1-15 JUNE, 2024

Down To Earth

FORTNIGHTLY ON PO[illegible]OPMENT, ENVIRONMENT AND HEALTH

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WORLD ENVIRONMENT DAY SPECIAL

BLOCK BY BLOCK

Development agenda for the new government

Climate change | Renewable energy | Air pollution | Industry
Water and sanitation | Habitat | Waste | Biodiversity | Mobility | Food systems

RESIDENTIAL TRAINING ON

SOCIAL IMPACT ASSESSMENT

As the country is progressing towards development, the arising need for more land is inevitable and so are the conflicts with the displacement of people. In order to minimize these conflicts, it is prudent to provide the inhabitants fair information on the impacts of the projects and the reimbursements against the acquisition of their lands. It is where Social Impact Assessment plays a crucial role.

Social Impact Assessment (SIA) is the process of analyzing, monitoring and managing the social and cultural consequences of projects. It is an important tool to inform decision makers, regulators and stakeholders about the possible social and economic impacts of a development project. In order to be effective, SIA requires active involvement of all concerned stakeholders.

With an objective to enhance the capacity of the stakeholders on SIA, Centre for Science and Environment is conducting a four-day residential training programme which focusses on the complete process of SIA including baseline data collection, land acquisition survey, preparation of the resettlement action plan (RAP) and evaluation of SIA reports. The programme aims to build a cadre of trained professional who can conduct and review SIA reports.

WHO CAN APPLY?

• SIA practitioners and consultants • Government officials from state revenue department, municipality, district collector, mining etc • Development corporations and industries • Academicians, students, researchers • Civil society groups, NGOs, advocates • Anyone else interested in the subject

CSE AAETI

DATE: August 6-9, 2024

VENUE: Anil Agarwal Environment Training Institute (AAETI), Neemli, Alwar, Rajasthan

COURSE FEES: ₹28,000
(includes training fees, accommodation, food and travel from/to Delhi and training centre)
For relevant government officials, the course fee is sponsored by CSE.

LEARNINGS FROM PROGRAMME:

The participants will develop a complete understanding of

- SIA methodology: Tools and instruments for conducting a SIA study
- Baseline data information: Learn data need, data collection, collation and interpretation
- Act and Policies: Learn provisions of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act-2013, issues and challenges in land acquisition, and how to prepare land acquisition plan
- Public consultation: Learn identification of affected people, modes of engagement and stages at which it is required.
- Rehabilitation and resettlement plan: Learn how to do asset evaluation, prepare entitlement matrix and develop R&R plan.
- Reporting methodologies: Learn how to develop a SIA report

Note: Participants have to reach CSE's Delhi office on August 5 latest by 1 pm. Transport to the campus will be arranged from the CSE's office.

FOR ANY QUERIES, PLEASE CONTACT

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DownToEarth

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OLD AGENDA WITH NEW IMAGINA

SUNITA NARAIN

WORLD ENVIRONMENT DAY SPECIAL

The new government must rebuild trust by being tolerant to ideas, opinions and information. It needs to strengthen ground-level institutions because participatory democracy can ensure development delivery. In this age of climate risk, the government also needs to re-engineer development to make it inclusive, affordable and sustainable

TION

ILLUSTRATIONS: YOGENDRA ANAND / CSE

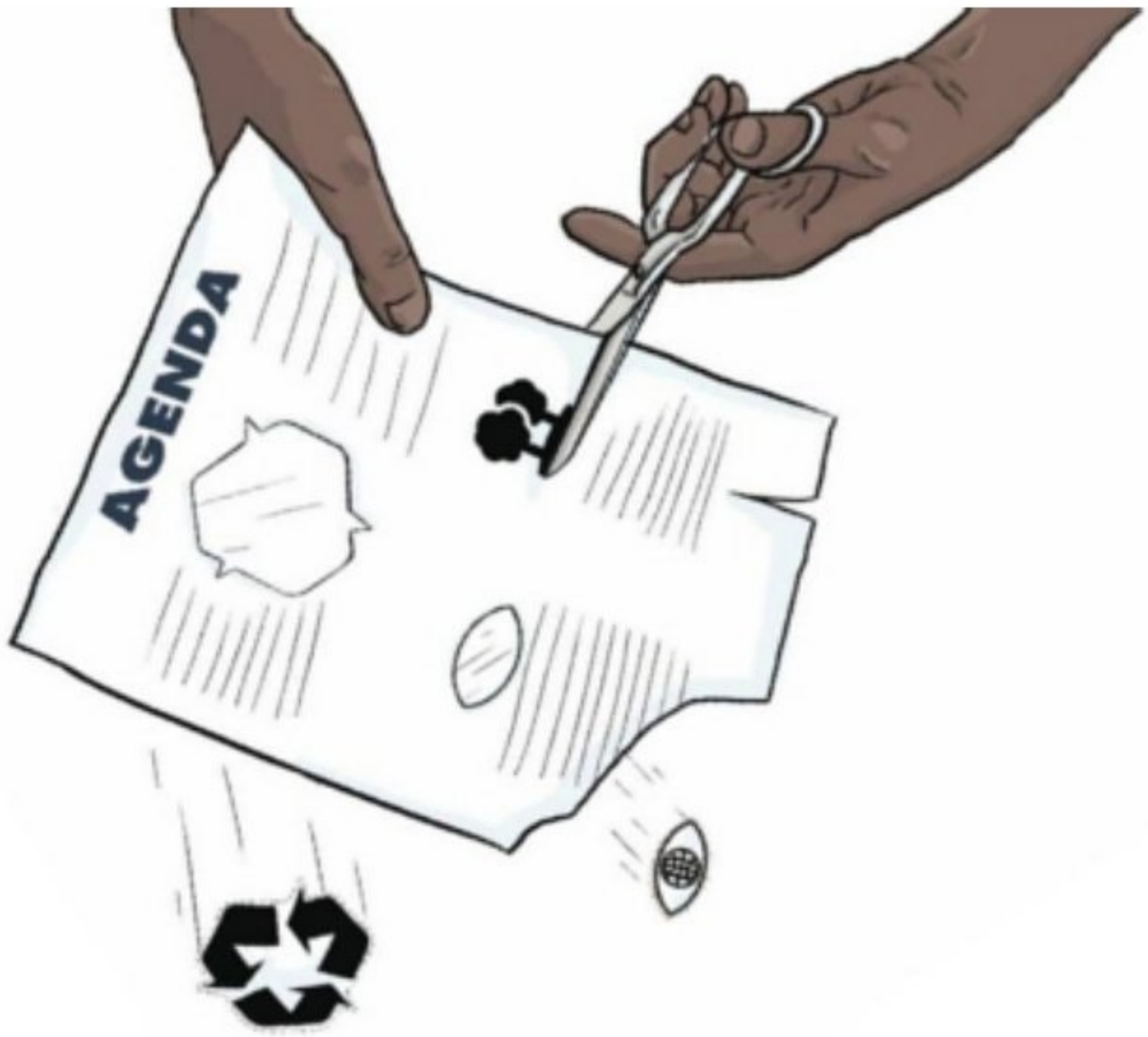
THE AGENDA for the next government is the old one, but with a fundamental difference. The fact is that the list of priority action areas remains the same. We have unfinished business when it comes to virtually everything—from energy to water and sanitation to food and nutrition to, of course, health and education. We know that the government has schemes in place and budgets allocated for all these issues. We also know that ensuring the welfare and well-being of people is a work in progress. During this election, as journalists fanned out to listen to the opinions of voters—perhaps the only time when their opinions count—we heard that unemployment is a major concern; lack of clean drinking water and sanitation tops the agenda; the energy crisis is still wicked as the price of the LPG cylinder is unaffordable and electricity unreliable. Farmers are still distressed. So, a lot of work still needs to be done, and in areas that the last government said it had checked off in its to-do list.

This should not come as a surprise. India is a vast country, with a massive deficit in governance. The last mile for any government scheme is about making sure that it reaches people—not once but every time. At the same time, we are seeing the impact of climate change. Our data shows that every day, some or the other part of the country is being battered by at least one extreme weather event. This has huge implications for development programmes—unseasonal and extreme weather lead to more droughts, floods and loss of livelihoods, putting additional strain on the resources of the government. This means that development will need to be more efficient and delivered at scale and speed.

But for all this to change and more, the next government's new agenda—and I say this even if the new government is the old one—must be different in the following respects.

First, it must be based on rebuilding institutions for increased feedback and accountability. Anybody who has a differing perspective is not an enemy of the state. Alternative information is not dissent or targeted criticism of the government. These sources of news and analysis must be seen as part of the tapestry of development. The more we learn about what is working and what is not, the more governance improves. Currently, most differing voices have been silenced—perhaps not deliberately but through the unsaid that makes it more acceptable to be acceptable if you have things that the powers want to hear. It is like an echo chamber where only cheerleaders thrive. In my view, this only makes a government poorer—they hear nothing and learn little. So, the agenda for the government-to-be is to be open—this is not about inclusion in government committee rooms but in the tolerance of information, ideas and opinions. Rebuilding trust is key—not just for schemes to succeed but also for societies to thrive.

Second, we need institutions for new India. Over the past few years, most conventional institutions have been deliberately, or by sheer neglect, allowed to



decay. The reason, the government may tell you, is that these agencies were not doing their jobs well; they needed to go. But the fact is that nothing has been done to replace the key functions that these institutions are required to play. Take the case of agencies set up to control pollution. They have become mute and meaningless. Maybe because when they had power, some indulged in making money from the business of combating pollution. But the fact is that combating pollution needs institutions that can apply deterrence with accountability and have the ability to navigate inconvenient and tough decisions. This is completely missing today. So, it should not surprise us that we have more pollution, not less, all across our rivers and in the air.

For this to change, we need two next-generation reforms. One, we need to strengthen the ground-level institutions, where local people take part. We need participatory democracy to make development programmes work. It is now over 30 years since the country passed the 74th and 75th amendments to the Constitution to empower people's institutions—the Panchayati Raj in rural areas and the municipal system for urban India. We have also experimented with deepening democracy through strengthening of gram sabhas—village assemblies. But all this is unfinished work. We have much more to do to give control over natural resources to village and city governments. We need them to manage funds and schemes; to create green jobs; to invest in natural resources for livelihoods. We need to celebrate the noise of democracy.

Third, we need imagination in the design of development schemes. For too long, governments have been caught between the welfare approach—which is often dismissed as the handout—and the capitalistic minimum approach. In my view, this age of climate risk needs a new narrative. The government needs to rework and re-engineer development so that it is inclusive, affordable and, thus, sustainable. This means reimagining the way we work in almost every sphere—from the supply of clean water, so that it is not resource- or capital-intensive, to the access to energy so that it is clean but, most importantly, affordable. This will require changes in design and then in delivery. We need a new development paradigm that can work for the Planet, but for this, it needs to work for every last person. This, then, is where we need the focus and attention of the new or old-new government. This is our common agenda.

