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MINISTRY OF SCIENCE AND TECHNOLOGY

MK Yadav Sir

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DTE

Nov 14

Convention on Biological Diversity (CBD)

(Syllabus: GS Paper 3 – Env and Eco)

Self-withering: Biodiversity Convention's new global framework raises basic questions

Context: The recently adopted **Kunming-Montreal Global Biodiversity Framework (GBF)** marks a significant milestone for the **Convention on Biological Diversity (CBD)** as it enters its 31st year.

Convention on Biological Diversity (CBD)

- **About:** It was opened for signature on 5 June 1992 at the United **Nations Conference on Environment and Development (the Rio "Earth Summit")** and entered into force in 1993.
- **Members:** 196 Parties
- **India** is a party to the convention.
- **The USA** is the only UN member state which has **not ratified the Convention.**
- **Secretariat:** Montreal, Canada.
- It is an international **legally binding treaty** with three main goals:
- Conservation of biological diversity.
- Sustainable use of the components of the Biodiversity.
- The fair and equitable sharing of the benefits arising from the use of genetic resources.

Kunming-Montreal Global Biodiversity Framework (KMGBF)

- **Adoption of the KMGBF**: The 15th Conference of Parties (COP15) to the UN Convention on Biological Diversity adopted the "Kunming-Montreal Global Biodiversity Framework" (GBF).
- **Four Goals & 23 Targets**: The GBF comprises four overarching goals and 23 specific targets to be achieved by 2030.
- **Location**: COP15 took place in Montreal, Canada.
- **Protecting 30% of the Planet:** Through the KMGBF, participating countries committed to safeguarding 30 percent of the **planet's biodiversity by 2030**.
- **Ecosystem Restoration;** Countries vowed to attain the 23 GBF targets aimed at reversing ecosystem degradation, and securing the survival of the natural world.
- **Subsidy Reduction**: Under the GBF, countries also agreed to reduce harmful government **subsidies by 2025** and to increase international financial flows from developed to **developing countries, aiming for at** least $20 billion by 2025 and $30 billion by 2030.

THE HINDU

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SUB-CATEGORIZATION OF SCs

(Syllabus: GS Paper 2 – Polity)

PM's promise for sub-categorisation of Madigas aims for the long term

NEWS ANALYSIS

Nistula Hebbar
NEW DELHI

PM Narendra Modi and Madiga community leader Manda Krishna Madiga (right) at a public rally in Hyderabad recently. NAGARA GOPAL

Prime Minister Narendra Modi's declaration in Hyderabad last week that the Union government would set up a committee to consider the sub-categorisation of the Madiga community in Telangana within the Scheduled Castes is a plank from which BJP hopes to reap political dividends in the Lok Sabha election in 2024.

The announcement, made at a huge rally in Telangana in the presence of community leader Manda Krishna Madiga and under the aegis of the Madiga Reservation Porata Samithi (MRPS), is being considered part of the BJP's "three Ms" strategy – to get the support of the Munnur Kapu, Mudiraju, Madiga communities – for making inroads into Telangana, if not during the Assembly election now, then at least in 2024.

The Munnur Kapu and the Mudiraju communities are Backward Class groups. Dharmapuri Aravind and Bandi Sanjay Kumar, BJP MPs, belong to the former. The party's election committee in-charge, Eatala Rajendra, is from the Mudiraju community.

The Madiga community makes up at least 50% of Telangana's SC population, which is a little over 15% of the State's population, as revealed by the 2011 Census. For years, the Madiga community has been complaining that the benefits of reservation under the SC category has been cornered by the Mala community.

Long fight

Since 1994, the community has been struggling for sub-categorisation, first through the Madiga Dandora movement, and later with the MRPS. Several commissions have been set up to look into these demands, including under Justice P. Ramachandra Raju in 1996, and under Justice Usha Mehra in 2007, who both said that ways and means could be found for sub-categorisation of the community.

The reason that the BJP has now brought the demand to the forefront again (the party had earlier said it was in favour but did not move forward administratively) is that it has now settled on the "three Ms" formula.

