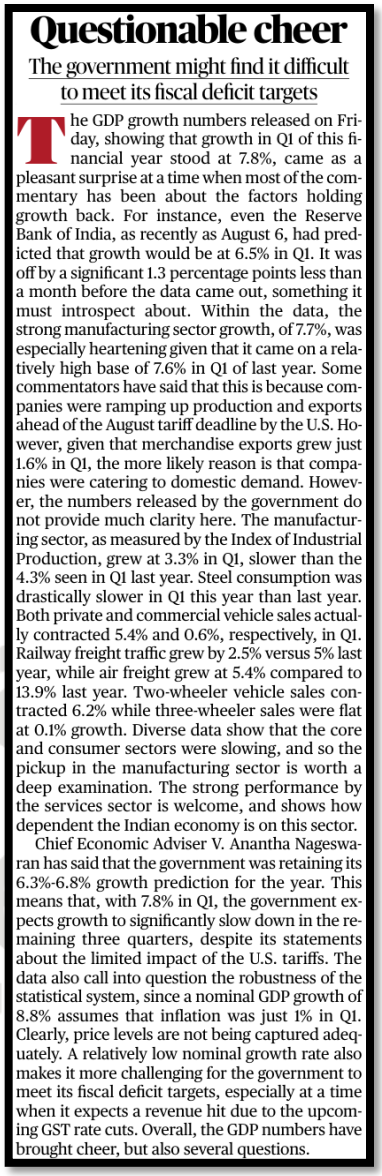
Ans : c)

UPSC Mains Practice Question

Ques : Given that air pollution transcends borders in South Asia, discuss the need for regional cooperation in tackling the crisis.**(150 Words)**

Page 08 :GS 3 : Indian Economy

India's Q1 GDP growth for the current financial year came in at **7.8%**, significantly higher than the RBI's estimate of **6.5%**. While the headline figure generated optimism, a closer look at the underlying data reveals inconsistencies, structural weaknesses, and challenges for fiscal management. The divergence between real sector data and GDP estimates raises questions about the robustness of India's statistical system and the sustainability of growth momentum.



Questionable cheer

The government might find it difficult to meet its fiscal deficit targets

The GDP growth numbers released on Friday, showing that growth in Q1 of this financial year stood at 7.8%, came as a pleasant surprise at a time when most of the commentary has been about the factors holding growth back. For instance, even the Reserve Bank of India, as recently as August 6, had predicted that growth would be at 6.5% in Q1. It was off by a significant 1.3 percentage points less than a month before the data came out, something it must introspect about. Within the data, the strong manufacturing sector growth, of 7.7%, was especially heartening given that it came on a relatively high base of 7.6% in Q1 of last year. Some commentators have said that this is because companies were ramping up production and exports ahead of the August tariff deadline by the U.S. However, given that merchandise exports grew just 1.6% in Q1, the more likely reason is that companies were catering to domestic demand. However, the numbers released by the government do not provide much clarity here. The manufacturing sector, as measured by the Index of Industrial Production, grew at 3.3% in Q1, slower than the 4.3% seen in Q1 last year. Steel consumption was drastically slower in Q1 this year than last year. Both private and commercial vehicle sales actually contracted 5.4% and 0.6%, respectively, in Q1. Railway freight traffic grew by 2.5% versus 5% last year, while air freight grew at 5.4% compared to 13.9% last year. Two-wheeler vehicle sales contracted 6.2% while three-wheeler sales were flat at 0.1% growth. Diverse data show that the core and consumer sectors were slowing, and so the pickup in the manufacturing sector is worth a deep examination. The strong performance by the services sector is welcome, and shows how dependent the Indian economy is on this sector.

Chief Economic Adviser V. Anantha Nageswaran has said that the government was retaining its 6.3%-6.8% growth prediction for the year. This means that, with 7.8% in Q1, the government expects growth to significantly slow down in the remaining three quarters, despite its statements about the limited impact of the U.S. tariffs. The data also call into question the robustness of the statistical system, since a nominal GDP growth of 8.8% assumes that inflation was just 1% in Q1. Clearly, price levels are not being captured adequately. A relatively low nominal growth rate also makes it more challenging for the government to meet its fiscal deficit targets, especially at a time when it expects a revenue hit due to the upcoming GST rate cuts. Overall, the GDP numbers have brought cheer, but also several questions.

