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The Hindu Important News Articles For UPSC CSE

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Add- 21/B, Om Swati Manor Chs, J.K. Sawant Marg, Opp. Shivaji Natyamandir, Behind Cambridge Showroom, Dadar (West) Mumbai – 400028
Con.- 09820971345, 9619071345, 9223209699
G-mail-lakshyaacademymumbai@gmail.com

Page 01 : GS III :Indian Economy / Preliminary Examination

Recently, the Government of India has changed the **base year** of calculation of **the Index of Industrial Production (IIP) from 2011-12 to 2022-23 to make the country's economic indicators more relevant and** modern. According to the first data released under this new base year (April 2026), India's industrial growth **rate stood** at 4.9%, which is slower than the same period last year (5.8% on the base year of 2011-12).

Industrial output slows in new data series

Base year revised from 2011-12 to 2022-23; growth in April was slower than 5.8% recorded last year

New series incorporates water supply, sewerage, and waste management activities, and gas supply

Of four indices, three grew at a slower pace and one shrank; mining and quarrying fell over 5%

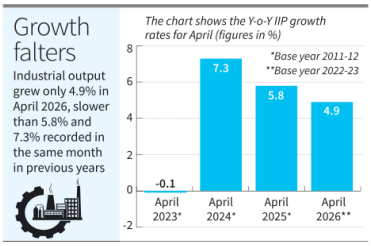
Ashokamithran T.
MUMBAI

India's industrial output, as measured by the Index of Industrial Production, grew 4.9% in April 2026 under the revised series with 2022-23 as base year released on Monday. The growth rate was slower than 5.8% recorded in the same period last year with 2011-12 as base year.

The new series has broadened the coverage of the index by incorporating water supply, sewerage and waste management activities and gas supply, while retaining the existing three core sectors – mining, manufacturing, and electricity. Of the four sectoral indices, three grew at a slower pace and one shrunk in the reporting month on a year-on-year basis. While mining and quarrying output declined by over 5.1%, manufacturing sector output grew at 6.2% in the reporting month, slightly slower than the 6.3% in 2025. The electricity and gas supply sector grew at 4.9% while water supply, sewerage and waste management grew at 6.6%.

The base year to assess major macroeconomic indicators, which was earlier 2011-12, was revised as 2022-23 in 2026 beginning with the GDP estimates. The IIP is the latest estimate to adopt 2022-23 as the base year. The dataset will assume the index to be 100 as of 2022-23 and then calculate the growth rate of the index in subsequent years.

Besides adding new sectoral divisions, the new series also entails "improved granularity". For instance, mining sector index will now include data classification for fuel minerals, metallic minerals, and non-metallic minerals. Similarly, the electricity index has been classified into renewable and non-renewable sources.



The new basket of goods to calculate IIP consists of 1,042 products mapped to 463 item groups. The older series had just 839 items mapped to 407 item groups. Further, the weights provided to each sector and each industry within the manufacturing sector has been revised in line with the updated Gross Value Added (GVA) 2022-23 series.

Manufacturing sector

The new series has also enabled users with a formula to link the older and new series of data to ensure comparability.

Within the manufacturing sector, which constitutes about 75% of the IIP basket of goods, six industries contracted, including major ones like manufacture of "coke and refined petroleum products", which shrank 0.4%, and "wearing apparel" industry in which the output declined 7%. Manufacturing of wood products other than furniture shrank the most, with output dipping 12.5%.

The rest of the industry categories within the manufacturing sector grew, with electrical equipment industry output increasing 19.2% in April 2026.

Under use-based classification, the series classifies the industries into primary, capital goods, intermediate goods, infrastructure/construction goods, consumer durables and consumer non-durables.

Growth in three of the six categories slowed in April 2026 on a year-on-year basis. Primary goods, consumer durables, and consumer non-durables grew 0.8%, 4.3% and 2.8% respectively in April 2026, slower than the same month in 2025. Intermediate goods output grew faster by 0.19% clocking a growth rate of 7.7% in April 2026, as against the same month in the previous fiscal.

Capital goods and infrastructure goods output growth quickened to 16% and 7.1% respectively in the reporting month as against the same month in the previous fiscal.

- This change follows the base year revision of the Gross Domestic Product (GDP) in 2026 to reflect the ground reality of the industrial sector more accurately. This topic is very important for the UPSC Mains Exam **General Studies Paper-3 (GS-3: Indian Economy and Planning, Resource Mobilization, Progress, Development and Employment**).

Key Features of the New IIP Series

- **Change in Base Year:** The base year has been revised from 2011-12 to 2022-23 **for accurate estimation of industrial activities**. The 2022-23 index will be taken as '100' to measure the growth rate further.
- **Expansion of Coverage:** The old series included only three main sectors (mining, manufacturing, and electricity). The new chain has now **expanded its scope by adding water supply, sewerageand waste management activities** and **gas supply**.
- **More Detailed and Granularity:**
  - The mining sector is now divided into fuel minerals, metallic minerals and non-metallic minerals.
  - The Electricity Index is now classified into renewable and non-renewable energy sources.

- **Increase in Basket of Goods:** The number of items in the new series **has been increased to 1,042 products (463** item groups), while the old series had only 839 products (407 item groups).
- **Restructuring of Weights:** The weights of each sector and manufacturing industries have been updated as per the data of the Gross Value Added (GVA) series for 2022-23.
- **Comparability:** For the convenience of the users, a formula has been given to compare the data of the old and new series by combining them.

Economic Analysis of April 2026 Data

Sectoral Performance

- **Manufacturing:**The manufacturing sector, which accounts **for about 75% of the** IIP basket, grew at 6.2% **in April** 2026, marginally lower than 2025 (6.3%).
    - Under manufacturing, 6 industries registered decline. Coke and refined petroleum products decreased by **0.4%** and the apparel industry by **7%.** The steepest decline was in wood products (excluding furniture) at **12.5%.**
    - In contrast, **the electrical equipment industry recorded a spectacular growth of 19.2%.**
- **Mining & Quarrying:** The sector saw the largest decline, registering a **shrinkage of over 5.1%.**
- **Electricity and Gas Supply:** This combined sector recorded a growth of **4.9%.**
- **Water Supply, Sewerage, and Waste Management:** This newly connected sector **recorded a robust growth of 6.6%.**

Use-based classification performance

- **Slower-growth sectors:** Primary goods (0.8%), consumer durables (4.3%), and consumer non-durables (2.8%) grew at a slower pace compared to the previous year, indicating some slowdown in rural and urban consumption.
- **Fast-growing sectors:** Intermediate goods grew at 7.7%.
- **Capital &Infrastructure Goods:** Capital goods grew at **16%** and infrastructure goods at **7.1**%. This shows that huge spending is being done on infrastructure and investment by the government and the private sector.

Administrative and Economic Implications for UPSC Mains

- **Accuracy in policy formulation:** The old base year (2011-12) being more than a decade old, was not able to give the right weightage to modern industries (e.g. digital technology, renewable energy). The new base year (2022-23) will help the RBIand the government to formulate more precise monetary and fiscal policies.

- **Disclosure of Structural Changes:** The separation of 'renewable energy' in the power sector shows that the Indian government's focus is on sustainable development and clean energy.

- **Mixed Economic Signals: The steep growth in** capital goods (16%) indicates that the economy's production capacity is expanding, but the decline in mining (-5.1%) and the slower growth of consumer goods point to constraints in domestic demand and the supply of raw materials.