"Just as in Uttar Pradesh, where the BJP managed to attract non-Jatav Dalits, and most important in Karnataka where "left-hand" communities among the Dalits, including the Madigas in the State, were inclined towards the BJP, and the "right-hand" SCs were inclined towards the Congress, the BJP is hoping that the Madigas in Telangana will form a firm support base for the party," a senior BJP leader said.

Context: The **Prime Minister of India recently announced** in Hyderabad that his government will be **establishing a committee to assess the sub-categorization** of the **Madiga community in Telangana** within the Scheduled Castes category.

Madiga Community

- **About:** Madiga is a Telugu caste from southern India.
- **Majority**: They mainly live in the states of Andhra Pradesh, Telangana and Karnataka, with a small minority in Tamil Nadu.
- **Occupation**: Work of tannery, leatherwork and small handicrafts.
- **Population**: The Madiga community constitutes at **least 50% of the total Scheduled Castes** in Telangana.

Background

- **Historical Struggle**: The Madiga community initiated the quest for sub-categorization in 1994 through the Madiga Dandora movement.
- **Persistent Advocacy (MRPS)**: Over the years, the movement continued with the formation of the Madiga Reservation Porata Samiti (MRPS) to advocate for sub-categorization.
- **Commission Inquiries**: In 1996, Justice P. Ramachandra Raju led a commission to examine the demands of sub-categorization put forth by the Madiga community.

Sub-Categorisation of Scheduled Caste

- **Under-representation among SCs**: States argue that certain Scheduled Castes (SCs) remain under-represented despite existing reservation policies.
- **Need**: Many reports underline the inequality within the SCs, drawing attention to the need for addressing the disparities.
- **Special Quotas**: To address the under-representation, special quotas have been framed and implemented in various states.
- **Initiatives in Specific States**: Andhra Pradesh, Punjab, Tamil Nadu, and Bihar have introduced special quotas specifically targeting the most vulnerable Dalits.

Rohini Commission

- It was set up by the **President under Article 340** of the Indian Constitution on October 2, 2017.
- **Objectives**: It was appointed **to examine the issues on sub-categorization** of Other Backward Castes.

PIB

Nov 14

RED SANDERS

(Syllabus: GS Paper 3 – Env and Eco)

Shri Bhupender Yadav says based on compliance and reporting India has been removed from the Review of Significant Trade process for Red Sanders

Context: Recently, the Union Minister for Environment, Forest and Climate Change informed that **India has been removed from the Review of Significant Trade (RST) for Red Sanders**, **under** Convention on International Trade in Endangered Species **(CITES)**.

Red Sanders

- **About**: The Red Sanders is a tree of significant market value, primarily found in specific districts of Andhra Pradesh.
- **Distribution**: Usually growing in the rocky, degraded and fallow lands with Red Soil and a hot and dry climate. It is an Indian endemic tree species, with a restricted geographical range in the Eastern Ghats.
- **Scientific name**: Pterocarpus santalinus.
- **CITES Status**: Appendix II.
- **IUCN Status:** Endangered.
- **Threats from Illegal Harvesting**: The Red sanders face severe threats from illegal harvesting and smuggling, resulting in their depletion from natural forest ecosystems.
- **Legal Export from Plantations**: Despite the challenges, a substantial portion of legally exported red sanders wood is sourced from artificially propagated plantations, contributing to the legal market.
- **Review of Significant Trade (RST)**: The Red sanders species has been under the scrutiny of the Review of Significant Trade process, with the assessment initiated around 2004 to address concerns related to its trade and conservation.

DTE

Nov 14

CYCLONE IN BAY OF BENGAL

(Syllabus: GS Paper 1 – Geography)

Threat of back-to-back cyclones in Bay of Bengal, with possibility of rapid intensification: Here's what to expect

Context: Recently, **experts have warned that two back-to-back low-pressure** areas are potentially **forming in the Bay of Bengal,** with the possibility of both intensifying into cyclones and one of them may even develop into a severe cyclone.

Cyclone

- **About**: A cyclone is a large, rotating storm system with low pressure at its center. Cyclones can form in any ocean basin, but they are most common in the tropics.
- Cyclones can cause a variety of hazards, including strong winds, storm surges, and heavy rainfall.