Key Observations from the Data

1. **Surprise Upside in Growth**
   - Q1 GDP at 7.8% was **1.3 percentage points higher** than RBI's projection.
   - Manufacturing sector reported **7.7% growth**, despite weak indicators.
2. **Manufacturing Puzzle**
   - Index of Industrial Production (IIP): **3.3% growth** (slower than 4.3% last year).
   - Steel consumption: sharply lower.
   - Vehicle sales: contraction in both private (-5.4%) and commercial (-0.6%).
   - Railway freight: **2.5% growth** vs. **5% last year**.
   - Two-wheeler sales: **-6.2%**, three-wheelers flat (0.1%).
   - Suggests domestic demand may not be as robust as GDP data indicates.
3. **Services Sector as Growth Driver**
   - Services continue to provide resilience, underlining India's dependence on them.
4. **Statistical Concerns**
   - **Nominal GDP growth**: only **8.8%**, implying inflation of just ~1%.
   - Actual price levels not adequately reflected in deflator calculations.
   - Raises credibility concerns about India's data systems.
5. **Fiscal Implications**
   - Low nominal growth → reduced tax buoyancy.
   - Government faces revenue stress due to **proposed GST cuts**.
   - Fiscal deficit targets may become harder to achieve.
6. **Growth Outlook**
   - Chief Economic Adviser retained FY growth forecast at **6.3%–6.8%**, implying slowdown in the next three quarters.
   - Uncertainty persists on impact of global factors, particularly **U.S. tariffs**.

Implications for India

- **Policy Credibility**: Discrepancies between ground-level data and GDP estimates can erode trust in statistics.
- **Revenue and Fiscal Health**: Lower-than-expected nominal GDP growth affects fiscal consolidation.
- **Sectoral Imbalances**: Overdependence on services makes the economy vulnerable to external shocks.
- **Employment Challenge**: Manufacturing slowdown impacts job creation, worsening unemployment pressures.
- **Global Trade Tensions**: India must recalibrate to mitigate risks from U.S. tariffs and slowing global demand.

Conclusion

While the 7.8% Q1 GDP growth figure offers a reason for optimism, the underlying inconsistencies in sectoral performance and statistical assumptions demand caution. Without strengthening the reliability of India's statistical apparatus, broad-basing growth across manufacturing, services, and agriculture, and maintaining fiscal discipline, the current growth trajectory may prove unsustainable. Policymakers must treat the "cheer" with scrutiny to ensure that India's economic recovery is genuine, broad-based, and durable.

UPSC Mains Practice Question

Ques: The services sector continues to drive India's growth momentum, but the real picture of manufacturing requires deeper scrutiny." Comment.**(150 words)**

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Carbon Border Adjustment Mechanisms (CBAMs) by the EU (from 2026) and the U.K. (from 2027) will impose carbon tariffs on imports to match domestic carbon pricing. For India, a major exporter of steel and aluminum, this creates significant competitiveness concerns.

Key Analysis

1. **Impact on India's Exports**
   - India-U.K. FTA reduces tariffs on steel &aluminum to zero, but CBAM will impose ~20–40% cost increase due to U.K.'s carbon price of **$66/tCO$_2$** vs India's projected **$8–10/tCO$_2$** under CCTS.
   - Fragmented recognition of India's existing carbon levies (coal cess, RPO, etc.) raises uncertainty.
   - Risk of supply chain disruption, reduced market access, and erosion of export competitiveness.
2. **Challenges of Fragmented Carbon Pricing**
   - Different carbon price levels across countries (high in EU/UK, low in developing nations).
   - Distortion of trade flows and violation of multilateral equity under Paris Agreement.
   - Increases compliance costs and undermines global climate goals.
3. **Rethinking India's Carbon Pricing Strategy**
   - Streamline multiple implicit levies → a **single explicit carbon tax** under CCTS.
   - Use revenues for **industrial decarbonisation & clean tech adoption**.
   - Explore synergies with developing countries for a **coalition against unilateral CBAMs**.
   - Support global proposals like **IMF's International Carbon Price Floor (tiered pricing)** and regional carbon market linkages.

Rethinking carbon pricing and taxes

India's free trade agreement (FTA) with the U.K., heralded as the gold standard by the Minister for Commerce and Industry, Piyush Goyal, has a lot going for it. Yet, it does not address the one imminent policy instrument that is likely to significantly upend its possible benefits for India.