Conclusion

Changing the base year of the IIP to 2022-23 and including eco-economic activities (such as waste management and water supply) is a progressive step towards bringing the Indian statistical system at par with global standards. The 4.9% slowdown in the April 2026 data makes it clear that while the investment cycle in the economy is strong, it is imperative to remove the constraints in the mining sector and revive employment-oriented industries (such as the garment industry) in the manufacturing sector to achieve a sustainable and high industrial growth rate. In the future, this new statistical series will provide a more transparent and reliable basis for evaluating India's true economic potential.

UPSC Prelims Exam Study Questions

Question: What is the main purpose of changing **the base year in** IIP**?**

(**a)** Artificially increasing industrial production

(**b)** Bringing the statistical series into line with the current economic structure

(**c)** Increasing tax collection

(**d)** Promoting exports

Answer: (**b)**

UPSC Mains Practice Questions

Question: Why was there a need to change the base year of Index of Industrial Production (**IIP)** from 2011-12 to 2022-23**?** Mention the salient features of the new series. **(150 words)**

Page 08 : GS II :International Relations / Preliminary Examination

The 'India-Middle East-Europe Economic Corridor' (IMEC), announced at the September 2023 G-20**Summit (New Delhi),** is a multifaceted and ambitious connectivity project. Its purpose is to connect India with Europe through the Arabian Peninsula and the Mediterranean Sea. However, the recent geopolitical tensions in the Middle East and **the Iran conflict (Operation Epic Fury - 2026)** have trapped the commercial interests of this project in the vortex of geopolitical security.

IMEC is caught between commerce and geopolitics

Rajeev Agarwal

Retired colonel, a Senior Research Consultant at CRF, Delhi, and the author of 'Between Tehran and Tel Aviv – Gaza's Story of Unending War'

The Iran conflict strengthens the case for the India-Middle East-Europe Economic Corridor (IMEC) while simultaneously complicating its execution

The ongoing war in Iran has shattered many myths and brought to light realities that expose the structural vulnerabilities of the existing world order. Iran, which was no match for the combined military might and technological superiority of Israel and the United States, has not only withstood the military onslaught but has also retaliated in ways that were neither expected nor planned for. Nearly three months into the conflict, although a fragile ceasefire is holding, there appears to be no immediate solution to end the war or achieve the politico-military objectives that Israel and the U.S. set at its outset. While Iran has suffered major losses to its leadership, infrastructure and military assets, the American military has also incurred unprecedented losses.

Lessons from the Iran conflict

A recent U.S. Congressional Research Service report has noted that 42 U.S. aircraft have been lost or damaged so far during "Operation Epic Fury" – the war with Iran – which includes fifth generation stealth fighters such as the F-35. Plus, the ability to intercept Iranian missiles and drones has been severely degraded as more than half the total inventory of Patriot, Tomahawk and Terminal High Altitude Area Defense (THAAD) missiles have been expended. With more than 240 American targets reportedly hit by Iran, the conflict has shattered the myth that military superiority alone will guarantee an outright victory. Several of the asymmetric tactics employed by Iran have caught the U.S. and Israel on the back foot.

Another reality check underscored by this war is the critical importance of global choke points and how their blockade can severely disrupt the global economy. Iran, by imposing a blockade on the Strait of Hormuz early in the conflict, has virtually brought the global economy to its knees. Nearly 20 million barrels of crude oil, accounting for about a third of global oil supplies, pass through this narrow sea passage every day. India is among the countries most affected, as it imports nearly 88% of its crude oil requirements, amounting to about 1.8 billion barrels annually. While the world grapples with the blockade and works to diversify its energy sources, one thing is clear: there is an urgent need to explore and develop alternative connectivity options beyond existing trade routes, particularly maritime routes. New routes and corridors must be developed that avoid the two 'C's – conflict zones and choke points.

However, this realisation is neither new nor have countries been idle in pursuing solutions. Transnational connectivity projects such as the International North-South Transport Corridor (INSTC) and the Belt and Road Initiative (BRI) were conceived precisely for this purpose. The INSTC was designed to bypass the Suez Canal choke point, while the overland component of the BRI across Asia and Europe seeks to reduce dependence on both the Malacca Strait and the Suez Canal. Another major connectivity project is the India-Middle East-Europe Economic Corridor (IMEC). Unlike the other initiatives, IMEC traverses parts of West Asia, a region that has been significantly affected by the current conflict.

The IMEC framework

What is IMEC? The IMEC is a transformative and ambitious connectivity initiative that was officially announced at the G-20 Summit in New Delhi in September 2023. It seeks to connect India with Europe across the Arabian Peninsula, bypassing the traditional choke point of the Suez Canal. The project envisions a multimodal economic corridor integrating railways, ports, highways, energy networks and digital infrastructure to enhance trade, investment and connectivity. Unlike conventional transport corridors, IMEC is conceived as a holistic and multidimensional infrastructure project encompassing sea routes, rail networks, pipelines, undersea high-speed data links, green hydrogen corridors and transnational energy transmission grids.

The proposed structure has three distinct sections. The eastern section links India with West Asia through sealinks to the United Arab Emirates (UAE). The central section consists of an overland route across West Asia, traversing the UAE, Saudi Arabia, Jordan and Israel, and culminating at the port of Haifa on Israel's Mediterranean coast. The western leg of the corridor is sea-based, connecting Haifa to various European ports, beyond which the continent's extensive transportation network takes over.

What has happened due to the war? Soon after IMEC was announced, the war in Gaza broke out on October 7, 2023, placing the project on the back burner. Major areas of the originally envisioned corridor, particularly those involving Israel and the port of Haifa, were directly affected by the conflict.

Soon after the Iran-Israel '12-Day War' in June 2025, there was a concerted effort to move the project forward. However, the ongoing conflict involving Iran has once again thrown a spanner into its execution. Key ports in the UAE, particularly Jebel Ali and Fujairah, have been repeatedly targeted by Iran, while disruptions in the Strait of Hormuz have exposed the geographical vulnerabilities of these ports.

Another critical fault line exposed by the war is the deep faultlines and divergence in the positions adopted by Saudi Arabia and the UAE in the war. Both countries are key partners in IMEC, and any adversarial posture between them could prove to be a major setback for the corridor, whose success depends on smooth coordination and seamless connectivity across the region. The UAE's April 2026 announcement that it was opting out of the global oil grouping, the Organization of the Petroleum Exporting Countries (OPEC) and reports of its growing strategic coordination with Israel, including the deployment of Israeli defence systems such as the Iron Beam, risk widening differences between Riyadh and Abu Dhabi. Such developments are unlikely to augur well for either regional stability or the future of IMEC.

Navigating the challenges

The war in Iran has highlighted two important issues for both West Asia and IMEC. First, there is an urgent need for projects such as IMEC that can bypass conflict zones and choke points. However, for such initiatives to succeed, they must also navigate the region's geopolitical complexities, including the rapidly evolving dynamics among key partners such as Saudi Arabia and the UAE.

To address the first challenge, IMEC must evolve into a broader and more flexible framework while keeping open the possibility of reverting to the originally envisioned alignment once the conflict subsides. To this end, the option of developing key ports in Oman – such as Salalah, Duqm and Muscat – as eastern entry points could be explored, as they are located well away from the conflict-prone Strait of Hormuz. Similarly, on the western end, until the port of Haifa becomes a secure transit hub, a western spur passing through Egypt and terminating at one of its major Mediterranean ports could offer a viable alternative. Egypt already possesses the logistics ecosystem required to support IMEC, including the Suez Canal Economic Zone, six operational ports and four industrial zones specialising in green hydrogen, liquefied natural gas, shipbuilding and other future-oriented sectors.