Types of Cyclones

- **Tropical cyclones**: These are the most common type of cyclones. They form over warm, tropical oceans and are characterized by strong winds, heavy rainfall, and storm surges.
- **Extratropical cyclones:** These cyclones form over cooler waters and are not as strong as tropical cyclones. They are characterized by strong winds, heavy rainfall, and snow.
- **Mid-latitude cyclones**: These cyclones form in the midlatitudes and are characterized by strong winds, heavy rainfall, and snow.

Formation of Cyclones

- **Warm ocean temperatures**: Cyclones thrive on warm waters with temperatures above 26.5°C (80°F) as they serve as a primary source of energy for their formation and intensification.
- **Favorable Atmospheric Conditions**: The presence of a pre-existing weather disturbance, such as a tropical wave or low-pressure system, can provide the initial trigger for cyclone development.
- **Moisture and instability**: Sufficient moisture in the lower atmosphere and unstable atmospheric conditions contribute to the development of thunderstorms, which are the building blocks of a cyclone.

Recent Cyclones

- **Cyclone Biparjoy**: Gujarat's coastal area
- **Super Cyclonic Storm Amphan (2020)**: India and Bangladesh.
- **Cyclone Hamoon**: Deep depression over the west-central Bay of Bengal
- **Cyclone Tej**: Arabian Sea

ECONOMIC TIMES Page 13

INDIA-UK PACT

(Syllabus: GS Paper 2 – IR)

Hope to find 'landing point' on India-UK trade pact: EAM

Discusses Extremism, Economic Offences With Home Secy Cleverly

Naomi Canton

London: External affairs minister S Jaishankar said in his address to the Indian diaspora on Monday that the UK-India relationship had many unrealised pathways for collaboration & the "shared history" between the countries had become a positive force in their contemporary relationship.

"India and the UK today, we have a very complex, long history, but what we are trying to do is make history a positive force that the commonalities, shared practices and institutions we have, the comfort that have come out of years of history, how do we make history work as a positive force — that is something we are trying to demonstrate," Jaishankar said. He said there were many different facets in the relationship owing to the long history and "each one of them is an avenue of collaboration". The "fusion offers enormous possibilities", he said, adding that the ability to do this now was "because our conversations are more open, candid and equal".

"We hope that we will find a landing point that will work for both of us" in the FTA, he said.

Jaishankar said the UK was far more global, globalised and multicultural than before with a technology-centric economy, and that combined with India's fast-growing economy and influence in the Global South, this meant increasingly the two countries were working side by side.

"When we look at crucial challenges facing the world, such as climate, health, and terrorism, these are challenges on which Indian interests and British interests converge. The more we work with each other, we find a greater comfort in doing so," he said.

Jaishankar met new home secretary James Cleverly during his visit. The home office, which is in charge of visas and combating extremism, is an important department for the Indian government. Jaishankar said on X: "Discussed the importance of mobility, skills and talent. Exchanged views on addressing shared concerns on extremism, economic offences, trafficking and security."

He spoke about the vast improvements India has seen since 2014 — from building toilets for girls to doubling airports & the growth of cashless payments, describing them as "social economic revolution".

EAM S Jaishankar with UK's new home secretary James Cleverly during the High Commissioner's reception in London

Context: The **external affairs minister of India**, recently on a trip to the UK, has emphasized the **joint commitment of India and the UK to a free trade agreement (FTA)**, expressing optimism that the two nations will soon find a "landing point" beneficial for both parties.

Key Points

- In 2022, **India and the UK had launched the formal Free Trade Agreement (FTA)** negotiations. Until then, both countries are contemplating an interim free trade area, which will result in reducing tariffs on most of the items.
- **Both countries agreed to an early harvest scheme** or a limited trade agreement to lower tariffs on a small set of goods apart from easing rules for select services.
- Further, they **agreed to avoid "sensitive issues"** and focus on areas where there is more complementarity.
- The **agriculture and dairy sectors are considered sensitive** sectors for India in trade talks.
- Also, a target of **doubling the trade between India and the United Kingdom** (UK) by 2030 was also set.