The U.K.'s Carbon Border Adjustment Mechanism (UK-CBAM), similar in principle to the European Union (EU)'s CBAM, will be implemented from January 2027. It covers both direct and indirect emissions for hard-to-abate sectors such as steel and aluminum, including the electricity used in their production. CBAM's scope will later be expanded to other products.

Mr. Goyal noted that India would retaliate against any harmful impacts of CBAM. However, any prospective action may not provide the desired relief for the imminent cost impact. This is an issue that needs to be addressed upfront in a bilateral agreement. For instance, in the recently announced U.S.-EU trade agreement, the EU has agreed to address U.S. concerns on CBAM and other rules relating to corporate sustainability, through flexibilities.

CBAM effect on India's exports

Before the FTA, the U.K.'s MFN rates for aluminium and iron and steel were in the range of 0-6%. Under the India-U.K. FTA, these duties will be reduced to zero for Indian exports. At first glance, this appears beneficial for India. But from January 2027, aluminium and steel imports will need to match the U.K.'s carbon price, which, as of now, is approximately $66/tCO$_2$, translating to a cost increase of at least 20% to 40% for exporters.

The U.K.'s CBAM permits deductions for carbon pricing in exporting countries, including carbon taxes or prices paid under emissions trading schemes. While Indian industry pays levies such as coal cess, bears costs under the renewable purchase obligation, and now an explicit carbon price under the recently announced Carbon Credit Trading Scheme (CCTS), it is unclear whether the U.K. will allow deductions beyond the CCTS. Even with respect to the CCTS, a major challenge is the large gap between India's projected carbon price, estimated by the Bureau of Energy Efficiency at around $8-10 per tonne of CO_2, and the U.K.'s carbon price, currently at $66 per tonne.

As with the EU's CBAM, the U.K.'s approach is focused on levying a charge on exports into the U.K. to match the embedded carbon price paid by domestic producers. By levying the same price as paid by U.K. producers in specific sectors where the U.K. perceives a competitive disadvantage, the unilateral setting of carbon price upends multilateral commitments on emission reductions under the United Nations Framework Convention on Climate Change and the Paris Agreement.

There can never be a singular carbon price across economies as emissions vary across countries based on energy mix, industry structure, and technological availability and viability. A joint report by multilateral institutions in October 2024 urged greater coordination on carbon markets, warning that fragmented systems cause distortions, leakage, and undermine net-zero goals.

Fragmented markets will only raise compliance costs, disrupt supply chains, and hinder both growth and climate goals. A global carbon pricing agreement is essential to align methods for measuring emissions, streamline reporting requirements, and ensure support for green tech transfer. The International Monetary Fund in 2021 proposed an International Carbon Price Floor (ICPF) with tiered pricing: $25 for low-income, $50 for middle-income, and $75 for high-income countries. Building on this, the World Economic Forum proposed a three-phased approach to facilitate a smooth transition to global carbon pricing, starting with minimum standards for pricing and reporting, and linking this to regional systems and harmonising monitoring and verification processes. It also proposed linking regional carbon markets (EU, China, India, other parts of Asia) to reduce fragmentation and move towards a unified global system.

It is important for the Indian government to assess whether this model would work and explore synergies with like-minded developing countries. In an era of rising tariff and non-tariff barriers, we cannot risk fragmented carbon pricing turning into massive compliance costs.

National action

Amidst rising protectionism global consensus is unlikely in the short term. Hence Indian industry must view clean technologies as tools for efficiency and competitiveness, and not just as export compliance. The government needs to act as an enabler by streamlining various implicit carbon taxes into a unified carbon market framework. Implementing stricter emission reduction targets under a single explicit carbon tax through the CCTS, instead of multiple taxes on carbon-intensive sectors, will improve carbon price discovery, simplify compliance and monitoring, and preserve our competitiveness. It would position India to build a stronger carbon pricing system, capable of joining a cohesive global carbon market in the future. Revenues from these carbon taxes should be ploughed back for industrial decarbonisation. The draft climate finance taxonomy developed by the Ministry of Finance, is another initiative that will enable investors to boost clean tech investment.

In a world where multilateral rules are being undermined, and bilateral free trade deals are failing to secure equity, proactive action between government and industry within the country is the only answer.