To address the second challenge, countries such as India, which enjoy close relations and the trust of both Saudi Arabia and the UAE, will have to navigate a delicate but critical diplomatic terrain. European countries such as Italy and France, which are positioning themselves as key champions of IMEC in Europe, will also need to play an active role. The growing recognition of IMEC's strategic importance was evident during Prime Minister Narendra Modi's visit to Europe in May 2026. While elevating their bilateral ties to a Special Strategic Partnership, India and Italy reaffirmed their commitment to cooperate on IMEC, recognising its transformative potential to reshape and promote global trade, connectivity and prosperity.

The bottom line is clear. The war in Iran has underscored the need for transnational connectivity projects such as IMEC that can bypass conflict zones and strategic choke points. However, for such initiatives to succeed, they must overcome the geopolitical complexities in West Asia.

Lessons from the Iran Conflict

- **Asymmetric Warfare:** This war proved that technological and military superiority alone (such as the US/Israel) does not guarantee a quick victory. Iran has inflicted heavy damage on America's modern aircraft like F-35 and defense systems like Patriot and THAAD with its drone and missile attacks.

- **Vulnerability to Global Choke** Points: Iran's blockade of the Strait of Hormuz has affected the global economy. For countries like India, which import 88% of their crude oil needs, this is a major crisis of energy security.
- **Urgent need for alternatives:** The crisis has made it clear that the world needs new corridors for trade that are free of **the two** 'Cs' **i.e.** Conflict Zones**and** Choke Points.

Structure of IMEC and Existing Constraints

1. Basic Structure of the Corridor:

- **Eastern Section: Connecting** the western coasts of India (such as Mundra, Kandla) with the ports of the United Arab Emirates (UAE) by sea route.
- **Central Section:** A rail and road network passing through the UAE, Saudi Arabia, Jordan, and Israel, terminating at Israel's 'Haifa Port'.
- **Western Section:** Connectivity from the port of Haifa to various ports in Europe via sea route.

2. Challenges Posed by War:

- **Security Crisis at Ports:** Major ports in the UAE (such as Jebel Ali and Fujairah) have come under attack from Iran, putting maritime security at risk.
- **Uncertainty of the Port of Haifa:** The main western tip of this route (Haifa) has become highly unsafe due to the Israel-Hamas and Iran conflict.
- **Internal Differences in the Gulf:** Strategic differences have emerged between Saudi Arabia and the UAE in the wake of the war. The UAE's exit from OPEC and supporting Israel's 'iron beam' defense systemexacerbates its geopolitical differences with Saudi Arabia, affecting the 'seamless coordination' required for the corridor.

Way Forward: Solving Challenges

This corridor needs to be redesigned, not just for peacetime, **but for strategic** uncertainty:

1. Exploring Alternative and Flexible Routes:

- **Inclusion of Oman:** Oman's ports (such as Salalah, Duqm and Muscat) can be used as eastern gateways to avoid the risk of the Strait of Hormuz, which are outside the conflict zone
- **Suez/Egypt Alternative:** Until Israel's port of Haifa is secured, an alternative route can be taken through Egyptian ports, as Egypt already has better logistics and industrial areas.

2. Active Diplomatic Navigation:

- **India's Mediation:** India's relations with both Saudi Arabia and the UAE are extremely strong. India will have to act as a bridge between these two countries so that there is no strategic hurdle in the project.
- **Involvement of European countries:** Countries like Italy and France which are its major supporters on the European endwill also have to use their diplomatic influence to maintain stability in the Middle-East. In May 2026, commitments have also been made under the India-Italy 'Special Strategic Partnership'.

Conclusion

The IMEC is not just a trade route, but a strategic instrument to make the global supply chain resilient against China's Belt and Road Initiative (BRI). The current Iran crisis has made it clear that unless a permanent solution or a workable alternative to the geopolitical complexities and security concerns of the Middle East is found, it will be impossible to reap commercial benefits。 India will have to pursue this project with 'strategic redundancy' to ensure its energy and economic security.

UPSC Prelims Exam Study Questions

Question: What is the "Eastern Corridor**" of IMEC** related **to?**

(a) Connecting India to Europe

(b) Connecting India with the Gulf region

(c) Connecting Saudi Arabia to Europe

(d) Connecting India with Africa

Answer: (**b)**

UPSC Mains Practice Questions

Question: Describe the structure and objectives of the India-Middle East-Europe Economic Corridor (**IMEC**). Analyse its economic and strategic importance for India. **(150 words)**

Page 08 : GS II :Social Justice / Preliminary Examination

The recent poisonous liquor tragedy in Pune-Pimpri-Chinchwad (in which more than a dozen working-class people lost their lives) has brought the illicit liquor crisis in India back into the limelight. These repeated deaths in various states such as Tamil Nadu, Gujarat, Punjab, Uttar Pradesh, Bihar, and Assam highlight the failure of law enforcement and weak regulatory mechanisms. Despite all the promises of systemic reforms after the 2015 Malvani tragedy (more than 100 deaths), the problem remains a serious public health crisis for India's poor.

Key Points

1. The Science and Supply Chain Behind the Tragedy

- **Fatal use of methanol:** 'Methanol' is the main factor behind most alcohol tragedies. It is an industrial chemical that is mixed with ethanol to increase profits and make alcohol highly intoxicating.
- **Organized Network:** Initial investigations suggest that this is not a local or incidental matter, but rather a well-organized supply chain. Industrial-grade methanol is often brought in illegally from other states.
- **Low cost, high profit:** Methanol blending is extremely beneficial for the illegal liquor mafia as it increases the batch volume of liquor manifold at a negligible cost, making their profit margins very high.

2. Socio-Economic Reasons for Demand for Illicit Liquor

- **High Taxes:** Legal and safe liquor is heavily taxed by state governments. Due to high prices, low-income and daily wage workers are unable to buy legal liquor.
- **Physical Labour and Addiction:** Daily wage labourers are subjected to extreme physical and mental stress. Economic insecurity and addiction lead them to look for "cheaper alternatives" to erase their fatigue, trapping them in the trap of poisonous alcohol.
- **Market Share:** According to an analysis (2024) by public health experts, about 40% of the total alcohol consumption in India still comes from the illicit market today.

Perfect storm

Weak enforcement and poor regulation sustain illicit liquor among the poor

India has suffered multiple mass deaths due to consuming illicit liquor, across Tamil Nadu, Gujarat, Punjab, Uttar Pradesh, Bihar, Assam, and Maharashtra. The Malwani incident in 2015, which left over 100 people dead, prompted official promises of systemic reform that never fully materialised – neither there nor elsewhere. The Pune-Pimpri-Chinchwad tragedy unfolded last week with more than a dozen victims of working-class backgrounds in poor neighbourhoods. Preliminary investigation has revealed a better than ad hoc supply chain with industry-grade methanol – the toxin behind most hooch tragedies– brought from outside the State and mixed with ethanol to produce a highly potent country liquor. The demand for licensed alcohol faces high State taxes, encouraging low-income individuals to turn to illicit liquor. On the other hand, adding industrial methanol increases the batch volume at negligible input cost, dramatically improving margins, although some people under investigation have also said during official questioning that it is not in the interest of 'regular' vendors to poison their 'customers'. Nonetheless, such operations are typically semi-visible local economies that get by on tolerance rather than secrecy, and so allegations of police and local authorities' complicity must be investigated. Early enforcement following most deadly incidents only arrests retail vendors; investigations into upstream suppliers and alleged kingpins have frequently proved uneven or inconclusive.