India-UK Relationship

- **Political Relationship**: India's political system influenced by UK. – Shared democratic values. – Collaboration on global issues. – Support for UN Security Council seat and NSG membership. – Joint declaration for annual Summits and meetings.
- **Defence Collaboration**: Strategic partnership since 2004. – Joint military exercises. – Cooperation in cyber security and maritime security. – "Make in India" campaign involvement. – Carrier Strike Group deployment in Indian Ocean.
- **Economic Relations**: The Joint Economic and Trade Committee (JETCO) was established in 2005. – India-UK Free Trade Agreement talks. – Bilateral trade and investment growth.

PIB Nov 14

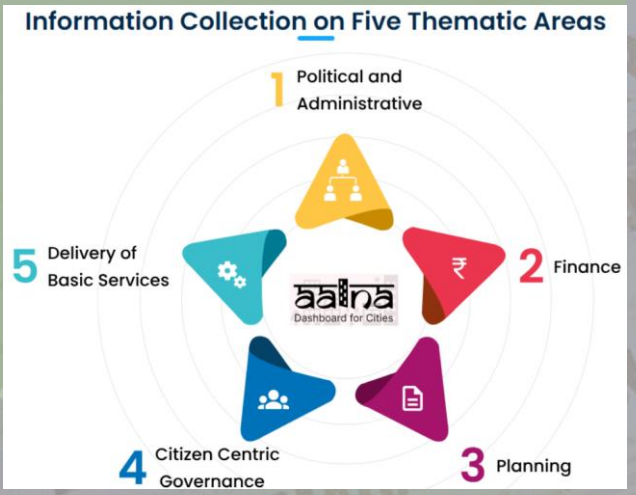
AAINA DASHBOARD
(Syllabus: GS Paper 2 – Government Schemes)

‘AAINA Dashboard for Cities’ portal launched

Context: Recently, the ‘AAINA Dashboard for Cities’ portal has been made live by the Ministry of Housing and Urban Affairs (MoHUA).

AAINA Dashboard for Cities

- **Launched by**: Ministry of Housing and Urban Affairs (MoHUA)
- **Aim**: To create a robust database of the key performance metrics of Urban Local Bodies
- **Nodal Ministry**: Ministry of Housing and Urban Affairs
- **Objectives**: To help cities to
  - See how they are faring vis-à-vis other cities
  - Inspire them by pointing to possibilities and areas of improvement
  - Provide an opportunity to learn and engage with frontrunners.
- **Will it rank ULBs**: The AAINA dashboard will not rank ULBs. It would serve as a tool for comparing similarly placed cities and promoting peer learning among cities.
- **Pillars**: The dashboard will provide information on the status and progress of the ULBs on five pillars:
  - Political & Administrative Structure
  - Finance
  - Planning
  - Citizen-Centric Governance
  - Delivery of Basic Services.
- **Significance**: This dashboard will inspire the ULBs by pointing to possibilities and areas of improvement and providing them the opportunity to learn and engage with frontrunners.



HINDUSTAN TIMES

Nov 14

NEW GECKO SPECIES

(Syllabus: GS Paper 3 – Env and Eco)

Scientists, researchers discover new gecko species endemic to Mizoram

Context: Recently, the **scientific community officially introduced** the newly discovered species, **'Cyrtodactylus vairengtensis,' named after the town in Mizoram** where it was found, and proposed the common name 'Vairengte bent-toed gecko.'

New Gecko Species

- **Name of Species**: 'Cyrtodactylus vairengtensis
- **Found in**: Mizoram
- **Suggested Common Name**: Vairengte bent-toed gecko
- **Features**: Number of femoral pores that distinguishes it from other members of the Cyrtodactylus family.
- Femoral pores, found on the underside of the hind legs in lizards, secrete a mixture of lipids and proteins, believed to be used for attracting mates and marking territories.
- Endemic to Mizoram, the n**ew species increases the count of geckos native** to the state to 6 and 22 across northeast India.
- **Across the world, there are 335 gecko species**, with 42 of them being found in India.

Gecko

- **About**: These are reptiles and are found on all the continents except Antarctica.
- Adapted to a range of environments, **from rainforests to deserts and cold mountain** slopes, these colorful lizards showcase remarkable versatility.
- Generally **small and primarily nocturnal**, these reptiles form a diverse group.
- **Spread across 6 families**: Carphodactylidae, Diplodactylidae, Eublepharidae, Gekkonidae, Phyllodactylidae, and Sphaerodactylidae.