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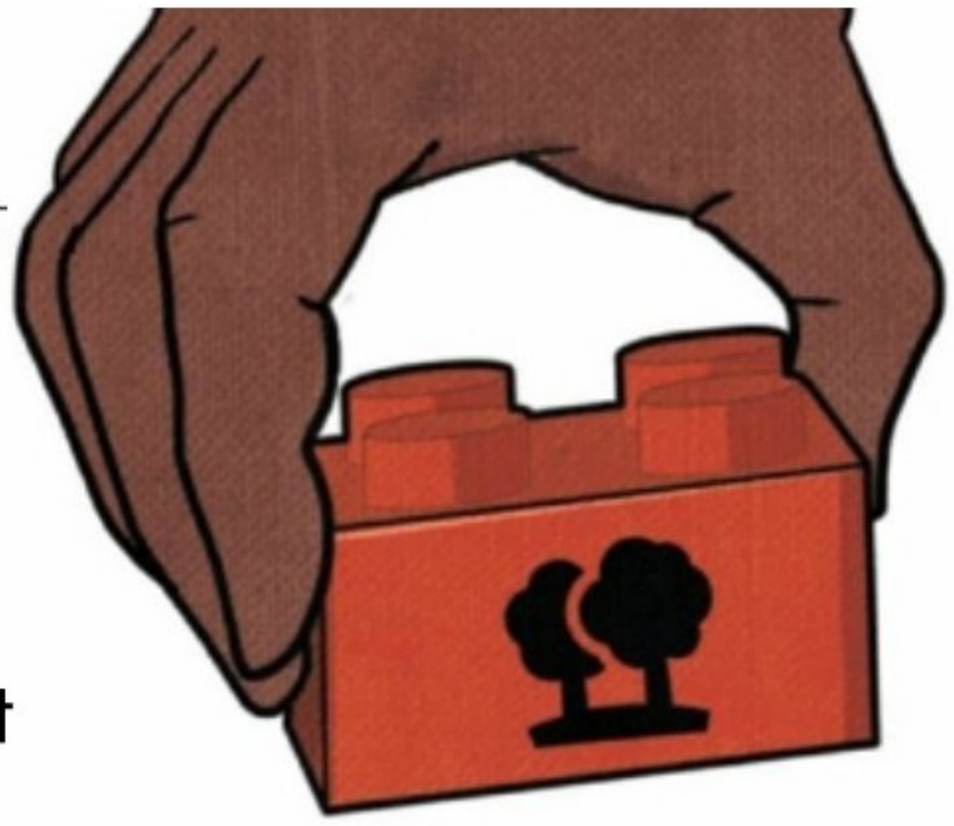
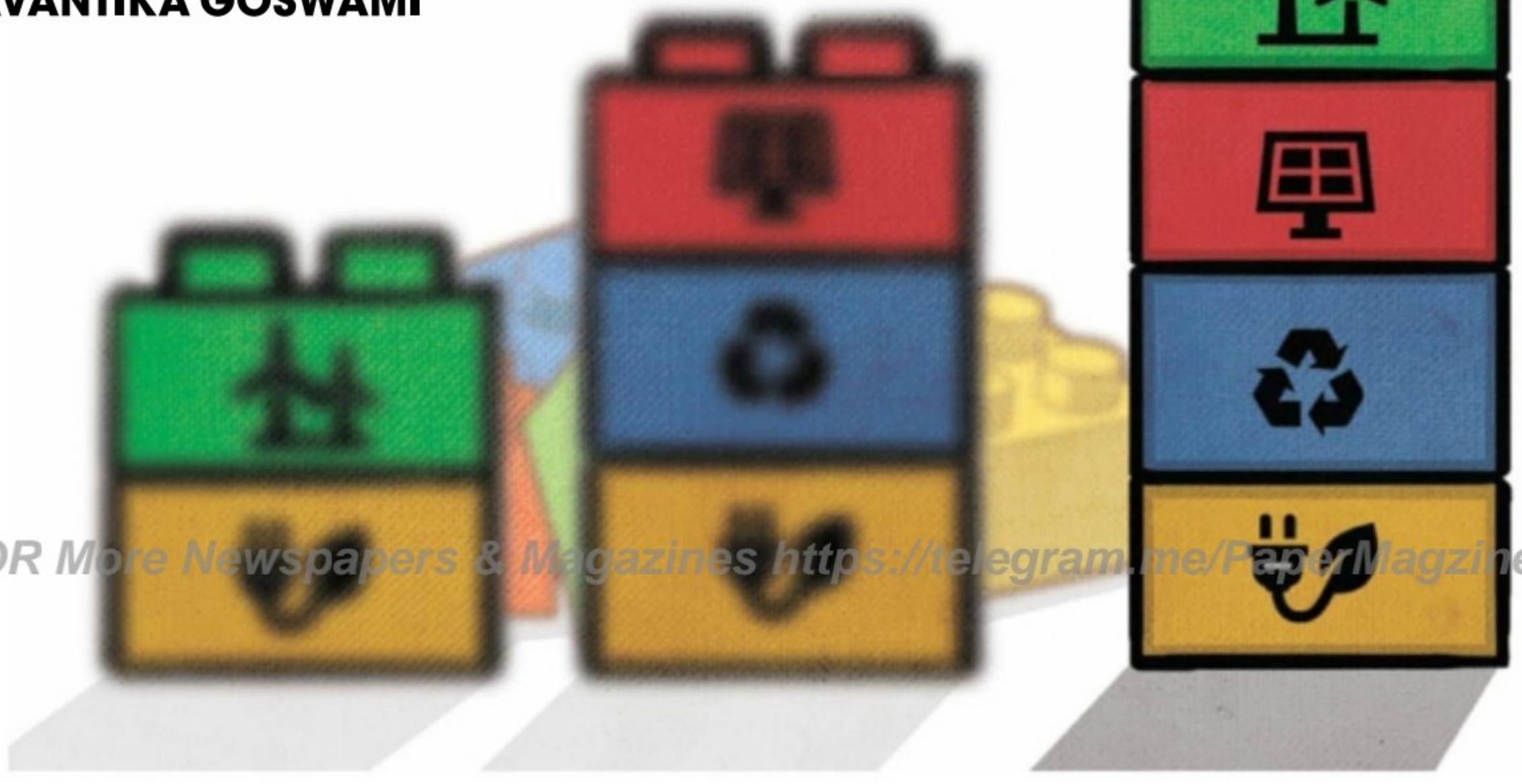


VISION 2030

Economic growth must take into account needs of energy transition, climate mitigation, with action aligned as per India's 2030 climate goals

TRISHANT DEV, TAMANNA SENGUPTA, AVANTIKA GOSWAMI



THE 2024 general elections in India came at a time when the country faced bouts of climate-linked adversities and challenges. Small wonder that climate change has entered the election manifestos of almost all the contesting political parties. The Bharatiya Janata Party has acknowledged the current shift in energy sources by declaring that it would continue to raise the share of renewable energy in the country's electricity mix. The Indian National Congress has pledged to set up a "green new deal investment programme" to promote the renewable energy sector and create green jobs, and an "environment protection and climate change authority" to enforce national and state climate action plans. Policymakers are also coming to terms with the fact that India's development must be in line with the reality of climate change.

The fact is that extreme and changing weather patterns, rising sea levels and soaring temperatures can undo a lot of development progress and economic growth achieved over the past decades; they can pose a serious threat to food security, spur a surge in disease outbreaks, fuel migration and even trigger conflicts. Thus, the new government has an arduous task of ensuring economic growth while tackling the effects

of climate change. One way to achieve this is by ensuring transition to clean energy.

MOVE ON ENERGY TRANSITION

India has made great strides in the field of renewable energy, with non-fossil fuels, excluding nuclear power, making up 43.12 per cent of the total installed capacity, according to the India Climate and Energy Dashboard by Union government think tank NITI Aayog. Installed capacity of solar power has increased twelvefold in the past eight years, says data with the dashboard as on March 31, 2024. This means India is on course to secure 50 per cent of its power capacity from non-fossil sources by 2030—a commitment made under the 2015 Paris Agreement on climate change.

This target requires a sweeping transition plan. Currently, despite making up 43.12 per cent of the country's energy capacity, non-fossil fuel sources only generate 23.4 per cent of the total electricity, as per the dashboard. While the share of coal is projected to decline in the overall energy mix, integrating greater shares of renewable power into the grid will be key. For this, necessary investments in grid flexibility, transmission and distribution infrastructure and energy storage technologies like pumped hydro and batteries will be crucial.

The government must work to bridge the gap between states that are swiftly adopting renewables and those trailing behind. It is equally important to address systemic issues like the ailing health of distribution companies. This must be done while maintaining affordability of energy.

PLAN FOR DECARBONISATION

By 2019, India reduced the emissions intensity of its GDP (gross domestic product) by 33 per cent of the levels recorded in 2005. This means that the country is on track to achieve its 2030 target to reduce the emissions intensity of its GDP by 45 per cent. At the same time, India aims to grow its economy over eight times its present size by 2047. This means the country needs a formidable sector-wise decarbonisation plan aligned with domestic development imperatives. The country submitted a Long-Term Low Emission Development Strategy (LT-LEDS) to the UN Framework Convention on Climate Change (UNFCCC) in 2022 with guidelines for different sectors. But we need detailed sectoral emissions reduction plans with short-, medium-, and long-term targets.

India should proactively identify the gaps in implementation of decarbonisation measures, as well as the finance and technologies needed. Solutions and institutional interventions should ideally be determined at the domestic level and guide global financial and technical support for the country, rather than the other way around.

This can harness multiple co-benefits, from alleviating the impacts of air pollution by reducing thermal power dependence to addressing the risk of stranded assets. It will also help lower the need for climate adaptation by avoiding the worst impacts of the climate crisis, and minimise the blow to economic and trade competitiveness in a changing global trade and climate regime.

BUILD CLIMATE RESILIENCE

As per India's Third National Communication to UNFCCC, submitted in December 2023, the country needs ₹56.68 lakh crore

ACTION POINTS

- Develop detailed emission-reduction plans for all sectors with short- and long-term targets
- Improve climate adaptation with standardised framework, methodology to evaluate climate risks, vulnerability, development programmes
- Prioritise resource security in the domestic green transformation through policy coherence and clear strategies
- Devote adequate budget to the National Adaptation Fund for Climate Change

(US $679 billion) until 2030 for climate adaptation. Mechanisms such as the National Adaptation Fund for Climate Change are aimed at enabling the states and Union Territories that are particularly vulnerable to climate impacts to meet the cost of adaptation. However, budgetary allocations for the fund have not kept pace with the growing needs—the past two financial years have not seen any budgetary allocation at all. While there have been growing allocations for mitigation mechanisms in recent years, it is important for the government to prioritise adaptation needs of the country.

To pinpoint adaptation gaps, thorough research on socio-economic impacts is vital. In the Third National Communication, the Union government highlights that most risk assessment studies focus solely on hazards. Improving adaptation research requires a standardised framework and methodology to evaluate climate risks, vulnerability and effectiveness of development programmes through government investment, community impact studies, building the capacity of local administrations and technological interventions to boost resilience, particularly in vulnerable sectors like medium and small enterprises and agriculture.

ADDRESS GEOPOLITICAL ISSUES

The country's climate ambitions are also susceptible to various external pressures, from the geopolitics of energy and industry to the global competition to control the supply chains for critical minerals and green technologies. Resource realism is at the forefront of international politics.

Take the case of rare earth metals, crucial for the production of low-carbon technologies. China produces nearly 85 per cent of the world's rare earth oxides, from which rare earth elements are obtained, according to the International Energy Agency. Countries are increasingly recognising the significant supply risk posed by such excessive concentration of production and processing. This risk extends to the supply chains of solar equipment and electric vehicles, the majority of which are concentrated in China.

The West is shielding itself from this onslaught through subsidies with which India cannot compete. The West is also resorting to mechanisms such as the EU's Carbon Border Adjustment Mechanism (CBAM), which may hurt India's trade competitiveness. Through CBAM, the EU proposes to tax imports of certain products based on their carbon footprint, which will have major economic impacts for countries like India that export carbon-intensive goods like iron, steel and aluminium to the bloc.

In light of these challenges, the country's foreign policy should prioritise resource security in the domestic green transformation. Policy coherence and clear strategies for onshore manufacturing of key technology components, diversification of supply chains for raw materials and appropriate challenging of parochial trade actions masquerading as climate protection will be key.

In a climate-risked and conflict-ridden world, India has a unique opportunity to fill the current vacuum in climate leadership by converging its international rhetoric at climate forums with clear and bold domestic action. DTE

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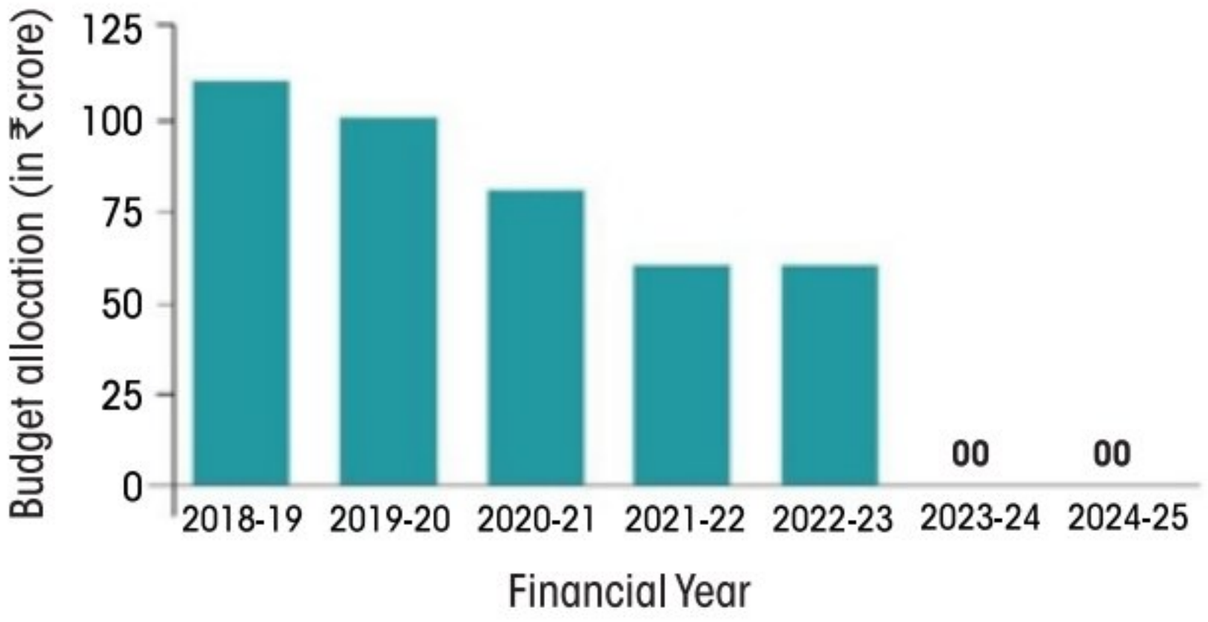
Anyone cares?