Indeed, these tragedies recur due to a perfect storm of factors that are able to repeatedly come together. One major regulatory gap in efforts to track methanol downstream is how easily it is pilfered and diverted for illicit liquor. Most victims are daily-wage labourers, and scholars have argued that the physical toll of manual labour creates a demand for cheap relief that, together with economic precarity and addiction, outweighs the wariness of poisonous substances. Since the victims are often from marginalised communities, the sustained political will needed to implement reforms – including better methanol accounting and affordable alcohol alternatives, required to break the cycle – is often lacking. In a 2024 analysis, public health experts found that higher prices for legal liquor push the poorest consumers toward the illicit market, which accounts for an estimated 40% of alcohol consumption in India. Likewise, total bans as in Bihar and Gujarat could deflect the market to criminal syndicates, where quality control is optional and oversight is poor. Finally, legal reviews have concluded that while the big fish are rarely caught, even those arrested are rarely convicted. Without these improvements, regulatory loopholes and weak enforcement will sustain illicit liquor as a public health crisis.

3. The Opposite Effect of Total Ban

- **Parallel Criminal Economy:** States like Bihar and Gujarat have a complete prohibition of liquor. Experts believe that a complete ban does not eliminate demand, but rather the market goes into the hands of criminal syndicates.
- **Lack of Quality Control:** These illegal syndicates have no quality checks and the risk of tragedies increases due to zero administrative oversight.

4. Regulatory and Enforcement Gaps

- **Collusion and Tolerance:** These illicit liquor businesses are not completely hidden, but are "semi-visible" locally. This is not possible without the tacit consent or connivance of the local police and administration.
- **Faulty investigation process:** After an accident, law enforcement agencies only complete the formalities by arresting small retailers. Investigations rarely reach the kingpins and big suppliers.
- **Low Conviction Rate:** Legal reviews make it clear that the conviction rate for criminals caught in illegal liquor cases is extremely low, eliminating the fear of the law among criminals.
- **Lack of Tracking:** The framework for downstream tracking of industrial methanol distribution and end-use is extremely weak, making it easy for the theft and diversion of methanol from factories.

5. Lack of political will

- Since the victims of these tragedies are mostly the most marginalized and poor sections of society, there is often a lack of long-term political and administrative will required to completely change this system.

Conclusion

The repeated illicit liquor deaths in India are not just administrative negligence, but a deep socio-economic and human rights crisis. Breaking this "perfect storm" (deadly cycle of challenges) requires a multi-pronged approach. The government will have to ensure strict digital tracking of the purchase and sale of methanol, curb corruption and rethink the pricing policy of legal liquor so that the poor can get safer alternatives. Unless the fear of the law is created by punishing the big criminals severely, weak enforcement and regulatory loopholes will continue to engulf the lives of the poor.

UPSC Prelims Exam Study Questions

Q: What is the leading cause of methanol fatalities in illicit liquor tragedies**?**

(**a)** It produces vitamin deficiency in the body

(**b)** It **strengthens** the liver

(**c)** It can cause blindness and death by forming formic acid in the body

(**d)** It only increases the intensity of intoxication

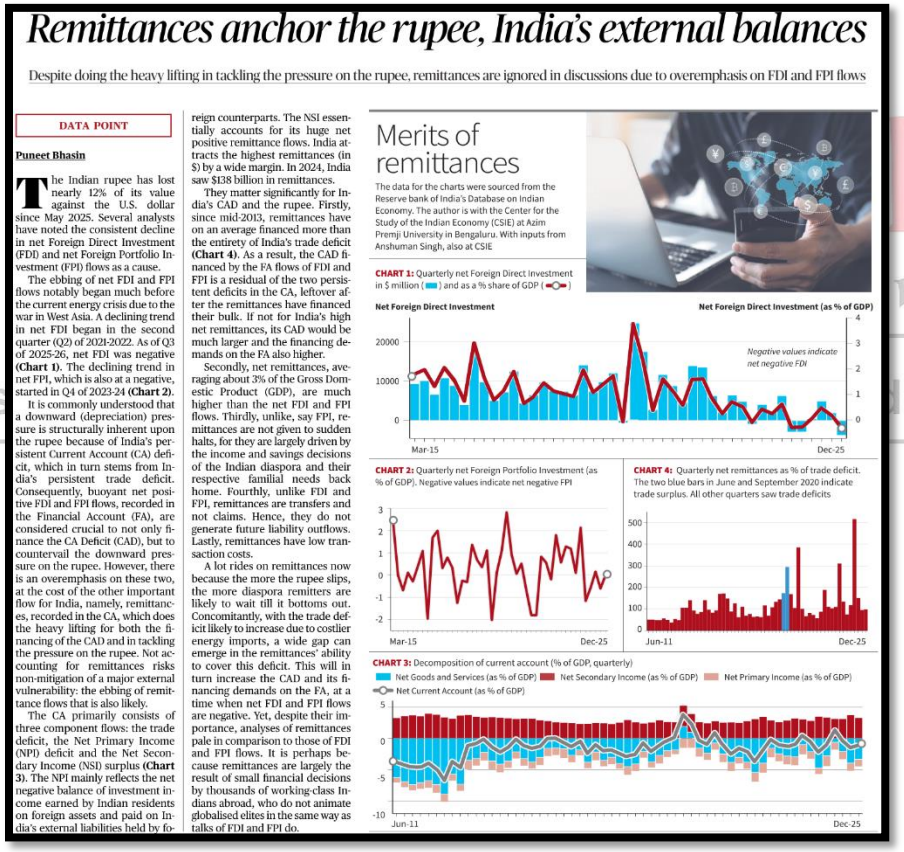
Answer: c)

UPSC Mains Practice Questions

Question: Analyse the major socio-economic reasons for the frequent illicit liquor tragedies in India. **(150 words)**

Page 09 : GS III : Indian Economy Preliminary Examination

Since May 2025, the value of the Indian rupee against the US dollar has depreciated by about 12%. Financial analysts are generally attributing this depreciation of the rupee to the steady decline in net foreign direct investment (net FDI) and net foreign portfolio investment (net FPI) flows. However, the role of 'remittances' has been most important in stabilizing India's external economic balance and the rupee. Due to the excessive focus on FDI and FPIs in policy discussions, this contribution of remittances is often overlooked, leading to a poor assessment of India's external vulnerability.



Remittances anchor the rupee, India's external balances

Despite doing the heavy lifting in tackling the pressure on the rupee, remittances are ignored in discussions due to overemphasis on FDI and FPI flows

DATA POINT

Puneet Bhasin

The Indian rupee has lost nearly 12% of its value against the U.S. dollar since May 2025. Several analysts have noted the consistent decline in net Foreign Direct Investment (FDI) and net Foreign Portfolio Investment (FPI) flows as a cause.

The ebbing of net FDI and FPI flows notably began much before the current energy crisis due to the war in West Asia. A declining trend in net FDI began in the second quarter (Q2) of 2021-2022. As of Q3 of 2025-26, net FDI was negative **(Chart 1)**. The declining trend in net FPI, which is also at a negative, started in Q4 of 2023-24 **(Chart 2)**.

It is commonly understood that a downward (depreciation) pressure is structurally inherent upon the rupee because of India's persistent Current Account (CA) deficit, which in turn stems from India's persistent trade deficit. Consequently, buoyant net positive FDI and FPI flows, recorded in the Financial Account (FA), are considered crucial to not only finance the CA Deficit (CAD), but to countervail the downward pressure on the rupee. However, there is an overemphasis on these two, at the cost of the other important flow for India, namely, remittances, recorded in the CA, which does the heavy lifting for both the financing of the CAD and in tackling the pressure on the rupee. Not accounting for remittances risks non-mitigation of a major external vulnerability: the ebbing of remittance flows that is also likely.