LIVEMINT

Page 2

INDIA- BRAZIL TIE UP

(Syllabus: GS Paper 2 – IR)

'Brazil's tech can help India reach 20% ethanol blending'

Will help to improve productivity in livestock and poultry sector: minister Carlos Favaro

Puja Das & Shashank Mattoo
NEW DELHI

Brazil has started sharing technology with India to help it achieve 20% ethanol blending for petrol by 2025-2026, and will send indigenous breeds to improve productivity in the livestock and poultry sector, said Brazilian agriculture and livestock minister Carlos Favaro in an interview. Brazil is the world's second largest producer of ethanol.

Brazil will also take measures to correct some of the imbalance in the agricultural trade relationship by improving market access for Indian agriculture exports, including urea, to Brazil. "We, through some companies, have already started sharing the technology to enhance ethanol blending with petrol. As India produces a lot of sugarcane, it's easy for them to reach up to 30% because we already have technologies with a capacity of 27.5 that can go up to 30%. The technology that we are sharing with India will help them to achieve the 20% blending target by 2025-26," Favaro told *Mint* during his visit to India earlier this month.

"In the past, we have received some genetic materials from other countries in Brazil and we managed to enhance the productivity of those indigenous breeds. Now we are planning to send those genetic materials to India so that they can take advantage of the breed that has higher productivity and increase their net milk and poultry production. We are happy to share it with India. Additionally, to ensure food security, Brazil can help India by transferring more technology, so that the country can produce more and meet their requirements. Embrapa (a Brazilian state-owned research corporation) has the technology to improve the soil quality and productivity to 6,000-7,000 kg per hectare from 2,000 hectares. It is relatively low in cost. This way India's collaboration with Embrapa will help them produce more than the current production," Favaro added. In turn, India's UPL, a Mumbai-based crop nutrition products company, will help Brazil convert degraded pastures into productive land.

"We have discussed it with some Indian companies like UPL that can help us with the investment," the agriculture minister said. The estimated cost of pasture restoration, encompassing soil correction, acquisition of modern machinery, the implementation of environmentally responsible agricultural systems, and support for operational expenses is $1,500-3,000 per hectare. Consequently, this project presents investment opportunities of up to $120 billion.

"We (India and Brazil) are both fighting hunger, ensuring food security and preserving the environment. By using this land, we don't need to go into the Amazon region because we have spare degraded land that we can convert into high-using land," Favaro added.

puja.das@livemint.com

Sugarcane crop being harvested in Brazil for ethanol production. BLOOMBERG

2nd largest producer of ethanol in the world: Brazil

40 mn hectares identified for agriculture potential in Brazil

"We are committed to ensuring food security and food availability to address hunger and malnutrition. At the same time, we are committed to saving our forests and India can help us a lot in that area. We had a meeting on 2 November with Indian business houses as we are seeking investment to do farming in a way that we produce more so that we don't need to cut the forest to have more farmland," Favaro said.

The push for cooperation in agriculture comes ahead of Brazilian President Luiz Inacio Lula da Silva launching a programme to convert degraded pastures into productive land.

Context: Brazil has recently **initiated a collaborative effort with India**, sharing technology to **support its goal of achieving 20% ethanol blending** for petrol by 2025-2026, and concurrently providing indigenous breeds to enhance productivity in the livestock and poultry sector.

Key Points

- **Brazil will also take measures** to correct some of the imbalance in the **agricultural trade relationship** by improving market access for Indian agriculture exports, including urea, to Brazil.
- **As India produces a lot of sugarcane**, it's easy for them to reach up to 30% because **both countries already have technologies** with a capacity of 27.5 that can go up to 30%.

Ethanol Blending Programme

- **About**: The Centre had "launched pilot projects wherein 5% ethanol-blended petrol was supplied to retail outlets".
- **Launched**: In 2003 on a pilot basis and has been subsequently extended to 21 states and 4 Union Territories.
- **Implemented by**: Ministry or Oil Marketing Companies (OMCs).
- **Aim**: Reducing the country's dependence on crude oil imports, cutting carbon emissions and boosting farmers' incomes.
- **Targets**: 10 percent ethanol blending in petrol by the end of 2022 and 20 percent blending by 2030.