Budget allocation for National Adaptation Fund on Climate Change on a decline since 2018



Note: There was no budget allocation for the fund in 2023-24 and 2024-25
Source: Budget documents

IT'S NOW OR NEVER

Clean energy sectors need demand-driven markets and domestic industries that can cater to the entire value chain

NIVIT KUMAR YADAV, BINIT DAS, RAHUL JAIN, ARVIND POSWAL, VAANI KHANNA

INDIA'S RENEWABLE energy push has not just helped reduce greenhouse gas emissions from thermal power generation, but also fuelled economic development and improved electricity access and security. Globally, India now ranks fourth in renewable energy capacity, with 145 GW of installed capacity (excluding large hydropower), as per data with the Union Ministry of New and Renewable Energy (MNRE). Government programmes in bioenergy, wind and solar power have driven these advancements. To sustain this growth, the country needs a thorough assessment of the barriers to clean energy transition, focusing on implementation challenges in each sector. It also needs structured interventions that create demand-driven markets for wind, solar and bioenergy, and facilitate a domestic industry, covering the entire value chain.

COMPRESSED BIOGAS: TAP THE POTENTIAL

Compressed biogas (CBG), a non-fossil fuel produced from feedstock such as agricultural residue and solid waste, is a cleaner alternative to imported compressed natural gas or CNG (CBG and CNG have similar properties and calorific values). India aims to establish 5,000 CBG projects across the country under the Sustainable Alternative Towards Affordable Transportation (SATAT) scheme. But the sector faces some key challenges.

Many CBG plants are operating below their designed capacity. Insufficient feedstock procurement impedes operations. Limited CNG infrastructure curbs potential to extend gas pipelines to CBG plants, hampering gas sales. Expanding gas pipeline around the plants can ensure complete gas offtake. In rural areas, incentivising the conversion of tractors and two-wheelers to use CBG can create a demand for the fuel.

CBG sees erratic biomass supply because of a scarcity in machinery for agro-residue harvesting. Well-directed incentives to promote domestic manufacturing of such machinery can be supported via subsidies. Encouraging farmer-producer organisations to act as feedstock aggregators can help replace third-party entities, while ensuring profit-sharing among farmers.

People are unaware of fermented organic manure (FOM), a by-product of CBG. Agricultural institutes must develop standard operating procedures for FOM enrichment and train farmers in FOM application techniques.

The Reserve Bank of India has classified CBG as a priority sector for lending, yet banks show little interest in financing these projects, citing low profit margins and lack of standardisation. Several banks demand high collateral for loans, with interest rates as high as 11.5 per cent. Establishing a government-backed guarantee programme will incentivise financial institutions to offer loans more readily.

There also exists a shortage of technical personnel in maintenance and operation of CBG plants. This results in leakages or inefficient operations. Skilling programmes on biogas development should be introduced through national skill training institutions.

WIND ENERGY: MAKE IT ATTRACTIVE FOR INVESTORS

Wind contributes 32 per cent or 45 GW of the country's total renewable energy capacity, second to solar power. This is meagre. The country has the potential to generate 700 GW from wind power and the Union government aims to expand wind capacity to 172 GW by 2030—140 GW from onshore projects and 32 GW from offshore projects. Achieving the target in just six years seems a tall order, given the fact that India added 2.2 GW in 2023. At this rate, India will need 57 years to achieve 172 GW.

The new government, therefore, needs to assess and remove the challenges that hinder the growth of the wind energy sector. For instance, wind power generation varies across the year as a result of seasonal patterns. Developers in Tamil Nadu, Gujarat and Karnataka say that wind power generation is usually at its peak in May, June and July, and at its lowest in December and January. To ensure that fluctuations in the wind energy supply do not hamper business, the Centre in 1992 introduced an annual energy banking system, where the grid acts as the energy bank. The system allowed developers to inject their excess supply into the grid and withdraw during the deficit period. However, in 2019, the government scrapped the system as the variable supply was leading to "grid imbalance". Though a monthly banking system has since been in place, new developers do not find it attractive. This scenario can be improved by extending the scope of the energy bank to a few more months during the lean generation period.

The government should also streamline capacity expansion. For instance, land acquisition is a significant hurdle for onshore wind projects. This can be addressed by simplifying the acquisition process, clarifying land-use policies and ensuring equitable compensation for landowners.

In terms of offshore wind energy, India's vast coastline holds the potential of generating 70 GW of wind power. But so far, India does not have any offshore wind project. In February this year, the government issued tenders for seabed lease rights for 4,000 MW offshore wind power projects in Tamil Nadu and Gujarat. But officials with MNRE say the bidding process received lukewarm response from investors. To allay the investors' fears, the government can launch a project on a pilot basis and prove the profitability of offshore wind. At the same time, rigorous environmental impact assessments and mitigation strategies must be in place to protect marine ecosystems. Experience in other countries shows that construction and operations of offshore wind energy projects could interact with marine life. The projects increase ocean noise, which could affect the behaviour of fish, whales and other species.

The government must provide guidelines

ACTION POINTS

- Expand gas pipeline around compressed biogas plants. This can ensure complete offtake of the clean fuel
- Launch offshore wind energy project on pilot basis to allay investors' fears
- Provide guidelines and incentives to encourage repowering of older wind farms with newer, more efficient turbines

and incentives to encourage repowering older wind farms with newer, more efficient turbines, and fostering collaboration between domestic and international experts to promote innovation and reduce costs.

SOLAR ENERGY: MAKE IT RELIABLE, AFFORDABLE

India has made tremendous strides in solar energy development in the last decade. The installed capacity from solar has increased from 1.2 GW in financial year 2013-14 to 82 GW in 2023-24. In other words, the contribution of solar energy has increased to 6.5 per cent of the total energy mix from less than 0.4 per cent a decade ago, according to data with MNRE. To maintain the current growth pattern, the government needs to remove challenges that have led to delays in deployment timeline, in integration with the grid and in power procurement practices.

According to MNRE, states such as Rajasthan, Gujarat, Karnataka, Tamil Nadu, Andhra Pradesh and Telangana contribute nearly 80 per cent of installed wind power capacity. This leads to uneven regional concentration of solar generation in western and southern parts of the country. Efficient transmission of solar power from these regions will require strengthening the power system interface for enhanced grid stability. Since gestation periods for setting up transmission corridors are higher than solar power plant construction, prior assessments to fast-track deployment can be undertaken.

The government can also prioritise projects that combine solar and wind energy in high-potential zones. Such solar-wind hybrid plants will lead to round-the-clock generation of power—from wind in nighttime and from solar in daytime. Renewable power integration in the grid can be seamless when coupled with battery storage devices. Additionally, this would boost the domestic battery manufacturing industry that, in turn, would make tariffs cost-competitive.

Since installation of solar plants has a huge land footprint, promoting alternative sites for solar energy such as floating solar power plants, producing crops and solar energy from the same land, or using mini- and micro-grids in areas with social and agricultural challenges will be useful. Detailed interventions such as manufacturing of floater beds and reducing developer risk in mini-grids are required.

The new government also needs to keep in mind that almost all the growth in solar energy has been from utility-scale models; adoption rates in solar rooftop segments are considerably low. Currently, rooftop solar contributes nearly 13 GW, with only 30 per cent from the residential sector. Improved adoption rates in rooftop solar will require better operational management of power distribution companies (DISCOMS), such as in billing efficiencies, power procurement practices and in technical aspects like residential metering arrangements (net, gross or virtual).

The growth in solar power is strongly correlated with the performance of DISCOMS. For instance, delays in approvals and subsidy disbursement to consumers reduce end-user confidence. DISCOMS also need to undergo urgent reforms to have flexibility to exit expensive thermal power purchase agreements. This will prompt them to procure cheaper solar power while offsetting carbon emissions from early retiring of thermal power plants. Finally, power distribution should not be used as a political tool; let sound economic principles dictate the cost. DTE @down2earthindia

ACTION POINTS

- Prioritise projects that combine solar and wind energy, which will lead to round-the-clock generation of power, in high-potential zones
- Improve operational management of DISCOMs to boost adoption of rooftop solar
- Provide DISCOMs flexibility to exit expensive thermal power purchase agreements to procure solar power, offset carbon emissions

LOOK BEYOND DUST

Reinvent National Clean Air Programme to focus on fine particulate matter and trans-boundary pollution

ANUMITA ROYCHOWDHURY

ONLY A year is left for the polluted cities of India to clean up their act. In January 2019, the Union environment ministry launched a comprehensive policy framework, the National Clean Air Programme (NCAP), to improve air quality in 131 cities and urban agglomerations that consistently reported high pollution levels. The aim was to lower the concentration of particulate matter in these cities by up to 40 per cent by 2025-26, from the 2019 level. To enable implementation, NCAP promised performance-linked funding—a first-of-its-kind strategy to curb air pollution. A massive ₹19,711 crore was earmarked for the programme. By 2023, as stated in the ministry's Annual Report 2023-24, all the 131 cities showed improvement in the levels of PM10 (particulate matter with a diameter of 10 microns or less). But have these cities managed to reduce air pollution effectively, which can cause a host of illnesses from lung cancer to cardiovascular diseases to low birth weight and lead to premature death? There are questions around this, and let me tell you why.

Of the ₹19,711 crore earmarked under NCAP, ₹16,539 crore is for 49 cities and urban agglomerations, each housing more than 1 million people; the remaining ₹3,172 crore has been earmarked for 82 cities with smaller populations, as per the ministry's Annual Report 2023-24. However, an analysis of this data shows poor utilisation of funds—an indicator of ineffective implementation. Till December 2023, the 49 million-plus cities received ₹8,357.51 crore, but spent only 70 per cent—₹5,835.03 crore—of it. The 82 smaller cities received ₹1,292.5 crore, and spent only 37.5 per cent, or ₹480.92 crore, of it. This indicates the scale and speed of action to tackle air pollution are yet to catch up with the target.

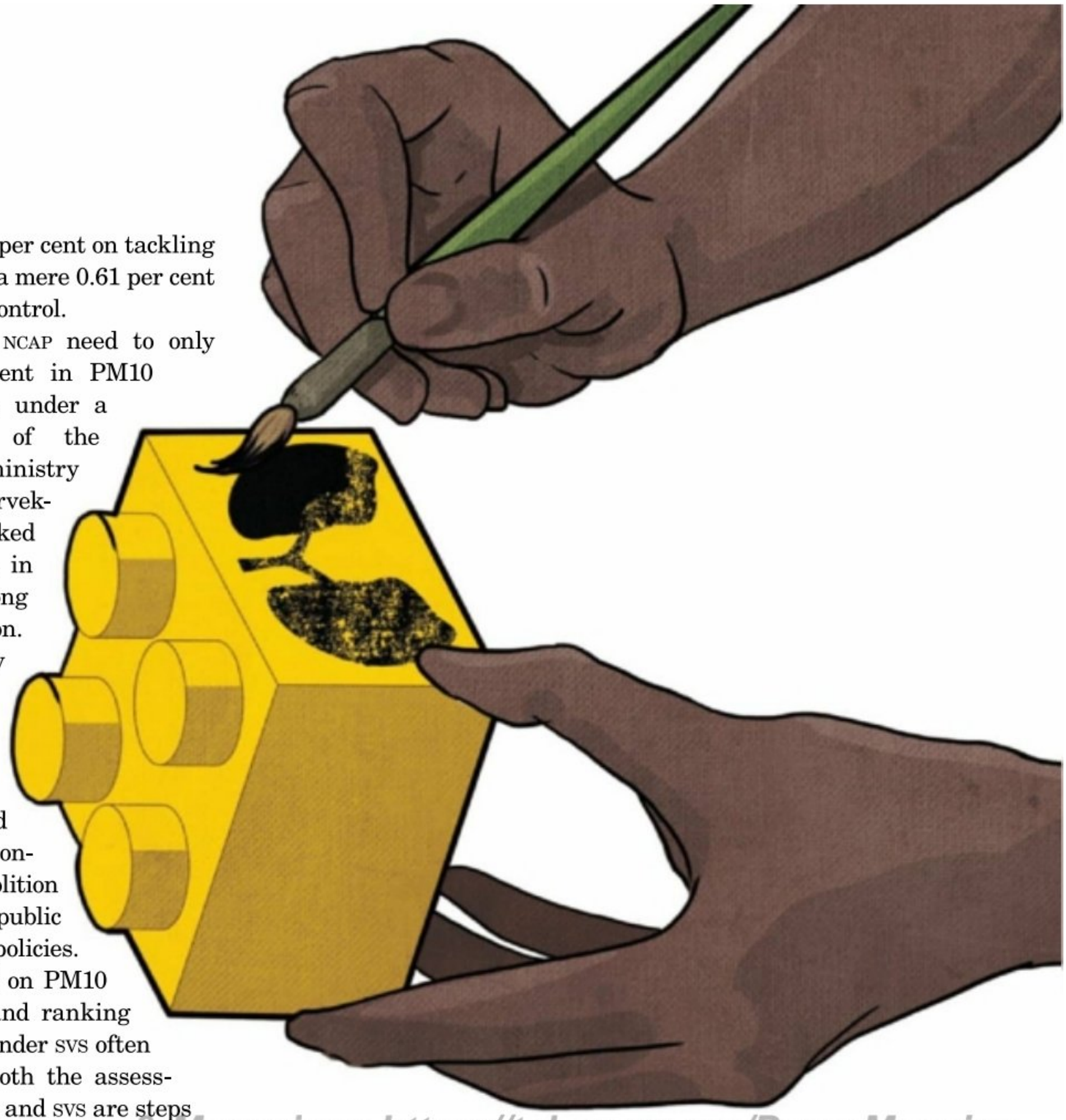
The metrics used for judging progress in air pollution abatement are also questionable. For instance, NCAP was originally planned to reduce concentrations of both PM10 and PM2.5. But in practice, only PM10—the coarser dust particles—is considered as the basis for assessing air quality improvement. This has diverted attention and investments towards dust control, while PM2.5, the more harmful particles emitted largely from combustion sources, remains neglected. Analysis of the spending under NCAP shows that as much as 64 per cent of the funds have gone into activities such as paving and widening roads, repairing potholes, water sprinkling and buying mechanical sweepers. By comparison, funds allocated to reduce emissions from combustion sources, responsible for PM2.5, are a lot less—only 14.51 per cent of the total funding under NCAP has been spent on controlling

ACTION POINTS

Fine particulate matter, PM2.5, is a more relevant health indicator to assess air quality than coarse particulate matter PM10. Use PM2.5 as benchmark in National Clean Air Programme

Identify key sources of PM2.5 and plan measures to mitigate the pollution

Cities that rank high under National Clean Air Programme for improved PM10 levels, do not necessarily rank high for policy action. Fix this



biomass burning, 12.63 per cent on tackling vehicular pollution and a mere 0.61 per cent on industrial pollution control.