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Mumbai-based economist. Views are personal

R.V. Anuradha
Partner, Clarus Law Associates, New Delhi. Views are personal

In an era of rising tariff and non-tariff barriers, we cannot risk fragmented carbon pricing turning into massive compliance costs

Conclusion

CBAM is both a challenge and an opportunity. India must strengthen its domestic carbon pricing, simplify compliance, and invest revenues into green technologies. This will not only protect export competitiveness but also prepare India for eventual integration into a cohesive global carbon market.

UPSC Mains Practice Question

Ques: Carbon Border Adjustment Mechanisms (CBAMs) by developed countries pose significant challenges for India's trade competitiveness and climate policy. Discuss the implications of CBAM for India and suggest policy measures to safeguard economic and environmental interests.**(150 words)**

Noise pollution is rising but policy is falling silent

Rohan Singh

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Urban India must adopt a rights-based approach to fight growing noise pollution

Urban noise pollution has quietly emerged as one of the most neglected public health crises of our time. Across Indian cities, decibel levels routinely exceed permissible limits, especially near schools, hospitals and residential zones, eroding the constitutional promise of peace and dignity.

In 2011, the Central Pollution Control Board (CPCB) launched the National Ambient Noise Monitoring Network (NANMN), which was envisioned as a real-time data platform. A decade later, the network functions less as a tool for reform and more as a passive repository. Data are scattered across dashboards, but meaningful enforcement remains elusive.

The problem lies not only in flawed sensor placement (many are mounted 25 to 30 feet high, in violation of the CPCB's 2015 guidelines – but in a deeper absence of accountability. Whether biased or incomplete, the available data remains politically and administratively inert. Contrast this with Europe, where noise-induced illnesses and mortality statistics actively shape policy. The European Environment Agency recently pegged the annual economic cost of urban noise pollution at €100 billion, prompting redesigns in speed zones and zoning frameworks. India, by contrast, suffers from regulatory fragmentation and institutional silence. Right to Information queries go unanswered; State Pollution Control Boards operate in silos; and even in States such as Uttar Pradesh, first-quarter 2025 data remains unavailable to the public.

Apathy, neglect, serious questions

This is not merely environmental apathy. It borders on constitutional neglect. Article 21 guarantees the right to life with dignity, encompassing mental and environmental well-being. Article 48A mandates proactive environmental protection. When "silence zones" become epicentres of noise, it raises serious questions about state capacity and civic respect.

The Noise Pollution (Regulation and Control) Rules, 2000 offer a robust legal framework, but enforcement has remained largely symbolic. According to the World Health Organization, safe limits in silent zones are 50 dB(A) by day and 40 dB(A) by night. Yet, in cities such as Delhi and Bengaluru, readings near sensitive institutions often reach 65 dB(A)-70 dB(A).

Infrastructure expansion and logistics-driven traffic have exacerbated the crisis. Late-night drilling and crane operations continue despite regulatory restrictions. In 2024, the Supreme Court of India reaffirmed that environmental disruptions – including excessive noise – can infringe upon the fundamental right to life and dignity under Article 21. In Noise Pollution (V), In Re, the Court recognised that unchecked urban noise poses a serious threat to mental well-being and civic freedom (The case dates back to 2005, and was referenced and interpreted again by the Court in 2024, in the context of renewed concerns over urban noise and its impact on fundamental rights).

The ecological cost is no less troubling. A 2025 study by the University of Auckland found that urban noise and artificial light disrupted the sleep and song patterns of common mynas after just one night. The birds sang less and with reduced complexity, impairing their social signalling. This is not merely an avian concern, it signals a breakdown in ecological communication systems. When biodiversity loses its voice, it reflects a deeper erosion of urban environmental ethics.

Civic fatigue and the politics of silence

Urban noise is not just a technical issue, it is deeply political. The absence of sustained public outrage stems from a normalisation of sonic aggression. Honking, drilling and loudspeakers have become ambient irritants, tolerated rather than challenged. This civic fatigue is compounded by the invisibility of noise as a pollutant. Unlike smog or garbage, sound leaves no residue, no visible stain – only a frayed mind and a disturbed sleep cycle. The result is a quiet erosion of public health, especially among children, the elderly, and those with pre-existing conditions.

India's legal framework, while robust on paper, suffers from fragmented execution. The Noise Pollution Rules, 2000 are rarely updated to reflect urban realities. There is little coordination between municipal bodies, traffic police and pollution control boards. A national acoustic policy akin to the National Ambient Air Quality Standards is urgently needed. Such a framework must define permissible decibel levels across zones, mandate regular audits, and empower local grievance redress mechanisms. Without inter-agency synergy, enforcement will remain sporadic and symbolic.