Ethanol

- **About**: It is also known as ethyl alcohol or grain alcohol, is a clear, colourless, and flammable liquid. It is a type of alcohol.
- **Produced by**: Molasses, a byproduct of sugar manufacture.
- **Uses**: Production of solvents, cleaning agents, pharmaceuticals, personal care products, and chemicals.

FINANCIAL EXPRESS

Page 1

AUCTIONING OF CRITICAL MINERALS

(Syllabus: GS Paper 3 – Economy)

CENTRE TO INVITE BIDS IN TWO WEEKS

20 critical mineral blocks to go under the hammer

Lithium blocks' auction key to boost domestic EV battery production

FE BUREAU
New Delhi, November 14

THE GOVERNMENT WILL invite bids for 20 critical mineral blocks, including lithium and graphite mines, in next two weeks, a top official said on Tuesday.

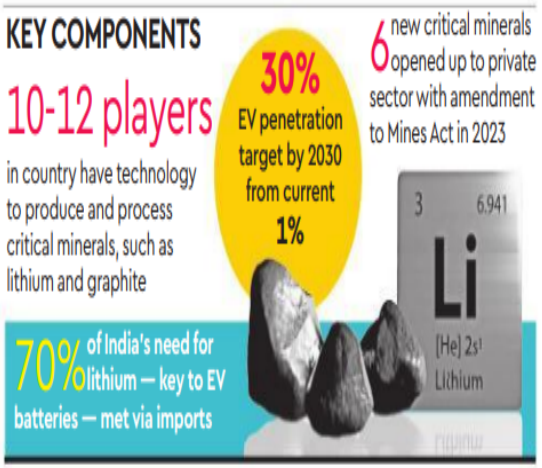
This will mark the first attempt to transfer these under-utilised assets to the private sector, after Parliament in early August empowered the Centre to auction concession rights for these critical minerals.

Mines secretary V L Kantha Rao said the government is planning to issue the auction notice in a couple of weeks.

Speaking after the inauguration of the Mining Pavilion at India International Trade Fair (IITF) here, the secretary said 10-12 players in the country have the technology to produce and process "critical minerals".

A workshop will be organised immediately, bringing all stakeholders together to frame a national-level strategy on mining and processing of critical minerals, he said.

Continued on Page 16



Context: **The Mines and Minerals (Development and Regulation Amendment) Act, 2023**, opened up six more critical minerals –beryllium, lithium, niobium, titanium, tantallium, and zirconium — to the private sector for exploration and mining.

Key Points

- **Critical minerals have gained significance** in view of India's commitment towards energy transition and achieving net-zero emission by 2070.
- The **idea is to reduce the country's import dependence** for lithium, the key element for the manufacturing of EV batteries, to the extent possible.
- **India meets about 70% of its lithium requirement via imports**, even as it seeks to increase the EV penetration from 1% now to 30% by 2030.
- The **current share of deep-seated minerals** like copper, zinc, lead, gold, silver, diamond, nickel, cobalt and platinum group of minerals in total mineral production of India is insignificant.

Critical Minerals

- **About**: Critical minerals are a group of minerals that are essential for various industrial sectors and have strategic importance for a country's economy and security.
- **Scarcity, Economic Value, and Criticality:** These minerals are distinguished by their rarity, high economic value, and crucial role in the production of advanced technologies and defense systems.
- **Priority in Industrial Sectors**: The Critical Minerals List prioritizes minerals that are indispensable for industrial sectors such as high-tech electronics, telecommunications, transport, and defense.
- **India's Membership in Mineral Security Partnership (MSP)**: India has recently become the newest partner in the MSP, a collaboration aimed at enhancing the resilience of critical mineral supply chains.