While cities under NCAP need to only demonstrate improvement in PM10 levels to access funds, under a parallel programme of the Union environment ministry called Swachh Vayu Sarvekshan (SVS), cities are ranked based on action taken in different sectors along with PM10 reduction. These include policy measures to reduce vehicular and industrial emissions, emissions from biomass and municipal solid waste, road dust and dust from construction and demolition waste, and also on public awareness about these policies. But performance based on PM10 reduction under NCAP and ranking based on action taken under SVS often do not match. While both the assessment strategies for NCAP and SVS are steps in the right direction, transformative changes are possible only if the method of tracking progress and compliance is stronger. So here are a few suggestions for the new government to achieve clean air.

Use PM2.5 as benchmark: PM2.5 is a more relevant health indicator to assess improvement in air quality. Besides, the impact of policy action on PM10 levels is difficult to establish, as it is highly impacted by wind-blown dust, loose sub-soil from farmlands, and is released by specific sources like mining and construction.

Choose the right metrics: Since under NCAP, PM10 is used as the indicator to measure progress in air pollution, focus is on dust control. Key combustion sources like transport and industry, which are the major sources of PM2.5, do not receive priority for developing mitigation pathways. Besides, most industrial sources and power plants are located outside municipal boundaries, and thus remain beyond the ambit of city action plans. Small- and medium-scale units that exist in the non-confirming areas of cities are often not considered.

Some information on industrial pollution control measures get reported only if a city is an industrial city or town. Even then, information on steps to accelerate transition to clean fuels and technologies is scanty. Similarly, often progress reports of cities are inadequate on the indicators set by the Central Pollution Control Board (CPCB) for improvement in on-road emissions management, old vehicle phase out, vehicle electrification, public transport improvement and non-motorised transport. These strategies are not well developed quantitatively and qualitatively for implementation, funding and reporting.

Link policy action with air quality improvement: Currently, there is no way to

ACTION POINTS

Cities cannot meet their clean air benchmark unless a regional approach is taken to reduce trans-boundary pollution

Polluter pays principle must be followed while designing taxes, cesses, and pricing products for additional revenue, which can be used to create dedicated funds for targeted action

Sector-specific funding strategies need to converge efficiently to accelerate action

establish the link between policy action and improvement in pollution levels. Cities ranked high under NCAP for improved PM10 levels do not necessarily rank high under SVS for taking policy action. Similarly, cities that score high for good policy action under SVS can be the worst performing cities under NCAP for not improving PM10 level. An assessment by Centre for Science and Environment (CSE), Delhi, shows that in 2022-23, Guntur city of Andhra Pradesh and Angul town of Odisha were among the best in their respective city categories for taking good action under SVS, but were worst performers under NCAP for not improving PM10 levels. In 2022, Lucknow was among the top performers for good action under SVS but in 2023, it was among the worst performers under NCAP. This needs to be fixed.

Go beyond cities: Experience shows that cities cannot meet their clean air benchmark unless a regional approach is taken to reduce trans-boundary pollution. Even though NCAP has taken on board the idea of airshed approach especially targeting the Indo-Gangetic Plain, an inter-state coordination framework is yet to develop. However, state action plans can be leveraged to minimise the influence of upwind pollution sources on downwind air quality within the state. Regional approach is also an opportunity for smaller towns, suburban and rural areas to curb air pollution collectively, as they do not have adequate resources and individual capacity to implement complex measures and infrastructure.

National policy for local action: Strategies for clean air action related to industry, power plants, public transport infrastructure, waste management and clean fuels need support from the Union government. For instance, although state governments are notifying the list of approved fuels, they cannot often scale up implementation as national policies on pricing and infrastructure for clean fuels are not adequately supportive. Similarly, cities aiming to improve transit infrastructure or to introduce remote sensing measurement need Central government rules and support. Even though national policies have suggested innovative financing strategies for sectoral resource mobilisation, it is not usually practised. Sector-specific funding strategies need to converge efficiently to accelerate sector-wise action on clean technologies, fuels, green infrastructure and urban design solutions.

Polluters must pay: Polluter pays principle must be followed while designing taxes and cesses, and pricing products for additional revenue, which can then be used to create dedicated funds for targeted action. Delhi has imposed an environmental compensation charge on truck entry daily, on each litre of diesel fuel sold and on big cars and SUVs (sports utility vehicles). Since municipalities are the primary driver of action, they can explore green municipal bonds.

Need sectoral targets: NCAP has rightly allowed sector-specific action and funding to align with clean air action. For example, performance-linked funding for garbage-free cities by 2025 under Swachh Bharat Mission 2.0 shows cities are taking action to control waste burning, and that is reported under NCAP. This also shows that sectoral schemes and programmes with stronger legislative and regulatory framework, and committed funding, have faster pace of progress. This needs to be scaled up. DTE

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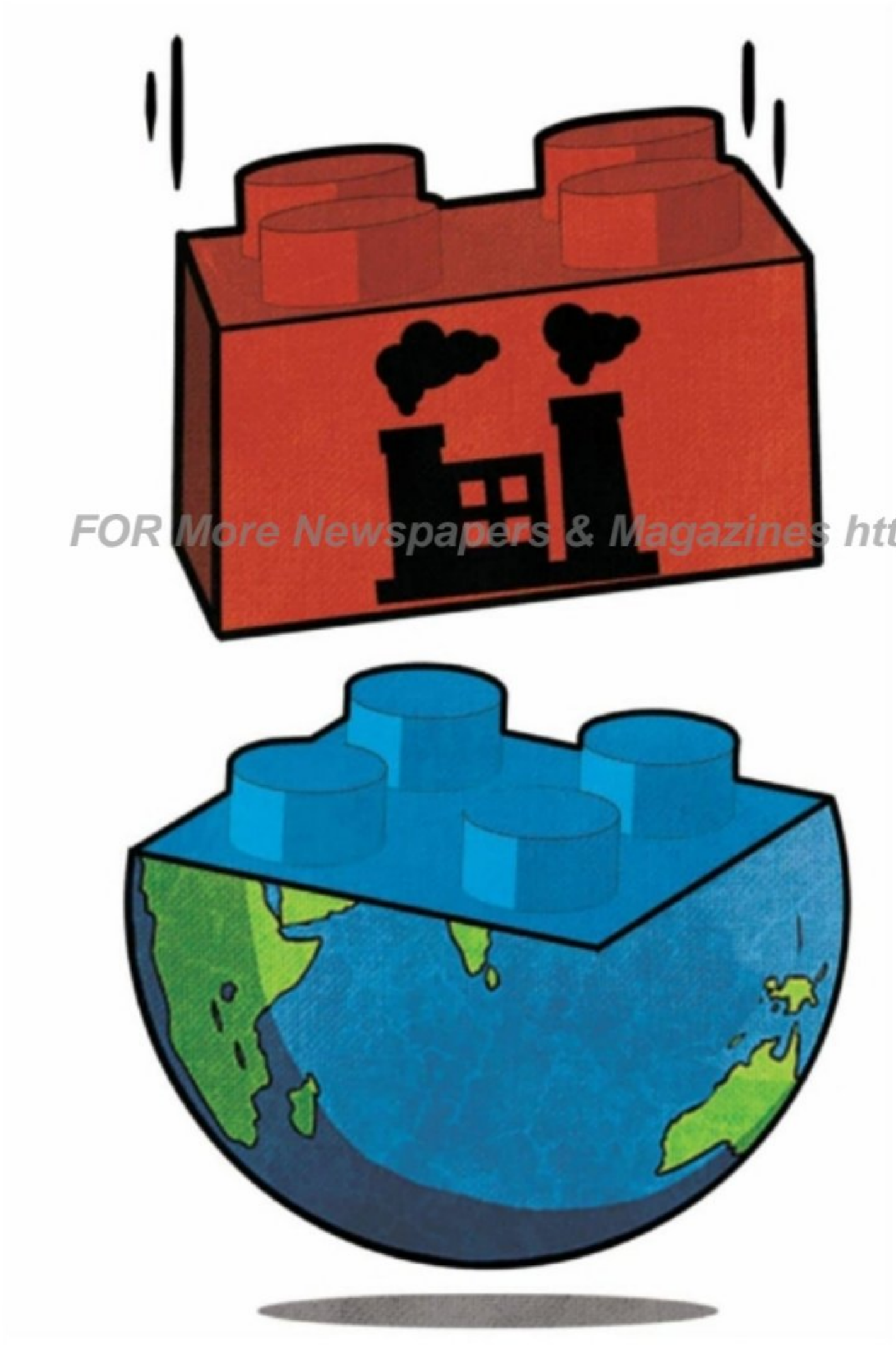
OVERHAUL OVERDUE

Hold polluting industries accountable for public health risks, environmental hazards, climate change; provide them support for green transition

NIVIT KUMAR YADAV, PARTH KUMAR, SHREYA VERMA, ANUBHA AGGARWAL



ENVIRONMENTAL DEGRADATION is invariably linked to poor implementation of environmental norms and standards. This is what the new government must remember as it sets out to lead the country at a time when its manufacturing capabilities are significantly expanding. The government would do well to address some key areas of concern that hamper the environmental performance of the country's industrial sector.

STRENGTHEN SPCBs

Effective state pollution control boards (SPCBS) play a vital role in environmental management and regulation, as mandated by various laws. However, their performance suffers due to insufficient humanpower, limited financial resources and absence of adequate infrastructure. According to an April 5, 2024 report by the Central Pollution Control Board (CPCB), 6,075, or over 50 per cent, of sanctioned positions across all SPCBS are vacant. In Andhra Pradesh, Bihar, Gujarat, Haryana, Jharkhand, Madhya Pradesh, Uttarakhand and Manipur, the vacancy rate is over 60 per cent. Such shortages affect environmental management and regulation. For example, the

Maharashtra Pollution Control Board has 505 staff against the sanctioned posts of 839 to monitor 111,928 industries, as per the 2022 annual report of the board. Given that only 315 of the 505 staff are technical specialists, each of them are responsible for monitoring 355 industries. Therefore, it is imperative to assess institutional capacity and prioritise filling vacant positions.

Adoption of advanced technologies is imperative for efficient monitoring and compliance. Though SPCBs use technologies like Continuous Emission Monitoring Systems (CEMS) for real-time monitoring of industries and industrial areas, the data generated is not being used for regulatory and compliance purposes as it is not an admissible evidence under the Air Act 1981. With the establishment of a certified CEMS, the Air Act, 1981, can be amended to allow for the use of CEMS data for legal and compliance purposes.

As per the performance audit of SPCBs and pollution control committees (PCCs) by CPCB in 2019-20, most boards and PCCs, except those in northeastern states, do not face any financial constraints. However, they are insecure about the availability of funds in the future. To alleviate this apprehension, it is imperative to explore new financial avenues and remove any procedural roadblocks to effectively utilise existing funds.

Data transparency serves as a crucial instrument for enforcing compliance, fostering accountability, encouraging public participation and raising public awareness. This is the reason the Supreme Court in 2017 had asked SPCBs and PCCs to make CEMS data publicly accessible. However, nine SPCBs and PCCs are yet to comply with the order. The Water (Prevention and Control of Pollution) Act, 1974, also requires SPCBs and PCCs to disclose their activities in annual reports. However, 11 SPCBs and PCCs do not make their annual reports publicly accessible. Reports that are publicly accessible show an inconsistency in data, which defeats the purpose. All SPCBs and PCCs should, therefore, follow a common format for providing data in annual reports.

ACTION POINTS

Over 50 per cent of sanctioned positions across all state pollution control boards are vacant. Assess institutional capacity and prioritise filling vacant positions

Replace the Environment Impact Assessment Notification, 2006 with a stricter law and ensure proper implementation

Foster transparency in implementation of environmental clearance conditions

REASSESS EIA NOTIFICATION

The Environment Impact Assessment (EIA) Notification, 2006, is the governing legal instrument to grant green clearance for establishment or expansion of an industry on the basis of its potential environmental impact. The notification is dynamic and can accommodate changes in its provisions and processes as per the requirement of the changing times. However, this characteristic of the legal instrument seems to have been exploited. Instead of ensuring stricter implementation, governments, over the years, have made concerted efforts to dilute the processes and norms to ease establishment and expansion of even heavily polluting industries.