Adopt a culture of 'sonic empathy'

Ultimately, the fight against urban noise is not just regulatory, it is cultural. Cities must cultivate a shared ethic of sonic empathy. Public campaigns should move beyond slogans to immersive education, in schools, driver training programmes and community spaces. Just as seatbelt usage became a norm through sustained messaging, honking reduction and noise sensitivity can be socially internalised. Silence is not the absence of sound, but the presence of care.

Where, then, must reform begin? First, decentralise NANMN – grant local bodies access to real-time noise data and the responsibility to act.

Second, link monitoring to enforcement – without penalties, zoning compliance or construction curbs, data remains performativity.

Third, institutionalise awareness – initiatives such as "No Honking Day" must evolve into sustained behavioural campaigns.

Fourth, embed acoustic resilience in urban planning – cities must be designed not just for speed and expansion, but for sonic civility.

Silence must not be imposed and must be enabled through design, governance and democratic will. Unless India adopts a rights-based lens to urban noise, its smart cities may remain unliveable at the level of sound.

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UPSC Mains Practice Question: Urban noise pollution in India is not just an environmental concern but a constitutional challenge." Critically examine in the light of Article 21 and Article 48A. **(150 words)**

Context :

Noise pollution, though invisible, has emerged as one of the gravest urban public health challenges in India. Despite constitutional safeguards under Article 21 (right to life with dignity) and a strong legal framework through the Noise Pollution (Regulation and Control) Rules, 2000, enforcement has remained weak and fragmented. The recent silence of policy, despite rising decibel levels across Indian cities, underlines a serious governance gap.

Key Analysis

1. **Current Situation in India**
   - Decibel levels in cities like Delhi and Bengaluru often cross 65–70 dB(A) near sensitive zones (schools, hospitals), far above the WHO norms of 50 dB(A) daytime and 40 dB(A) nighttime.
   - The National Ambient Noise Monitoring Network (2011), instead of being a tool for policy action, has become a passive data repository due to flawed sensor placement and lack of accountability.
   - First-quarter 2025 data from states like Uttar Pradesh remains unavailable, showing weak transparency and administrative inertia.
2. **Constitutional and Legal Dimension**
   - Article 21: Noise pollution is directly linked to health and mental well-being.
   - Article 48A: Mandates proactive environmental protection.
   - Supreme Court judgments (Noise Pollution V, In Re, reaffirmed in 2024) recognise excessive noise as an infringement of fundamental rights.
   - Yet, enforcement of Noise Pollution Rules, 2000 has been largely symbolic.
3. **Comparative Perspective**
   - Europe has quantified the annual economic cost of noise pollution (€100 billion), leading to speed zone redesigns and new zoning frameworks.
   - In contrast, India suffers from institutional silos — municipal bodies, traffic police, and pollution boards work in isolation.
4. **Public Health and Ecological Concerns**
   - Noise pollution impacts children, elderly, and patients with pre-existing conditions through disturbed sleep cycles and mental fatigue.
   - A 2025 study (University of Auckland) shows even birds lose song complexity and social communication under urban noise, reflecting wider ecological disruptions.
5. **Socio-political Factors**
   - Civic fatigue and normalisation of "sonic aggression" (honking, drilling, loudspeakers) have reduced public outrage.
   - Unlike visible pollutants like smog, noise leaves no residue, making it less tangible but equally harmful.
6. **Way Forward**
   - **Decentralise monitoring**: Local bodies must access and act on real-time NANMN data.
   - **Link data to enforcement**: Penalties, zoning compliance, and restrictions on construction noise must be enforced.
   - **Behavioural change campaigns**: Beyond "No Honking Day," schools, driver training, and public campaigns should cultivate "sonic empathy."
   - **Urban planning**: Embed acoustic resilience in city design with green buffers, better traffic management, and silent construction practices.
   - **National Acoustic Policy**: Similar to air quality standards, a dedicated framework must be created.

Conclusion

Rising noise pollution in India represents not just environmental neglect but a constitutional failure to safeguard dignity and well-being. To make smart cities truly liveable, India must adopt a rights-based approach to urban soundscapes. Silence should not be imposed by force but enabled through governance, cultural change, and urban design. The fight against noise is ultimately a fight for healthier, more humane cities.