The CA primarily consists of three component flows: the trade deficit, the Net Primary Income (NPI) deficit and the Net Secondary Income (NSI) surplus **(Chart 3)**. The NPI mainly reflects the net negative balance of investment income earned by Indian residents on foreign assets and paid on India's external liabilities held by foreign counterparts. The NSI essentially accounts for its huge net positive remittance flows. India attracts the highest remittances (in $) by a wide margin. In 2024, India saw $138 billion in remittances.

They matter significantly for India's CAD and the rupee. Firstly, since mid-2013, remittances have on an average financed more than the entirety of India's trade deficit **(Chart 4)**. As a result, the CAD financed by the FA flows of FDI and FPI is a residual of the two persistent deficits in the CA, leftover after the remittances have financed their bulk. If not for India's high net remittances, its CAD would be much larger and the financing demands on the FA also higher.

Secondly, net remittances, averaging about 3% of the Gross Domestic Product (GDP), are much higher than the net FDI and FPI flows. Thirdly, unlike, say FPI, remittances are not given to sudden halts, for they are largely driven by the income and savings decisions of the Indian diaspora and their respective familial needs back home. Fourthly, unlike FDI and FPI, remittances are transfers and not claims. Hence, they do not generate future liability outflows. Lastly, remittances have low transaction costs.

A lot rides on remittances now because the more the rupee slips, the more diaspora remitters are likely to wait till it bottoms out. Concomitantly, with the trade deficit likely to increase due to costlier energy imports, a wide gap can emerge in the remittances' ability to cover this deficit. This will in turn increase the CAD and its financing demands on the FA, at a time when net FDI and FPI flows are negative. Yet, despite their importance, analyses of remittances pale in comparison to those of FDI and FPI flows. It is perhaps because remittances are largely the result of small financial decisions by thousands of working-class Indians abroad, who do not animate globalised elites in the same way as talks of FDI and FPI do.

Merits of remittances

The data for the charts were sourced from the Reserve bank of India's Database on Indian Economy. The author is with the Center for the Study of the Indian Economy (CSIE) at Azim Premji University in Bengaluru. With inputs from Anshuman Singh, also at CSIE

CHART 1: Quarterly net Foreign Direct Investment in $ million ( ) and as a % share of GDP ( )

Net Foreign Direct Investment

Net Foreign Direct Investment (as % of GDP)

Negative values indicate net negative FDI

CHART 2: Quarterly net Foreign Portfolio Investment (as % of GDP). Negative values indicate net negative FPI

CHART 4: Quarterly net remittances as % of trade deficit. The two blue bars in June and September 2020 indicate trade surplus. All other quarters saw trade deficits

CHART 3: Decomposition of current account (% of GDP, quarterly)

Net Goods and Services (as % of GDP) Net Secondary Income (as % of GDP) Net Primary Income (as % of GDP)

Net Current Account (as % of GDP)

Key Points

1. **Traditional view of current account deficit (CAD) and rupee pressure**

- **Structural Pressures:** India's trade deficit is always there (because India imports more than it exports). Because of this, there is always a deficit in the current account, which creates structural pressure on the rupee downwards.
- **Confusion of Capital Account Dependence:** The general economic understanding assumes that positive FDI and FPI flows under the financial account are the only recourse to bridge the current account deficit (CAD) and handle the rupee.

2. Downward trend in capital inflows (FDI and FPI)

- **Long-term decline:** The inflow of foreign capital into India had decreased long before the war and energy crisis in the Mid-East at present.
- **Negative Numbers:** The downward trend in net FDI started from the second quarter of the year 2021-22, which has reached the 'negative' level by the third quarter of the financial year 2025-26. Similarly, net FPI has also fallen continuously since the fourth quarter of 2023-24 and remains negative.

3. Structure of Current Account and Importance of Remittances

The current account has three main components: the trade deficit, the net primary income deficit, and the net secondary income surplus.

- **NSI and Remittances:** Net Secondary Income (NSI) primarily reflects the hefty remittances that India receives.
- **Global Leader:** India is the largest remittance receiving country in the world. In 2024, India received a record $138 billion in remittances.

4. Why is remittances better than FDI and FPI?

According to the author, remittances are 'heavy lifting' for India's economy for the following reasons:

- **Full Remittance of Trade Deficit:** Since mid-2013, remittances have financed more than the entire trade deficit of India alone, on average. It is because of remittances that India's current account deficit (CAD) remains at a manageable level.
- **High Share in GDP:** India's net remittances account for around 3% of the country's Gross Domestic Product (GDP), which is much higher than the combined sum of net FDI and FPI inflows.
- **No Sudden Halts:** Unlike FPIs, remittances do not carry the risk of sudden capital flights. It does not depend on the mood of foreign investors, but on the expatriate Indians' own family needs and savings decisions.
- **No Claims:** Unlike FDI and FPI, remittances are only a 'transfer', no 'claims' or liabilities. Therefore, there is no risk of money going out of the country in the form of dividends or interest in the future.

- **Low Transaction Costs:** This money reaches the bottom of the country's economy directly at a very low transaction cost.

5. Reasons for Policy Neglect

- Despite the broader economic significance of remittances, it does not get the same place in economic debates as corporate investment (FDI/FPI). The reason for this is that remittances are the result of small financial decisions of thousands of middle- and working-class Indians working abroad, which does not attract the globalised elite as much.

6. Emerging Economic Challenges and Risks

- **Fear of interruption:** As the rupee is falling, NRIs sitting abroad may stop sending money in the hope that they will send money when the rupee reaches its bottom out.

- **Double Storm:** India's trade deficit is expected to increase due to expensive energy imports. If remittance flows slow down at the same time, the current account deficit (CAD) will grow sharply. At a time when FDI and FPIs are already negative, the country's balance of payments may come under immense pressure.

Conclusion

It is a big policy blunder to consider remittances as just a complementary component in the analysis of the external sector of the Indian economy; In fact, it is the main anchor holding the Indian rupee. In the current global energy crisis and negative capital flows (FDI/FPI), the stability of remittances will test India's macroeconomic resilience. The government and policymakers should actively work on policies to protect the interests of the Indian workforce working abroad (especially in the Gulf and developed countries), facilitate their migration and further reduce the cost of remittances, rather than focusing only on attracting corporate investment, so that this safety net can be kept strong.

UPSC Prelims Exam Study Questions

Question: Which of the following features **distinguishes** remittances **from** FDI **and** FPI**?**

(**a)** It does not increase foreign exchange reserves

(**b)** It does not lead to an obligation to pay dividends or interest in the future

(**c)** It is sent only by government institutions

(**d)** It is part of the capital account

Answer: b)

UPSC Mains Practice Questions

Question: Examine the role of remittances **in** India's external sector. Is it **a more stable forex source than** FDI **and** FPI**? (150 words)**

Page :10 : GS III :Environment /Environment. Preliminary Examination

Air pollution and smog are generallyconsidered to be winter problems, but in recent years, the severe deterioration of air quality even during summers in Indian cities has emerged as a new challenge. The summer of 2026 (April-May) saw a huge jump in pollution levels in metros like Mumbai, Chennai, Hyderabad, Bengaluru, and Kolkata, including Delhi. The re-implementation of the phases of the Graded Response Action Plan (GRAP) by the Commission for Air Quality Management (CAQM) as temperatures rise proves that summer air pollution is also a serious public health crisis, with a distinct nature and science of its own.