Records of the Union Ministry of Environment, Forest and Climate Change (MoEFCC) show that in the past five years, some 110 changes have been introduced in the 2006 EIA notification simply through office memoranda, which do not involve public consultation. Some of these changes have been challenged in the National Green Tribunal. Some changes were also introduced as provisions in the draft 2020 EIA notification that was heavily criticised for weakening environmental norms.

The government must ensure that the EIA notification is not changed every now and then. Instead, it is pertinent to replace the EIA notification with an EIA Act to ensure its

meaningful implementation.

The new government also needs to foster transparency regarding how environmental clearance (EC) conditions are implemented once a project is commissioned. Currently, project developers submit a six-monthly compliance report, which is uploaded on MOEFCC's website or on the state portals. However, this information is hardly available in the public domain. The quality of these reports is also questionable and they are often incomplete. This defeats the purpose of submitting compliance reports for EC. Sometimes, environmental conditions in the Consent to Operate to a project are stricter than what is granted or permitted in the EC letter and may have additional environmental standards to comply with. In that case, the project may be in compliance with the EC but may still be flouting the environmental parameters set by SPCBs. It is important for the new government to ensure that all environment-related information is available on a single portal, irrespective of it being under the jurisdiction of the state or the Centre.

TAME POLLUTION

Industries are always under scanner for air pollution. Industries emit two major types of emissions. First, stack-based emissions that are usually emitted due to combustion of fuels. The path ahead to combat stack emissions is to ensure that industries switch to cleaner fuels, adopt cleaner and efficient technologies and set up and maintain appropriate pollution-control devices. Technology-based standards should be set for small- and medium-scale industries that are difficult to monitor because of their size and sheer number. Another option is to introduce common combustion facilities like a common boiler to reduce the compliance load on both regulators and industry. Individual sectoral plans can be designed for energy-intensive sectors like metal, chemicals, cement, fertiliser, pulp and paper, and brick kilns, which are majorly responsible for stack-based emissions.

The other major type of emission from industries is fugitive emissions. Sectors like stone crushers, mineral grinding and brick kilns are major sources of fugitive emissions. Since these emissions are not from a point source (a single point such as a pipe or chimney), it is important to prepare detailed sectoral process-wise guidelines of pollution abatement, which are strictly implemented on the ground. Weaknesses in existing guidelines and their poor implementation has made the situation quite worse on the ground. Apart from these two types, certain sectors like chemical and refinery emit volatile organic compounds, such as ether, which require added attention.

ACTION POINTS

Plan dedicated ministries, bodies for emission-intensive sectors like cement, fertiliser

Thermal power plants must comply with 2015 emission norms without further delay and become energy efficient with ambitious renewable energy mandates

Provision of common facilities, suitable location away from habitable areas can improve sustainability of industries

DECARBONISE ALL SECTORS

The Third National Communication by MOEFCC to the UN Framework Convention on Climate Change (UNFCCC) in 2023, shows that the industrial sector through its energy- and process-based emissions had contributed around 22 per cent of the country's total emissions. Sectors like steel, cement and aluminium are major contributors to this load of industrial emissions. A large part of the discussions around decarbonising emission-intensive sectors has revolved around steel sector, which is under a dedicated ministry. It is time the government planned dedicated ministries or bodies for other crucial emission-intensive sectors like cement, aluminium and fertiliser.

Additionally, the government must focus

on the following strategies to decarbonise the industrial sector. First, switch to cleaner sources of energy or fuel and use the latest efficient technologies. Second, increase the use of alternate cleaner raw materials and identify how these materials and fuels may be sourced from a circular value chain. This means identifying how the waste of one industry could become a boon for another. These pathways will also clean our air and water and manage the waste streams.

Micro, small and medium enterprises (MSMES) are a huge source of employment in India and also contribute significantly to the economic growth of the country. However, a majority of these industries use dirty fuels. To decarbonise MSMEs in a just and equitable manner, the government must launch a national mission to collect authentic and detailed data on these industries and prepare a plan based on it.

India is setting up its own carbon markets which will see industry as the main stakeholder. The proposed market is based on the perform, achieve and trade (PAT) scheme, which has been operational since 2012 and has had its own set challenges like low price, excess supply of energy certificates in the market, unambitious targets, non-imposition of penalties on non-compliance and marginal carbon dioxide reductions. It will be crucial to prevent the upcoming carbon markets from the same challenges and many more. It is also essential to ensure that these markets cover a substantial share of the country's emissions.

CLEAN UP POWER

MOEFCC introduced new emission standards for coal-fired thermal power plants in 2015. Eight years later, only a handful of power plants, which account for 5 per cent of the country's total installed capacity, are complying with the norms. This delay is the result of several extensions given to the plants by MOEFCC, with the latest extension deferring the deadline until 2026. We would urge the government to not delay the deadlines further as emissions from coal-fired power plants have a huge impact on public health. Besides, it is futile for the plants to meet emission standards almost a decade after they were introduced.

The government must ensure its thermal power plants become more energy efficient. Inefficient old plants must be retired and replaced with an efficient fleet of super-critical and ultra-super critical plants, if required to meet the rising demand. Co-firing of biomass needs to be ramped up. An ambitious renewable generation obligation for thermal power plants can also play a crucial role in their transitioning.

SUSTAINABLE INFRASTRUCTURE

Time has come when India's industrial development agencies begin to look at industrial areas from beyond an economic lens. As India plans to increase its manufacturing manifold, it is important that these new and upcoming industries are provided with the right kind of infrastructure which enables them to produce in a clean manner. Currently, Indian industrial areas grapple with poor road conditions, lack of a management system for non-hazardous industrial waste, inadequate parking spaces, absence of greenery and of other common amenities.

One idea central to a sustainable infrastructure is the provision of common facilities. This would include a common boiler, effluent treatment plant, waste management facility, parking facility for heavy vehicles, dignified housing for workers, markets, green areas and more such facilities as required. Upcoming industrial areas should be planned in locations at a distance from habitable areas—with a buffer zone—with availability of cleaner fuel sources, air quality monitoring facility, well-designed roads and sidewalks with plantations.

Changes should not just be considered for new and upcoming areas; a larger challenge is to improve existing industrial areas. Without well-developed sustainable infrastructure, deterioration of our environment will go beyond our control. DTE

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THINK LONG-TERM

India needs continued emphasis on flagship programmes, aligned to long-term planning that focusses on water security and circular economy in a climate-risked era

DEPINDER KAPUR, SUSHMITA SENGUPTA, SUMITA SINGHAL

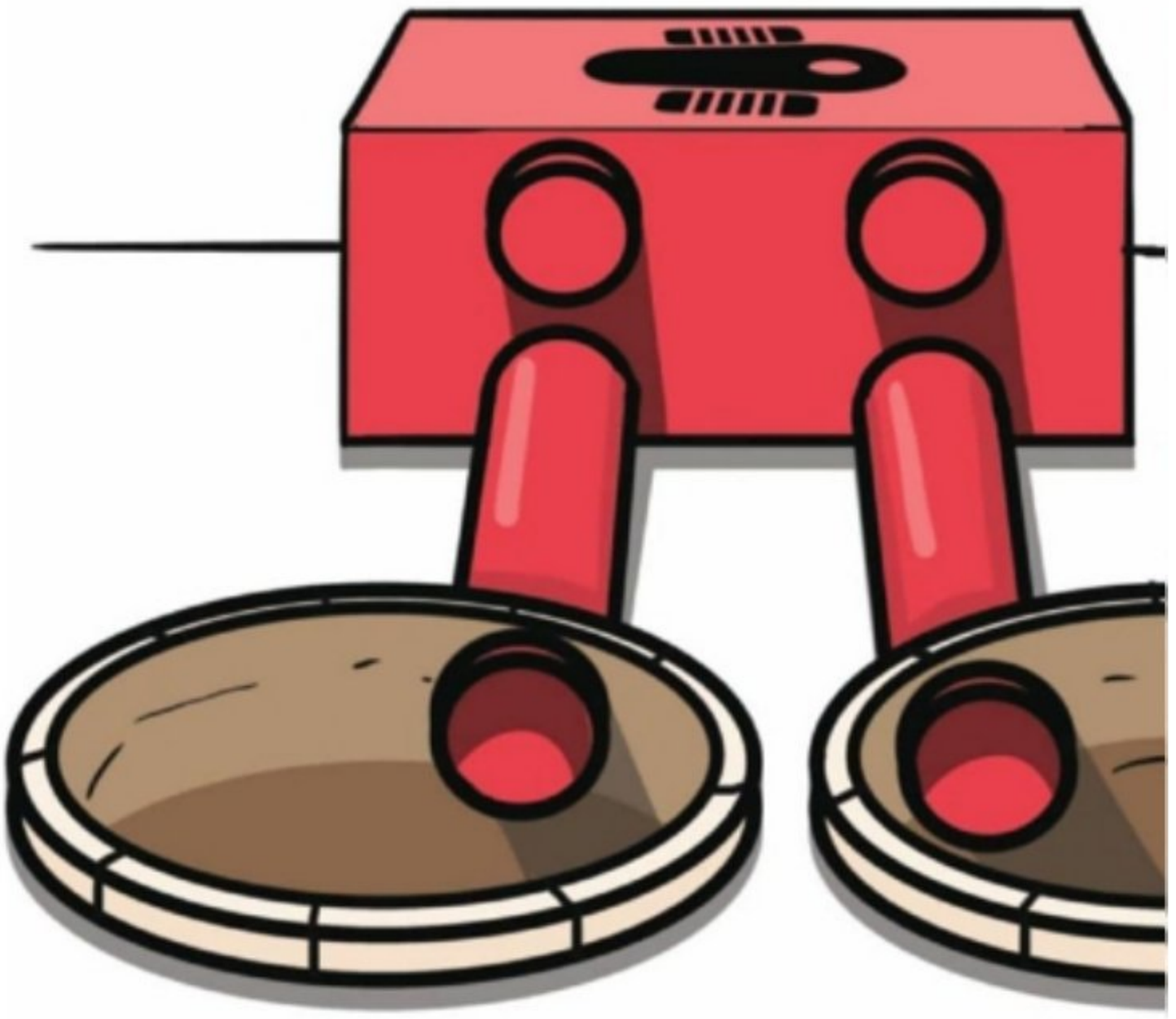
INDIA HAS made substantial progress in creating infrastructure for water supply and sanitation over the past decade. At present, as many as five schemes and programmes are being undertaken nationally in mission mode to sustain the country's recently achieved open defecation-free (ODF) status, ensure solid and liquid waste management, keep the rivers clean, conserve water for the future and supply drinking water to every house. These include Swachh Bharat Mission (SBM), Jal Jeevan Mission (JJM), Mission Amrit Sarovar, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), and the National Mission for Clean Ganga (NMCG). Their successful implementation can help the country reach the UN's Sustainable Development Goal on safe water and sanitation by the target year of 2030.

Researchers from Delhi-based think tank Centre for Science and Environment (CSE) travelled the length and breadth of the country to assess the performance and implementation of some of the schemes at the ground level. There are good and bad stories. Let's start with Swachh Bharat Mission-Gramin (SBM-G), whose objective is to achieve universal sanitation coverage, sustain it and improve the level of cleanliness in villages.

About 114.5 million toilets have been built under SBM-G since the launch of the mission in 2014, as per government data released in February 2024. Under SBM, the government has promoted construction of toilets with dual-pit honeycomb structure. In this structure, one pit gets filled at a time. Once it is filled, the toilet is connected to another pit. While the second pit gets filled, the sludge in the first pit gets degraded into manure that can be directly reused in fields.

While the government has been making people aware about the benefits of degraded sludge, the purpose is defeated if people do not use it. The new government should incentivise the use of degraded faecal sludge. Local governments like village panchayats that enforce reuse plans should be provided incentives. Since toilets that do not follow the recommended design lead to partial digestion of faecal sludge, documentation and dissemination of best practices of toilet construction should be done extensively.

Management of wastewater discharged from the washing area, bathroom and kitchen is another integral component of SBM-G. Rural households with functional taps get 55 litres per capita of water daily. Experts



estimate that about 70 per cent of this is converted into greywater. The mission prioritises greywater management using simple techniques such as soak pits and kitchen garden. CSE researchers found greywater flowing into open drains and polluting ponds and other waterbodies in several villages. The new government must ensure that greywater is managed on site or near the source.

MAKE SOURCES SUSTAINABLE

Jal Jeevan Mission (JJM) is another flagship programme that envisions "to provide safe and adequate drinking water through individual household tap connections by 2024 to all households in rural India". Since the launch of the programme in 2019, an impressive 76 per cent of the 193 million households in the rural areas have been connected to taps, as per the JJM dashboard accessed on May 17, 2024. The government must now ensure that the programme does not meet the fate of previous such programmes.