INDIAN EXPRESS

Page 11

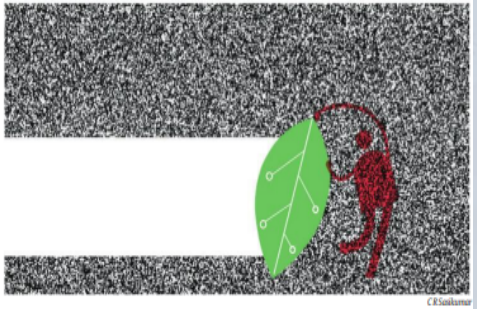
CLEAN AIR STRATEGIES

(Syllabus: GS Paper 3 – Env and Eco)

Nine things to do for clean air

Piecemeal approaches will only lead to the annual cycle of panic and shutdowns. With coordinated and sustained actions, we can address not only air pollution but also urban climate and health goals

AROMAR REVI



C R Sasikumar

AIR POLLUTION IS the fifth-largest cause of death in India — it led to premature deaths of 1.6 million Indians in 2019. This is more than three times the official number of Covid deaths during the pandemic. Poor air amounts to about Rs 7 lakh crore of economic loss annually, more than a third of our annual GST collection. This does not account for the human impact and routine disruption of life, work and study. Even worse, it discounts the impact of poor air on the health of rural Indians, who make up two-thirds of the air pollution-led premature deaths, despite their limited contribution to emissions that lead to severe air days across the country.

Why have we failed to improve this situation despite awareness of the problem and solutions? The answer both is simple and complex. Air pollution is a systems problem that cuts across state and regional boundaries, spanning rural and urban areas, sources of emissions, and is linked to interconnected economic factors and interests. But our responses to this crisis are often fragmented, addressing symptoms and not root causes. A few smog towers, some dust suppression by spraying roads, knee-jerk construction bans, haphazard odd-even restrictions, and shutting down schools cannot address this wicked problem. Unless we address root causes across fractured system of governance, financing and implementation, we have little hope of tackling a deepening air pollution crisis.

To begin, we need to acknowledge that this is a human-induced problem. Secondly, we have to realise that those most vulnerable — like children and older people, rural communities, and the urban poor — have contributed the least to the problem. Finally, we have to learn lessons from other countries that have successfully tackled this challenge, and action evidence-backed options to address it.

While constraints like population growth and increasing urbanisation will persist, we have to focus on changing our production, transportation, consumption and waste management systems to address this challenge. Beijing, Mexico City, and even London did just that to address even worse air pollution than what we are facing. Closer home, Delhi's poor air also improved following a fuel switch from diesel to CNG in public transport in the 2000s.

We need to examine nine tightly coordinated interventions (listed below) that can enable a successful campaign against air pollution, over decades.

First, we need an integrated approach to limit emissions and reduce exposure across the value chain from production to consumption to recycling of goods and delivery of services. This means limiting emissions from coal-fired power plants, polluting industries and brick kilns as well as limiting wood, cow dung and garbage burning for cooking and heating for half a billion rural and some urban residents. We have made progress on this with the PM Ujjwala Yojana, but its recent impact is reported to have slowed.

Simultaneously, we need to limit crop residue burning by implementing known solutions like shifting to less water-intensive crops, altering irrigation arrangements, timing, harvesting, baling practices and building a wider year-round market for straw. Even though these solutions exist, livelihood imperatives, limited access to technology and economic distress of farmers push back against them. The challenge is to establish coherent cross-sectoral policies and coordinated local to regional governance, along with monitoring systems, to enable them to work in practice, rather than just on paper.

Second, there must be a dramatic increase in the availability of affordable green urban public transport that enables universal last-mile connectivity like in Singapore, Hong Kong and most Chinese million-population cities, but at a fraction of their costs. If we can do this, it will be a win-win for climate, air quality, economic productivity and jobs that this industry would create. The shift of many metro systems in India to renewable power is a step forward in the right direction. Expanding metro ridership, and improving and electrifying viable bus services can help limit the exponential growth of private two-wheelers and cars that are a key driver of urban air pollution.

Third, we need widespread electrification of buildings, vehicles and production processes, where possible. Fuel switching to renewables can both curb pollution and meet climate goals. However, the transport fuel switch is complex and requires large investments in new electric charging infrastructure and enhanced rail services across the country. China made such huge investments in the late '00s to create the most efficient land-based transport infrastructure in the world. This will provide it significant competitive advantage for the rest of the century.