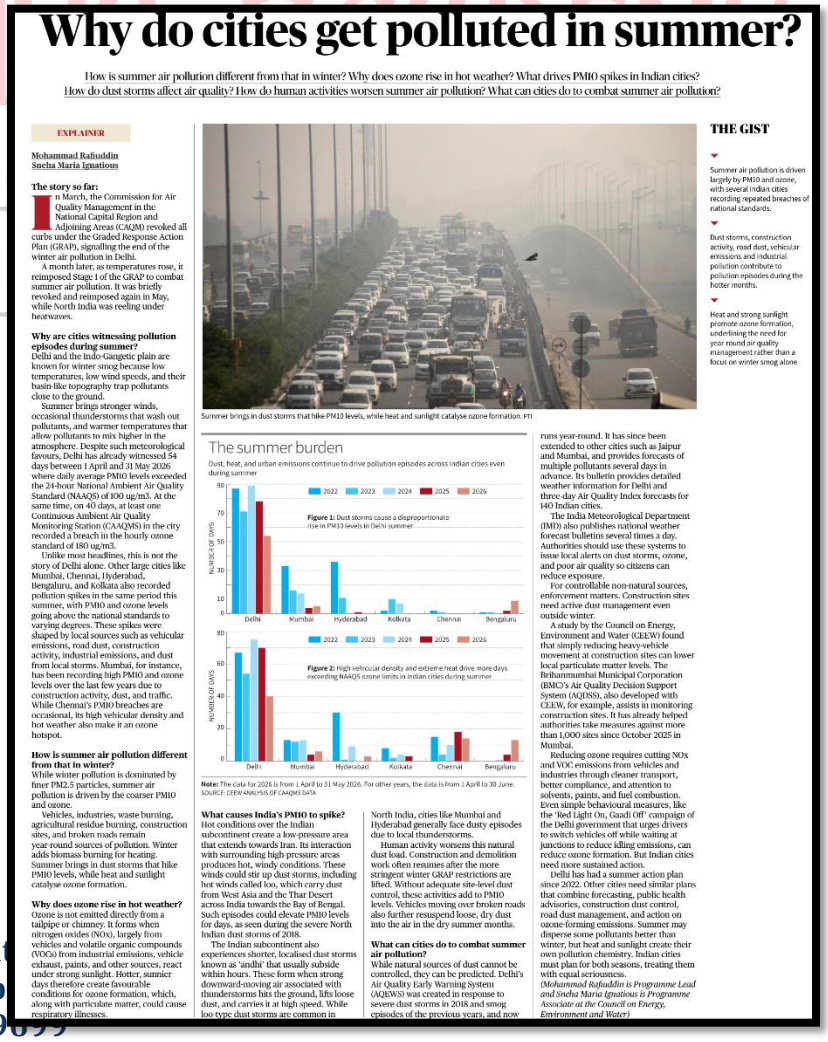
Key Points

1. Summer vs. Winter Pollution: Key Differences

- **Nature of Pollutants:** Winter pollution is primarily driven by fine particles (**PM2.5**) and heavy smog (smog). In contrast, summer pollution is caused by coarse particles (**PM10**) and highly toxic **ozone (O3)** gas.
- **Meteorological Factors:** In winter, pollution increases due to low temperatures, slow winds, and 'inversion'. In summer, strong winds and high temperatures help pollutants to mix up in the atmosphere, but the scorching heat and hot sunlight start a new chemical cycle between pollutants.

2. The Science of Rising Ozone (O3) Levels in Summer

- **Indirect Formation:** Ozone gas does not come out of a vehicle's silencer or factory chimney. It is a secondary pollutant.
- **Chemical Catalysis:** When nitrogen oxides (NOx) emitted from vehicles and volatile organic compounds (VOCs) from industries, paints, or fuels are exposed to bright sunlight and high temperatures, a photochemical reaction occurs



Why do cities get polluted in summer?

How is summer air pollution different from that in winter? Why does ozone rise in hot weather? What drives PM10 spikes in Indian cities? How do dust storms affect air quality? How do human activities worsen summer air pollution? What can cities do to combat summer air pollution?

EXPLAINER

Mohammad Rafiuddin
Sneha Maria Ignatious

The story so far:

In March, the Commission for Air Quality Management in the National Capital Region and Adjoining Areas (CAQM) revoked all curbs under the Graded Response Action Plan (GRAP), signalling the end of the winter air pollution in Delhi.

A month later, as temperatures rose, it reimposed Stage 1 of the GRAP to combat summer air pollution. It was briefly revoked and reimposed again in May, while North India was reeling under heatwaves.

Why are cities witnessing pollution episodes during summer?

Delhi and the Indo-Gangetic plain are known for winter smog because low temperatures, low wind speeds, and their basin-like topography trap pollutants close to the ground.

Summer brings stronger winds, occasional thunderstorms that wash out pollutants, and warmer temperatures that allow pollutants to mix higher in the atmosphere. Despite such meteorological favours, Delhi has already witnessed 54 days between 1 April and 31 May 2026 where daily average PM10 levels exceeded the 24-hour National Ambient Air Quality Standard (NAAQS) of 100 ug/m3. At the same time, on 40 days, at least one Continuous Ambient Air Quality Monitoring Station (CAAQMS) in the city recorded a breach in the hourly ozone standard of 180 ug/m3.

Unlike most headlines, this is not the story of Delhi alone. Other large cities like Mumbai, Chennai, Hyderabad, Bengaluru, and Kolkata also recorded pollution spikes in the same period this summer, with PM10 and ozone levels going above the national standards to varying degrees. These spikes were shaped by local sources such as vehicular emissions, road dust, construction activity, industrial emissions, and dust from local storms. Mumbai, for instance, has been recording high PM10 and ozone levels over the last few years due to construction activity, dust, and traffic. While Chennai's PM10 breaches are occasional, its high vehicular density and hot weather also make it an ozone hotspot.

How is summer air pollution different from that in winter?

While winter pollution is dominated by finer PM2.5 particles, summer air pollution is driven by the coarser PM10 and ozone.

Vehicles, industries, waste burning, agricultural residue burning, construction sites, and broken roads remain year-round sources of pollution. Winter adds biomass burning for heating. Summer brings in dust storms that hike PM10 levels, while heat and sunlight catalyse ozone formation.

Why does ozone rise in hot weather?

Ozone is not emitted directly from a tailpipe or chimney. It forms when nitrogen oxides (NOx), largely from vehicles and volatile organic compounds (VOCs) from industrial emissions, vehicle exhaust, paints, and other sources, react under strong sunlight. Hotter, sunnier days therefore create favourable conditions for ozone formation, which, along with particulate matter, could cause respiratory illnesses.

Summer brings in dust storms that hike PM10 levels, while heat and sunlight catalyse ozone formation. PTI

THE GIST

- Summer air pollution is driven largely by PM10 and ozone, with several Indian cities recording repeated breaches of national standards.
- Dust storms, construction activity, road dust, vehicular emissions and industrial pollution contribute to pollution episodes during the hotter months.
- Heat and strong sunlight promote ozone formation, underlining the need for year-round air quality management rather than a focus on winter smog alone

Figure 1: Dust storms cause a disproportionate rise in PM10 levels in Delhi summer

Figure 2: High vehicular density and extreme heat drive more days exceeding NAAQS ozone limits in Indian cities during summer

Note: The data for 2026 is from 1 April to 31 May 2026. For other years, the data is from 1 April to 30 June.
SOURCE: CEEW ANALYSIS OF CAAQMS DATA

What causes India's PM10 to spike?