As many as six rural water supply programmes, launched since Independence, failed within years as the sources were unsustainable. JJM, thus, plans to focus on protecting or recharging the water sources, which is mainly groundwater, through measures such as water conservation, rainwater harvesting and recharge and reuse through greywater management. It should take the following measures to ensure that water supplied from the tap is safe and sustainable.

(i) Map the aquifer at local levels. Since 89 per cent of India's water sources are groundwater dependent, mapping of the recharge and discharge areas should be done at the district and sub-district levels. Groundwater board and the rural departments should develop the discharge and recharge zones together. Communities should be part of this exercise to make use of their local knowledge about the quality of the soil and the geomorphic features.

(ii) Add features on sustainability to the JJM dashboard. Currently, the dashboard has village-level data on the contaminants in the drinking water supply. It also needs to display sites of groundwater recharge or rainwater harvesting, especially if the drinking water source is groundwater-dependent. Details of the design and the cost of the recharge project should be displayed. Measuring the impact of the recharge projects, engaging local communities for monitoring of groundwater and budgeting the available water is key to sustainability.

(iii) Ensure sustainability of surface water sources. Since JJM focuses on using surface water in areas where groundwater is contaminated or scarce, there is a need to ensure that the water sources are clean, which again means treating greywater for reuse or safe disposal into open waterbodies.

MAP, MONITOR THE RECHARGE

To overcome the water crisis in rural India, the Union government in 2022, launched Mission Amrit Sarovar, whose objective was to construct or rejuvenate 75 ponds or waterbodies in each district by August 15, 2023, to mark India's 75th year of independence. It was an impressive success. As per the mission dashboard accessed on May 17, 2024, some 109,000 sites have been identified for creation or rejuvenation and 66 per cent of the work completed. This is much more than the 50,000 Amrit Sarovars initially targeted. To create or rejuvenate waterbodies in the remaining 34 per cent identified sites, the new government should extend the mission by another year. In this phase, the mission should focus on the following.

ACTION POINTS

- In rural areas, incentivise use of treated faecal sludge as manure in agriculture
- Enforce management of greywater
- Map the recharge and discharge of aquifers at the district and sub-district levels

(i) Mapping the progress of the mission on the dashboard. This is important because even though the country as a whole has overshot the target of 500,000, CSE researchers have found that several districts are yet to have the mandated minimum 75 waterbodies. The dashboard should also have information related to the project location, technology used, source of funding and its usage, and the impact on groundwater.

(ii) The government also needs to develop strategy to maintain health of the waterbodies. A part of project fund should be booked for maintenance and monitoring. Gram panchayats should be made capable of generating revenue from the waterbody, which can then be used for its upkeep.

PLAN FOR WARMING WORLD

In all probability, the exisiting schemes and programmes are not enough to ensure access to water and sanitation for all in a warming world. The crises are already evident. For the past few years, Bengaluru regularly experiences flood-like situation after heavy rains. This year, in February-March, it experienced a severe water crisis, which was followed by cholera outbreaks in April. Metropolitan cities are no longer able to cater to the needs of their ever-increasing population. With depleting groundwater and drying rivers, inequity in water access is widening in our cities as well as in rural areas. These are perfect examples of what awaits their future.

The new government should thus focus on enhancing—not just ensuring—access to water and sanitation for all. Here are a few ways to overcome the challenges.

In situ solutions to mitigate urban floods: Conserve rainwater and keep it contamination free. Enhance stormwater drainage dimensions/norms to mitigate flooding, in situ, especially wherever built-up area has reduced groundwater recharge potential.

Nature-based revival of lakes, waterbodies, streams and rivers: Rejuvenation must follow nature-based principles. In cities, where groundwater recharge is less, waterbodies should be developed as recharge zones.

ACTION POINTS

In urban areas, fix all non-functional water, sanitation and stormwater infrastructure services

Additional grey infrastructure and services needed for unserved informal settlements that now dominate cities

Promote non-sewered sanitation systems

Restructure water utilities to ensure aquifer recharge: Cities should also map aquifers and regularly monitor their recharge/discharge. Aquifer recharge must include reuse of treated sewage through the area's waterbodies.

Fix infrastructure and services: All water, sanitation and stormwater infrastructure and services need to be improved to plug leakages, increase efficacy and treatment outcomes. This is important to ensure that the supply water or groundwater does not get contaminated by poor sewage infrastructure. Many studies have found *E coli* in the groundwater in peri-urban areas of Bengaluru. Leachate from sewage drains and septic tanks has been identified as one of the reasons for such contamination.

Promote decentralised, water supply and sanitation systems: This requires mapping the drainage of surface water, which will enable stormwater harvesting for groundwater recharge. The mapping must use small unit area of 1-10 sq km in cities as well as in rural areas to ensure that groundwater recharge can be done at the granular level. Only if they are unavoidable should large and centralised water supply and sewage treatment systems be promoted in cities because these are often unviable. Dependence on long distance river- and reservoir-based water supply for cities and multi-village water supply schemes must also be discouraged for the same reason. In Bengaluru, water is sourced from the Cauvery river, 100 km away, pumped up and transported. This increases the cost of water supply. A longer water supply network

results in more leakage—it is 50 per cent in Bengaluru.

Prioritise unmet needs of informal urban settlements: A majority of people in big cities live in congested, unplanned settlements (authorised and unauthorised). All of them cannot access water and sanitation through large, centralised water supply and sewarage systems. CSE has conducted a study in Sangam Vihar—a large, unplanned settlement in the national capital. This settlement has a population of over 1 million (in just 13 blocks) and get as little as 45 litres per capita per day of water supply from all sources combined, compared with the Central government standard of 135 litres per capita per day for urban areas. Due to lack of space, laying water pipelines and sewer networks is quite difficult. Only a city-wide decentralised water supply and sanitation system approach can augment and improve the per capita water supply and sustainable sanitation systems in such settlements. The government also needs to create additional grey infrastructure for the unserved informal settlements.

Non-sewered sanitation systems can help: CSE has been studying the challenge of septage management in six states of India. Non-sewered sanitation systems, like septic tanks and dual pit toilets, can serve as an effective measure to manage faecal matter in Tier III and Tier IV towns. As per Census 2011, India has some 7,900 towns, less than 10 per cent of which have sewerage systems, that too partial. The increasing water stress will make it extremely difficult for all towns to instal, operate, maintain and pay for expensive underground sewerage systems.

Promote circular economy: This will help water and nutrient replenishment. According to an estimate by Bengaluru-based non-profit CDD India, there were 1,469 sewage treatment plants (STPs) in the country in 2021. These STPs produced 104,210 tonnes of treated faecal sludge a day which can be used as fertiliser; treated greywater from the STPs be used for groundwater recharge.

The government should increase wastewater reuse targets from the current levels of 20 per cent and 30 per cent under SBM and AMRUT. Currently, only Chennai and Bengaluru make substantial reuse of treated water for purposes other than drinking water. Bengaluru has shown how treated wastewater can be reused for lake rejuvenation, groundwater recharge and agriculture. During the ongoing water scarcity, the city supplied this resource to water-starved Kolar and Chikballarpur districts for agriculture.

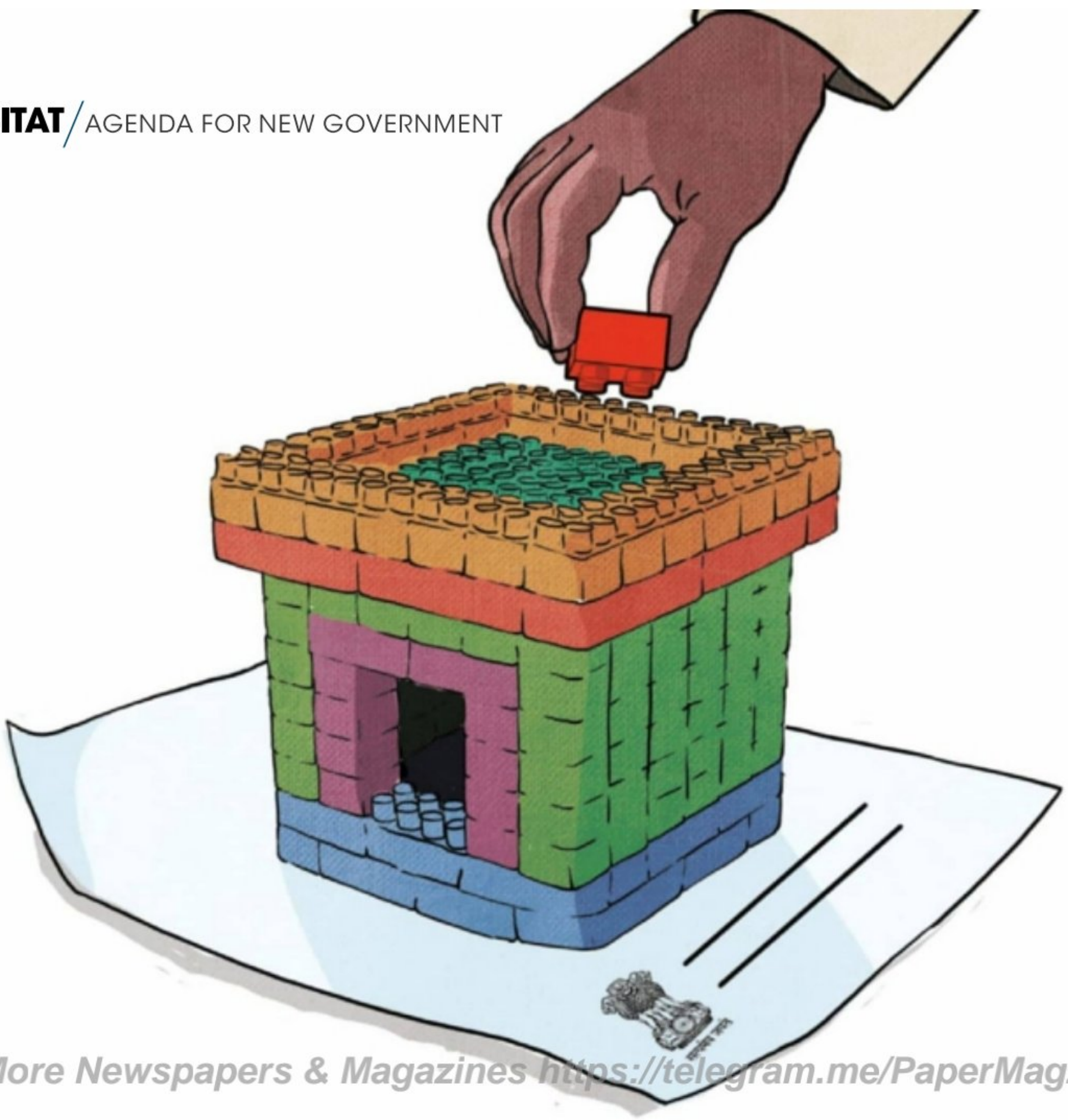
Improve public involvement and awareness: Most water conservation campaigns have been limited to a few simplistic aspects of conserving water, such as turning off the tap while brushing teeth. Urban local bodies, water utilities, state governments and the Central ministries should raise public awareness about the impending climate risk and its impact on water and sanitation, just like they did for toilets under SBM.

Expand scope of Swachh Survekshan to rank wards: This needs to be done to highlight deficiencies in water supply, sanitation and stormwater management.

The next generation of water and sanitation challenges require planning, implementation and monitoring of long-term (10-20 years) multisectoral water, sanitation, stormwater and treated-water-reuse interventions. This should be done both at the city level and in rural areas under a Centre-led exercise. States should set their plans and year-wise targets for urban and rural water supply, sanitation and stormwater management with help and incentives from the Centre. DTE @down2earthindia

ACTION POINTS

- Increase public involvement and awareness
- Swachh Survekshan should take into account deficiencies in water supply, sanitation and stormwater management
- End manual scavenging and deaths during cleaning of sewer lines and septic tanks



PLAN THEM COOL

As urban India turns into a heat trap, the government must focus on improving cities' liveability

RAJNEESH SAREEN, MITASHI SINGH

CITIES ARE fast becoming hotspots for environmental action. As they grow to cater to the needs of the expanding urban population, there is an increase in motorisation, concretisation, proliferation of slums and shrinking green and blue spaces. In a warming world, cities suffer due to the urban heat island effect, flooding, water scarcity, improper solid waste management, pollution of air and water and overall deteriorating liveability.

The Centre has taken measures to combat these impacts. For instance, Union Budget 2024-25 allocated ₹10,400 crore for the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Smart

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Cities Mission; ₹21,336 crore for metro rail projects; ₹5,000 crore for the Swachh Bharat Mission; and ₹80,761 crore for the Pradhan Mantri Awas Yojana (PMAY). The 15th Finance Commission of India and the National Clean Air Programme have also proposed more funds to urban local bodies to tackle some problems.

However, action so far has been slow and is not quite outcome-oriented. Sustainable growth of cities needs measurable indicators that bring tangible results:

HOUSING SUPPORT

PMAY or the Housing for All mission has led to the development of millions of affordable housing units. However, these units may not provide thermal comfort, given the lack of criteria for thermal performance. This is confirmed in a 2021 study by Delhi-based Centre for Science and Environment (CSE).