Fourth, adopting a regional or airshed approach is crucial to address pollution sources and impacts across an entire region rather than individual cities and towns. This approach was successfully deployed in Los Angeles, Mexico City and many mega-urban regions in China. India faces big challenges in doing this, as our systems of governance are fragmented both within urban areas and across states, with coordinated action an administrative nightmare.

Fifth, end-to-end construction and waste management is pivotal to reducing tonnes of dust and waste released in the air and water bodies. Recycling concrete, brick and stone from existing buildings will also limit the mining of our rivers of irreplaceable sand and the expansion of illegal quarries. Tackling 150 million tonnes of construction and demolition waste generated annually, of which only one per cent is being recycled, could make a tangible difference to some cities.

There must be a dramatic increase in the availability of affordable green urban public transport that enables universal last-mile connectivity like in Singapore, Hong Kong and most Chinese million-population cities, but at a fraction of their costs. If we can do this, it will be a win-win for climate, air quality, economic productivity and jobs that this industry would create. The shift of many metro systems in India to renewable power is a step forward in the right direction. Expanding metro ridership, and improving and electrifying viable bus services can help limit the exponential growth of private two-wheelers and cars that are a key driver of urban air pollution.

Sixth, strong legislation and enforcement of regulations are necessary throughout the year, not just around Diwali. This is possible if courts stay determined, and the executive resists the temptation to dilute environmental regulation in the face of special interest group pressures.

Seventh, there must be wide-scale citizen mobilisation for awareness and education, which can influence lifestyle choices over decades. This helped turn the tide in Los Angeles in the 1960s and Mexico City in the 1990s and 2000s. We also have to rethink whether our "western" lifestyles are sustainable in our context, which the government's LiFE initiative challenges us to do.

Eighth, the amount of funds needed to implement these coordinated actions and to strengthen the local government's capacity to deliver them is not trivial. The precedent set by the Fifteenth Finance Commission by investing in health and solid waste management should extend to financing of climate change and air pollution reduction interventions in the Sixteenth Finance Commission.

Ninth, there is a need to deploy the best science and technology available to establish real-time monitoring systems that can even provide advance weekly forecasts. To this end, expanding and improving the System of Air Quality Forecasting and Research (SAFAR) network, managed by IITM Pune, across airsheds of major cities in the country, can help us make rational decisions on alerts, interventions and investments.

Implementing all these measures together seems an impossible mountain to climb. But this is exactly what Mexico City did in much worse metrological conditions between the 1990s to 2010s, and many Chinese regions have tried to do in the 2010s. Piecemeal approaches will only lead to the annual cycle of panic and shutdowns. With coordinated actions, we can address not only air pollution but also our urban climate and health goals together. The choices before us are relatively clear, the question is when we choose to act.

The writer is director, Indian Institute for Human Settlements

Context: Recently, Delhi experienced a setback in air quality as the Air Quality Index (AQI) re-entered the "severe" category in various areas.

Key Point to tackle Air Pollution

- **Emission**: limiting emissions from coal-fired power plants, polluting industries and brick kilns as well as limiting wood, cow dung and garbage burning
- **Renewable Power**: The shift of many metro systems in India to renewable power is a step forward in the right direction.
- **Electrification**: Fuel switching to renewables can both curb pollution and meet climate goals.
- **Airshed Approach**: adopting a regional or airshed approach is crucial to address pollution sources and impacts across an entire region rather than individual cities and towns.
- **Waste Management**: End-to-End construction and waste management is pivotal to reducing tonnes of dust and waste released in the air and water bodies.
- **Lifestyle**: There must be wide-scale citizen mobilization for awareness and education, which can influence lifestyle choices over decades.
- **Funds**: The amount of funds needed to implement these coordinated actions and to strengthen the local government's capacity to deliver them is not trivial.
- **Technology**: There is a need to deploy the best science and technology available to establish real-time monitoring systems that can even provide advanced weekly forecasts.

Air Pollution

- **About**: Air pollution is the contamination of the atmosphere by harmful substances, such as gases, particulates, and biological molecules, which can cause detrimental effects on human health, ecosystems, and the Earth's climate.

Types of Air Pollutants: Particulate Matter (PM), Nitrogen Oxides (NOx), Sulfur Dioxide (SO2), Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), Ozone (O3).

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