Hot conditions over the Indian subcontinent create a low-pressure area that extends towards Iran. Its interaction with surrounding high pressure areas produces hot, windy conditions. These winds could stir up dust storms, including hot winds called loo, which carry dust from West Asia and the Thar Desert across India towards the Bay of Bengal. Such episodes could elevate PM10 levels for days, as seen during the severe North Indian dust storms of 2018.

The Indian subcontinent also experiences shorter, localised dust storms known as 'andhi' that usually subside within hours. These form when strong downward-moving air associated with thunderstorms hits the ground, lifts loose dust, and carries it at high speed. While loo type dust storms are common in North India, cities like Mumbai and Hyderabad generally face dusty episodes due to local thunderstorms.

Human activity worsens this natural dust load. Construction and demolition work often resumes after the more stringent winter GRAP restrictions are lifted. Without adequate site-level dust control, these activities add to PM10 levels. Vehicles moving over broken roads also further resuspend loose, dry dust into the air in the dry summer months.

What can cities do to combat summer air pollution?

While natural sources of dust cannot be controlled, they can be predicted. Delhi's Air Quality Early Warning System (AQEWS) was created in response to severe dust storms in 2018 and smog episodes of the previous years, and now runs year-round. It has since been extended to other cities such as Jaipur and Mumbai, and provides forecasts of multiple pollutants several days in advance. Its bulletin provides detailed weather information for Delhi and three-day Air Quality Index forecasts for 140 Indian cities.

The India Meteorological Department (IMD) also publishes national weather forecast bulletins several times a day. Authorities should use these systems to issue local alerts on dust storms, ozone, and poor air quality so citizens can reduce exposure.

For controllable non-natural sources, enforcement matters. Construction sites need active dust management even outside winter.

A study by the Council on Energy, Environment and Water (CEEW) found that simply reducing heavy-vehicle movement at construction sites can lower local particulate matter levels. The Brihanmumbai Municipal Corporation (BMC)'s Air Quality Decision Support System (AQDSS), also developed with CEEW, for example, assists in monitoring construction sites. It has already helped authorities take measures against more than 1,000 sites since October 2025 in Mumbai.

Reducing ozone requires cutting NOx and VOC emissions from vehicles and industries through cleaner transport, better compliance, and attention to solvents, paints, and fuel combustion. Even simple behavioural measures, like the 'Red Light On, Gaadi Off' campaign of the Delhi government that urges drivers to switch vehicles off while waiting at junctions to reduce idling emissions, can reduce ozone formation. But Indian cities need more sustained action.

Delhi has had a summer action plan since 2022. Other cities need similar plans that combine forecasting, public health advisories, construction dust control, road dust management, and action on ozone-forming emissions. Summer may disperse some pollutants better than winter, but heat and sunlight create their own pollution chemistry. Indian cities must plan for both seasons, treating them with equal seriousness.

(Mohammad Rafiuddin is Programme Lead and Sneha Maria Ignatious is Programme Associate at the Council on Energy, Environment and Water)

between them, leading to the formation of ground-level ozone.

3. Impact of PM10 surge and dust storms

PM10 levels during summers in Indian cities go far above the national standards (100 $\mu g/m^3$), for two main reasons:

- **Regional Dust Winds (Loo):** Intense heat over the Indian subcontinent in summer creates a low-pressure area that extends to Iran. The strong and hot winds (heatwaves) that blow the dust of West Asia and the Thar Desert all over India and the Bay of Bengal, causing PM10 to rise for several days.
- **Local Storms:** Strong winds caused by localized thunderstorms raise the dry dust of the ground. In cities like Mumbai and Hyderabad, such localized weather events increase the dust levels.

4. Human activities that make pollution worse

- **Uncontrolled Construction Operations:** Construction and demolition (C&D) work starts in full swing in the summer as soon as the strict winter restrictions (GRAP) are lifted. The lack of dust control measures at construction sites makes PM10 levels dangerous.
- **Road Dust:** In dry and hot summers, due to vehicles passing through broken roads, the dry dust accumulated on the ground starts floating in the air again (Resuspension).
- **Year-round sources:** Vehicular emissions, industrial fumes, garbage burning, and garbage dump fires continue to cause pollution even in summer.

5. Measures to combat summer air pollution

- **Use of Early Warning Systems:** Dust storms and ozone levels should be forecast in advance using the 'Air Quality Early Warning System' (AQEWS) and bulletins of the India Meteorological Department (IMD), so that timely health advisories can be issued to citizens.

- **Strict Construction and Dust Management:** Particulate matter can be significantly reduced locally by reducing the movement of heavy vehicles on construction sites. The Mumbai Municipal Corporation's (BMC) Air Quality Decision Support System (AQDSS) is a good example of this.
- **Reduction of Ozone Emissions:** Strict adherence to clean transportation and fuel standards is essential to reduce NOx and VOCs emitted from vehicles and industries.
- **Viable campaigns:** The Delhi government' s campaigns like 'Red Light On, Gaadi Off' should be promoted to reduce idling emissions of vehicles at traffic junctions.

Conclusion

Summer air pollution makes it clear that the fight for clean air in India cannot be limited to just a four-month winter action plan. Heat and bright sunlight create their own pollutant chemistry (ozone formation), which is equally deadly to human health. Indian cities will now have to move out of the 'six-month planning' model and adopt a year-round action plan. Timely integration of weather forecasts into environmental policies, strict digital monitoring of construction sites and tighter control of sources of ozone producing gases are the need of the hour, so as to balance both development and environment.

UPSC Prelims Exam Study Questions

Question: What is GRAP related to**?**

(a) Water conservation

(b) Air pollution control

(c) Biodiversity conservation

(d) Solid waste management

Answer: b)

UPSC Mains Practice Questions

Q: "It is a policy blunder to treat air pollution in India as a mere winter problem. Discuss the challenges of summer air pollution. **(150 words)**

Page :08 : Editorial Analysis

Orbital rivalry — the challenge of China's space power

Harinder Singh
Former corps commander

China's expanding counter-space capabilities are a cause for concern. While no conflict has ever been fought in space, the incentive to influence activities on earth by controlling outer space remains a potential trigger for future confrontation. Beijing's development of anti-satellite missiles and co-orbital systems blurs the line between routine space operations and counter-space activities.

The key question is how Beijing views its space ambitions and control of outer space, and what India can do to safeguard its vital interests in this domain.

Beijing's space ambitions

While the Chinese space programme emphasises the peaceful use of space, evidence suggests that China is preparing for an orbital war.

In January 2007, it targeted its own satellite from earth. In October 2015, China tested an exo-atmospheric vehicle designed to strike a hostile satellite. In 2022, China used a robotic spacecraft to push a defunct satellite into the graveyard orbit. In 2024, it demonstrated an orbital dog-fight. There is a clear research and developmental push for fielding offensive capabilities in space.

China's space ambitions operate at two levels. First, it seeks to remain competitive in the emerging space race, both technologically and numerically. China has around 1,900 satellites in orbit, compared to more than 8,000 American satellites, including the SpaceX satellites.

Second, it recognises the military and economic implications of the weaponisation of space. A single strike could disrupt communications, power grids, navigation systems, financial markets, and military command-and-control (C2) and intelligence, surveillance and reconnaissance (ISR) networks.

Accordingly, China aims to land on the moon by 2036, launch a nuclear-powered shuttle by 2040, and establish a solar power system by 2050. Chinese start-ups such as LandSpace, iSpace and OneSpace are challenging rivals such as SpaceX and Blue Origin. China is also exploring lunar and asteroid mining for energy and critical minerals. The growing demand for energy-efficient data centres is likely to further intensify the space race.