The Affordable Rental Housing Complexes scheme, a sub-programme under PMAY introduced in 2020, comes with great opportunity to align the rental housing stock with national thermal comfort goals. Provisions of the scheme, such as the technology innovation grant to facilitate adoption of innovative, sustainable, green and disaster-resilient technologies and building materials, must be linked to better thermal performance.

The criterion for this grant is speedy, innovative and sustainable construction, which is quite open-ended and less binding. Here is where thermal comfort standards for different climate zones become crucial.

Currently, no housing scheme has parameters to ensure access to important infrastructure such as schools, healthcare facilities or public transport, says a 2021 CSE report, "Mass housing and liveability". Even in slum rehabilitation projects, most times, beneficiaries are relocated to unsuitable peripheral locations that compromise liveability. This model results in creation of more slums and vacant housing at the periphery, CSE notes in another 2021 report titled "Towards affordable and sustainable rental housing". Housing schemes must focus on in situ rehabilitation.

Alternatively, a balanced scorecard approach, in which sites with adequate access to infrastructure are prioritised, can help decision-makers ensure future housing stock has the crucial liveability parameters.

Further, affordable housing projects, and cities in general, are yet to reap the benefits of environmental services like nature-based decentralised wastewater treatment, in situ solid waste management and solar rooftop. This is despite incentives—for instance, under the PM Surya Ghar Muft Bijli Yojana, independent homeowners can avail a subsidy of ₹30,000 per kW and group housing societies can avail ₹18,000 per kW. Such benefits must be mandatory for affordable housing projects.

HEAT MANAGEMENT IN CITIES

The urban heat island effect has become widespread, affecting most cities and leading to increased heat exposure. This not only poses health risks to people, but could create a vicious cycle where air-conditioning becomes a quick fix for thermal comfort and ejects more heat into ambient environment.

The government has initiatives such as the India Cooling Action Plan, 2019; energy conservation building codes; National Mission for Sustainable Habitat 2.0; addendums to Urban and Regional Development Plan Formulation and Implementation (URDPFI) Guidelines, 2014; and Model

ACTION POINTS

- Provisions under the Affordable Rental Housing Complexes scheme must be linked to better thermal performance
- Cities' building by-laws must cover aspects such as construction morphology, shading and increasing green cover to mitigate heat
- Cities must develop a strong ecosystem to manage construction and demolition waste

Building Bye-Laws, 2016. However, heat management in cities has not seen comprehensive action so far. In an analysis of 37 heat action plans, Delhi-based think tank Centre for Policy Research reveals that focus is mainly on disaster preparedness and emergency response. Plans do not identify vulnerable groups and lack local bearing.

CSE also analysed four cities (Jaipur, Delhi, Pune and Kolkata) of various sizes and in different climate zones to understand how land surface temperatures (LSTs) may be affected by the height and density of buildings and roads, roof materials, natural green cover and waterbodies. The study revealed that cities can mitigate LSTs by as much as 10°C by increasing green spaces with thick canopy trees, reducing street exposure to the sun, enabling mutual shading and proper orientation of buildings and using materials that do not trap heat.

Cities must aim to increase their green space in line with the World Health Organization recommendations of at least 9 sq m per capita. URDPFI guidelines recommend a larger green space of 12-18 sq m per capita.

Compact development with mid-rise buildings; heat-resilient streets that use water elements like fountains, swales and rain gardens; shading elements; reflective materials; and cool and green roofs can help enhance microclimate and improve thermal comfort to a great extent. All this must be captured in cities' building by-laws.

Heat mitigation must also move beyond disaster response during a heatwave. Cities must assess vulnerability for prioritised and localised action, such as retrofits in certain areas. Global adaptation funds and current fiscal support to urban local bodies could be leveraged to enable these actions. Heat management needs to be institutionalised with city climate change cells, which are currently being set up, as a nodal agency.

BUILDING POTENTIAL

Cities show a lot of potential to integrate solar energy in the urban built environment. The government, apart from increasing solar rooftop under the PM Suryoday scheme, can promote use of solar energy in electric vehicle charging stations, uncovered parking lots and other public spaces by leveraging state subsidies.

In construction, traditional technologies and materials like mud, thatch, bamboo, cob walls, adobe blocks, laterite blocks, wattle and daub are valued for climate responsiveness, since they protect from extreme heat or cold and improve thermal comfort; and are locally available and affordable. Rural communities, especially women, possess knowledge around their use.

This traditional wisdom must be documented, preserved and leveraged to enable thermal comfort in modern buildings. Some architects are already doing this through hybridisation, for example, using concrete columns and slabs for structural strength and mud-filled walls for thermal comfort. Such practices must be promoted and mainstreamed, especially in affordable housing.

C&D WASTE MANAGEMENT

Construction and demolition (C&D) waste is India's newest waste stream. Since the notification of C&D Waste Management Rules, 2016, India has set up nearly 31 recycling plants with 27 more underway, as per ongoing CSE research. However, cities are still working on their C&D waste ecosystem for smooth management and reuse.

While big cities have involved the private sector for setup and operations of the plant, small cities require fiscal support from the government. This is mainly because small urban local bodies are unable to ensure continuous waste feed for the plant, leaving private players hesitant to invest and implement projects. This calls for first setting up a collection system, then a plant.

The focus should not be just on recycling plants, but the entire ecosystem. This includes proper estimation of C&D waste generated, setting a convenient collection system and user charges, comprehensive by-laws that lay down duties of all stakeholders, ensuring reuse and uptake of recycled products, and creating awareness among the public. DTE @down2earthindia

SCRAP THE DUMP

Disincentivise garbage dumping, invest in behavioural change

ATIN BISWAS

INDIAN CITIES have shown remarkable progress in waste management in the past decade. Programmes that have played a key role in this achievement are: Swachh Bharat Mission (SBM), a flagship programme initiated in 2014 to eliminate open defecation and improve the sanitation system, and Swachh Survekshan, an assessment tool to ensure sustainability in these development goals by urban local bodies (ULBs). The programmes have shifted the focus of waste management from just "visual cleanliness" to "waste to wealth", yet Indian cities continue to be behind the pollution curve. It is important that the new government relearns the art and science of waste management.

NO FALSE SOLUTION

On the face of it, waste to wealth seems to be a win-win situation for cities drowning in piles of refuse. For instance, biodegradable matter in municipal solid waste can be treated to produce biogas or compost, yet India does not have a single waste-to-energy plant that is financially viable and environmentally sustainable. One reason for this paradox is that cities still use mixed waste as feedstock. Unsegregated waste contains inert and hazardous materials and has low calorific value, which makes the plants polluting and unviable.

Similarly, when unsegregated, the recyclable waste, such as plastic, paper and metal, gets soiled and contaminated by the organic waste. This diminishes its market value. To recover wealth from waste, the government needs to adopt these measures.

Invest in behaviour change: Since waste management is a shared responsibility between ULBs and citizens, policy measures should be introduced to "invest" in behavioural changes to promote segregation at source and composting at home. The instrument must have a mechanism to monetise the gains from such investment.

Use municipal by-law as legal instrument: The Constitution (74th Amendment) Act, 1992, empowers ULBs to address local challenges through by-laws and use them for enforcement. A study conducted by the Centre for Science and Environment (CSE), Delhi, in 37 cities shows that despite clear provisions in the law, not all of them have been able to enforce source segregation. This could be because the cities do not have adequate infrastructure to treat or process waste.

Automated Irrigation to Make Every Drop Count for Smallholder Farmers

Solving India's water crisis is particularly difficult because the agricultural sector which accounts for 80% of the country's water use is highly fragmented, with smallholder farmers making up 86% of farming households.

We know which crops are the most water intensive - sugarcane, wheat, rice and cotton, but it's not enough to create solutions for these crops. We have to factor in the varying realities and challenges of the smallholder farmers who grow them. Many promising technological solutions fail because they are not affordable or profitable for a smallholder farmer, although they might work well in bigger farms or when paired with better resources.

For example, advanced analytics and precision agriculture can all help, but it might not work for every farmer everywhere. To solve this puzzle, we need solutions that approach the problem from different angles, rather than try and scale a few high potential approaches.

Automating irrigation can help, but we need automation that bridges the gap from monitoring to execution in real-time, and is practical and reliable in small farms. This enables optimal water usage, preventing issues like over or under-watering while reducing manual labour requirements.

The DCM Shriram AgWater Challenge, a startup challenge sponsored by DCM Shriram Foundation and run by The/Nudge Prize was set up to find innovative solutions that help smallholder farmers gain more control over their farming operations through practical solutions that work on the ground and demonstrate visible benefits and returns for them. Several organisations competing in the challenge are working on making irrigation automation viable for these farmers, tackling this need.

Oscillo Machines has created a product known as the Suvarna 4R eRT, a diesel-run paddy transplanter. The traditional nursery-grown method in paddy is water-intensive, as it requires the nursery to be flooded continuously. Direct Seeded Rice (DSR) is more water efficient, but it is often hard to get farmers to transition.

The Suvarna 4R eRT directly addresses this, with a combination method. The machine has one component that transplants rice seedlings that were raised in a nursery bed into a portion of the main field, while the other part of the same machine drills and directly sows rice seeds into another portion of the main field. This lets the farmer use both cultivation methods simultaneously, and slowly transition to DSR in more areas as it starts working well. This new method also reduces manual work and drudgery for farmers, reducing effort as well as cost.

SICCA by SenseitOut Technologies is another organisation that makes automation practical, with retrofittable IoT systems that can be integrated into existing drip irrigation systems, which then uses advanced wireless tech for remote control of irrigation schedules based on soil data. This lets smallholder farmers harness the benefits of automated irrigation without major infrastructure changes.

The Centre for Environment Concerns has a complementary SWAR system - a root zone moisture diffuser which can be attached to existing drip irrigation systems and automatically applies water or not based on real-time soil moisture levels detected by it near the roots. This improves crop productivity while significantly reducing water consumption.
While these companies apply technology at the soil level, Intech Harness focuses on water pumps, with an AI-driven motor controller. Since many smallholder farmers rely on water pumps powered by erratic power supply, they often use water inefficiently and ruin crop productivity, as they struggle to turn it on and off at the right time. Intech Harness' IoT connected system automates pump operations, eliminating manual intervention and optimising irrigation, saving both water and crop productivity.

What sets these solutions apart is their emphasis on automating the entire irrigation cycle, from data monitoring to intelligent control of water application equipment like pumps, valves, and diffusers. Moreover, by ensuring accessibility through retrofitting capabilities and accommodating traditional practices, these solutions are democratising cutting-edge irrigation automation tech for resource-constrained small farmers by making solutions accessible & practical. This level of automation not only conserves precious water resources but also improves overall irrigation efficiency, resulting in higher crop productivity and cost savings for smallholder farmers.

We need solutions for every type of farmer, and such all-in-one solutions promise to make efficient water use and high crop yield a reality for everyone. By tackling the challenge from different angles – automating transplanting, retrofitting IoT systems, optimising pump operations, and targeting root zones – these organisations are providing a comprehensive suite of irrigation automation tools tailored to the diverse needs of smallholders across India.

"This article is one part of an 8-part series covering agricultural water utilisation in India."

PRIORITISE TREATMENT

An analysis of the latest 2021 report by the Central Pollution Control Board (CPCB) shows cities collect 95 per cent of the waste, but only 50 per cent of it is treated. The remaining is dumped in landfills or elsewhere without treatment or processing. This indicates a business ecosystem around waste cannot be created unless the waste is collected and transported separately. The government must do the following to meet the challenge:

Redesign concession agreement: Contractors are responsible for collection, transportation and disposal of waste in half of the cities. They receive payment from ULBs on the basis of mixed waste collected. A national policy on sustainable public procurement must be introduced to pay the concessionaires as per the quantum of segregated or treated waste.

Decentralistion is key: Collection and transportation of mixed waste to landfills consume 40 to 60 per cent of the municipal budget. A decentralised approach must be followed to treat source-segregated waste in a local facility. This would substantially reduce transportation cost and divert waste from the landfill. The 114 ULBs of Odisha are implementing this decentralised approach.

Rein in bulk waste generators: Estimates show bulk waste generators like housing societies and industries are responsible for 30 per cent of the garbage generated. The Solid Waste Management Rules, 2016, require them to manage biodegradable waste within their premises. But the CSE study has found bulk generators flouting the rules. CSE estimates show the rules, if strictly enforced, can reduce cities' waste management burden by 40 per cent.

Rope in informal sector: The role of the informal sector is crucial in waste management. Recognising this, the Pune Municipal Corporation has signed an agreement with 4,500 informal waste-pickers, who formed a cooperative, for door-to-door collection of waste. The corporation does not pay them salary, but allows them to charge households for waste collection and sell the recyclable waste. This approach has guaranteed segregation and brought down the cost of collection by 45 per cent. Such measures must be replicated across India.

ACTION POINTS

- Strengthen enforcement, behavioural change measures to improve segregation at source
- Separate collection and transportation of waste to ensure proper treatment
- Curb dumping through landfill tax and ban on discard of biodegradable, combustible waste

DISCOURAGE DUMPING

Waste management is an expensive operation. The cost of waste collection and transportation varies from ₹1,500 to ₹3,000 per tonne. It is even higher in hilly areas. Therefore, the following measures can be followed to disincentivise dumping.