China's counter-space rise demands stronger resilience and deterrence from India

China is seeking to assert control over outer space in two distinct ways. First, by leveraging space-based assets to safeguard its military and economic systems. Second, by competing with its rivals – both numerically and technologically – to maintain space superiority. Its most immediate competition is with Starlink in low-earth orbit (LEO). China plans to deploy more than 36,000 LEO satellites by 2030. This rivalry could intensify if China were to become the first to establish a presence on the far side of the moon or demonstrate a particular interest in exploiting asteroid resources. Such developments could create an escalatory dynamic in an environment that lacks a comprehensive regulatory framework.

Consequently, China's capabilities are evolving in three key areas. First, kinetic attack systems such as the DN-3 and SC-19 missiles, which can physically destroy satellites. Second, laser-based systems that can dazzle or blind satellites, disrupting navigation and communications. Third, co-orbital satellites, such as the SJ and TJS series, designed to interfere with or dislodge other satellites from orbit. Together, these capabilities could enable the People's Liberation Army (PLA) to cripple Intelligence, Surveillance, and Reconnaissance (ISR), GPS and communication networks, shaping the battlespace during the first 24 to 48 hours of a conflict.

Implications for India

If a contingency arises in Taiwan, the PLA is likely to first blind ISR and communication networks before resorting to hard-kill attacks. This would give Beijing time to shape the narrative, whereas a hard kill could trigger immediate escalation.

The U.S. would then have to assess China's military objectives, and, if an invasion proceeds, neutralise its counter-space capabilities. While both sides may lose assets, the U.S. would likely retain an advantage due to its greater redundancy and resilience. The Taiwan scenario applies to India albeit on a lesser scale. India has around 60 operational satellites as against 400-plus Chinese military satellites alone, which implies lesser redundancy. Losing five to six satellites will hurt India more.

Hypothetically, China could strike at the CARTOSAT/RISAT series, which could lead to loss of tactical-level imagery for hours, if not days. Instead, if it only choose to lase as these satellites as they pass over the Line of Actual Control, it could lead to temporary blind spots. They could even deploy jammers to disable India's NavIC system.

The key strategic takeaway is that while China can conduct peacetime harassment using lasers and jammers, or temporarily blind a few satellites during a border crisis, it cannot inflict crippling damage without destroying a large number of Indian satellites and risking severe Kessler Syndrome consequences. While Mission Shakti has strengthened India's deterrence posture, its utility remains restricted. Moreover, a single successful test does not guarantee operational reliability, and India still lacks co-orbital capabilities to counter satellites such as the SJ and TJS series.

Safeguarding India's interests

A few measures are pertinent. First, India must expand its space industry beyond the Indian Space Research Organisation to increase satellite production and launch capacity. Greater capacity translates into greater redundancy. Second, it should disaggregate large satellite programmes, such as GSAT, into smaller constellations, which are more resilient and survivable. Third, India must strengthen the protection of its ground space assets to mitigate the impact of hard-kill attacks. Fourth, it should enhance data-sharing arrangements with strategic partners so that, in the event of satellite losses, critical services can be restored through commercial or partner networks within hours.

Besides, India should also clearly define its red lines and the scope of a proportionate response to ensure that China fully understands the potential escalation ladder.

GS Paper II: International Relations

UPSC Mains Exam Practice Questions: "The militarization of space has become the new dimension of geopolitical competition of the 21st century. Discuss in the context of China's space capabilities. **(250 words)**

Context:

Outer space is no longer just a field of scientific research, but a new frontier of geopolitical and military competition. Although no direct war has yet been fought in space, China's growing counter-spacecapabilities are a concern for global security. China's development of anti-satellite missiles and co-orbital systemsis blurring the line between routine space missions and military operations. Understanding China's ambitions and safeguarding India's strategic interests has become an extremely important national security imperative.

Key Points

1. China's Space Ambitions and Military Capabilities

Even though the official stance of China's space program claims its peaceful use, the evidence on the ground points to preparations for 'orbital war':

- **History of capability performance:** China destroyed its own satellite with a missile in 2007. In 2015 it tested an anti-satellite vehicle. In 2022, a defunct satellite was pushed into 'graveyard orbit' by robotic spacecraft and in 2024 performed an orbital dog-fight.
- **Long-Term Goals:** China aims to land on the moon by 2036, launch a nuclear-powered shuttle by 2040, and install a solar power system by 2050. Along with this, heis also exploring the possibility of mining important minerals on the moon and asteroids.

- **Rivalry:** China is in direct competition with America's 'Starlink' in space. China plans to deploy more than 36,000 satellites in low-earth orbit (LEO) by 2030.

2. The Three Main Pillars of China's Counter-Space Capability

The Chinese People's Liberation Army (PLA) is working on three types of systems to paralyze the enemy's communications and intelligence networks in the first 24 to 48 hours of the war:

- **Kinetic Attack Systems:** Missiles like DN-3 and SC-19, which can hard-kill enemy satellites.
- **Laser-based Systems:** These temporarily or permanently blind the cameras/sensors of satellites, leading to a halt in navigation and communication.
- **Co-orbital Satellites:** Satellites such as the SJ and TJS series, which can intervene or remove an enemy satellite from its orbit by getting close to it in space.

3. Strategic Implications for India

In the case of India, as in the Taiwan crisis, China may adopt a strategy of first 'blinding' satellites or jamming their signals instead of directly destroying them in the event of a war, so that tensions at the global level do not escalate immediately. The following are the threats to India:

- **Lesser redundancy:** India has only about 60 operational satellites, compared to China's more than 400 military satellites alone. If India loses even 5-6 of its satellites, India will suffer much more than China.
- **Disadvantages of Tactical Imagery:** China can temporarily block real-time military imagery by firing lasers at India's CARTOSATs or RISAT series satellites, creating 'blind spots' for the Indian Army along the Line of Actual Control (LAC).
- **Obstruction of Navigation:** China can disable India's indigenous navigation system NavIC using jammers .
- **Fear of Kessler Syndrome:** China cannot completely destroy all the satellites of India, because it will create such a web of debris in space (Kessler Syndrome) that will also destroy China's own satellites. India's 'Mission Shakti' (A-SAT test) has strengthened India's deterrence, but it is still limited in terms of operational reliability and co-orbital defense.

The Way Forward for India Safeguarding India's Interests

To deal with this space threat of China, India should take the following strategic steps:

- **Decentralization of Space Industry: Private defence and space industry will have to be promoted rapidly in addition to the** Indian Space Research Organisation (ISRO) to increase satellite production and launch capacity. Having more satellites will increase the redundancy in the system.
- Constellations: Large and heavy satellite programs like 'GSAT' should be replaced by constellations of small satellites, so that even if one satellite is destroyed, the entire network does not come to a standstill.
- **Security of Ground Assets:** The security infrastructure has to be strengthened to protect the ground stations that control satellites from cyber and physical attacks.
- **International data-sharing:** Commercial and military data-sharing agreements with strategic partners (such as Quad countries or allies) will have to be strengthened so that backup services can be restored within hours even if satellites are destroyed in wartime.
- **Determining the Red Lines:** India will have to clarify the scope of its 'Red Lines' and the proportionate response to its violation to China, so that China has an idea of possible retaliation.

Conclusion

Space is no longer just a platform for science but a new dimension of national sovereignty and military power. China's fast-growing space strike capabilities pose a direct challenge to India's national security and border surveillance system. India will have to move beyond its traditional defence strategies and take a balanced but aggressive approach towards 'space diplomacy' and 'space militarisation'. It is only through private sector participation, flexible network of small satellites and global partnerships that India can effectively counter China's dominance in space and ensure strategic balance in outer space.