Impose landfill tax: India has lost 10,000 ha to garbage dumps. To prevent fresh waste from reaching dump sites, landfills should be taken away from ULBs and allotted to private agencies through bidding. A tax must be levied on the concessionaire or ULB, as per the quantum of waste brought to the landfill. Landfill tax has helped several countries reduce the waste being dumped.

Ban biodegradable, combustible waste dumping: As per the Solid Waste Management Rules, 2016, only inert material like road sweeps and small quantity of construction and demolition waste are allowed to be dumped in landfills as there is no technology for their reuse. Fractions that create problems are biodegradable waste that rots and emits greenhouse gases, and combustible waste that creates havoc in case of fire. Combustible waste can also be used for energy recovery. A legal ban on dumping biodegradable and combustible waste is needed. Combined with landfill tax, this ban will disincentivise dumping and compel ULBs to ensure wealth is recovered from waste. DTE @down2earthindia

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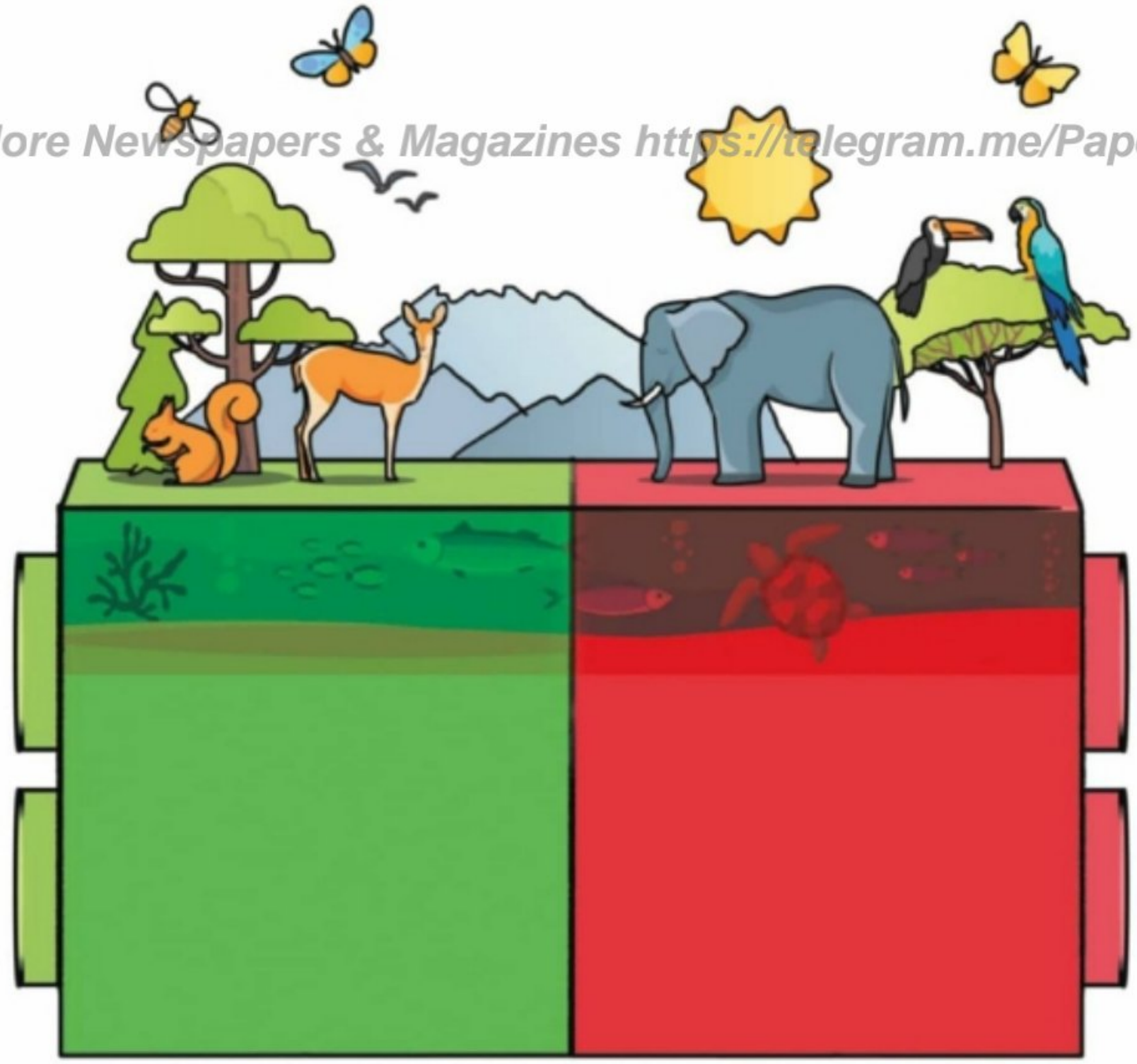
CONSERVE NOW

Disregard for biodiversity conservation over the past two decades needs immediate redressal

VIBHA VARSHNEY

INDIA IS home to 7-8 per cent of the recorded global biodiversity. But what is the use of such diversity if the country is unable to protect it, ensure its sustainable use or secure benefits arising from its use for communities that have conserved resources for generations?

When it comes to biodiversity, most of the work done in the country is marred by a lack of data and transparency. India ratified the Convention on Biological Diversity (CBD) in 1994, and nearly a decade later, it passed the Biological Diversity Act, 2002. The Act established a three-tier system, with the National Biodiversity Authority at the Centre, a biodiversity board for each state and biodiversity management committees (BMCS) at the level of local bodies. BMCS are tasked with preparing a People's Biodiversity Register (PBR) that documents the biodiversity of their respective areas. The committees must ensure sustainable use of resources and that a share in profits accrued from the use reaches local communities.



Until 2016, just 9,700 BMCs were established and only 1,388 PBRs prepared. This fact came to light after Pune-based wildlife enthusiast Chandra Bhal Singh filed a case in the National Green Tribunal. In 2019, the tribunal directed total compliance to this provision of the Biological Diversity Act by January 2020. As of January 2024, there are 277,688 BMCs and 268,031 PBRs.

However, the quality of these bodies and PBRs are questionable (see "Benefit withheld", *Down To Earth*, May 16-31, 2022). Communities are not even aware of how they could benefit from biodiversity. Even in cases where agreements have been made on access and benefit sharing, meagre returns have been reported. This could be seen in the case of the Irula tribe's agreement to provide snake venom to pharmaceutical companies. Data on who has accessed resources and what benefits have been provided to communities are not available publicly. Overall, not much has been done over the past two decades. This must change.

Local communities must be empowered to document biodiversity. The world accepts that communities are adept in protecting the environment in the recently adopted Kunming Montreal Global Biodiversity Framework (KMGBF), now called the Biodiversity Plan. The communities hold immense knowledge about their local biodiversity and its use. But this knowledge has been disregarded even when government authorities are involved in documentation.

KMGBF also acknowledges the need for funds for conservation of biodiversity. However, in India, between 2018 and 2024, budget for four Centrally sponsored schemes for environmental protection—National Mission for Green India, Integrated Development of Wildlife Habitats, Conservation of Natural Resources and Eco-Systems, and National River Conservation Programme—saw reduced allocation, as per "Envistats — India 2023", released by the Union Ministry of Statistics and Programme Implementation. The incoming government must ensure action, especially as biodiversity is one of the three triggers of the planetary crisis.

ACTION POINTS

Empower local communities to document their immense knowledge on local biodiversity and its use

Ensure transparency in access and benefit-sharing agreements made with communities

Funds and budgetary allocation to schemes of environmental protection need greater focus

The manifestos of political parties contesting in the 2024 election show some focus on biodiversity. For example, the Indian National Congress's manifesto reaffirms its "commitment to rapid, inclusive and sustainable development, and to protect its ecosystems, local communities, flora and fauna." It points out "several departures from the previous policies and important components such as environment protection, forest conservation, biodiversity preservation, coastal zone regulation, wetlands protection and protection of tribal rights." The Communist Party Of India (Marxist) in its manifesto promises strict regulation for the protection of biodiversity and a repeal of provisions of the Biodiversity Amendment Act, 2023 that permit transfer of knowledge on biodiversity resources to corporations.

The Bharatiya Janata Party mentions biodiversity in the context of sustainable development of hill states, with a promise to work with state governments and local bodies to prepare master plans to maintain biodiversity. It also aims to launch a Green Aravalli Project to preserve the biodiversity of the Aravalli range and combat desertification.

The results of India's elections would also come as the country revises its National Biodiversity Strategies and Action Plans, to be submitted to CBD before the 16th Conference of the Parties to the Convention in October 2024. The strength of this document would be a good indicator of the future of India's biodiversity. @down2earthindia

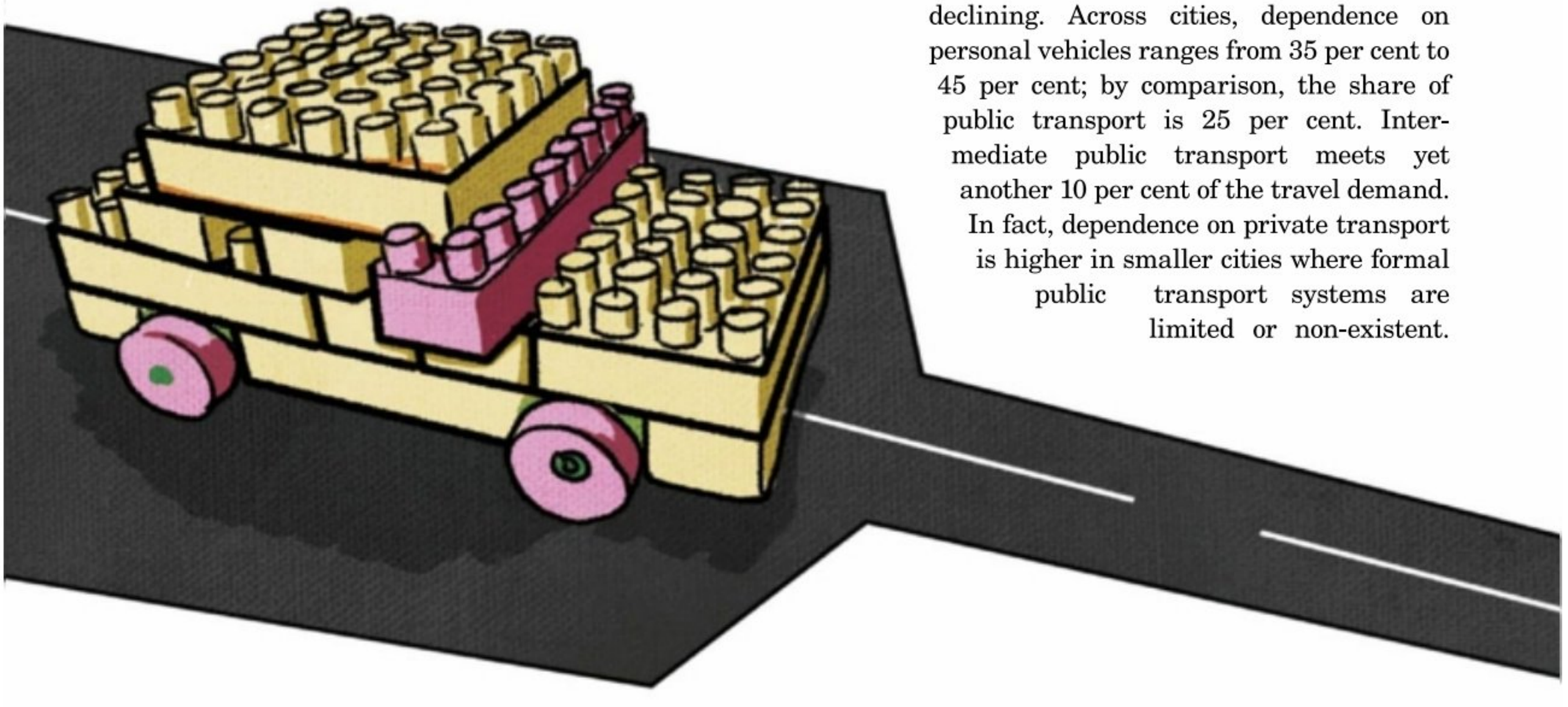
BATTLE THE CAR BULGE

Clean, affordable, integrated and accessible public transport the only solution

ANUMITA ROYCHOWDHURY

MOBILITY CRISIS has hit our cities hard. As public transport, walking and cycling are fast losing space to cars and two-wheelers, energy inefficiency, carbon intensity and toxic pollution are getting locked in the transportation infrastructure. This is snuffing the life out of cities and diverting resources towards car-centric infrastructure—making the mobility crisis irreversible.

Urban agenda of the new government has to fix this crisis. Even though the policies around transportation and mobility have changed considerably to integrate principles of sustainability, and investments have been directed to augment bus programmes and metro and pedestrian infrastructure, the scale of action is yet to gather momentum. There also exists a yawning gap between policies and implementation. To address all these, the new government must first recognise the many facets of mobility crisis.



Transport emissions: Transport emissions, both carbon and other toxic emissions, are difficult to tame. This hard-to-abate sector is dominated by road transport and threatens to upset the energy and carbon budget of the country. The International Energy Agency (IEA) states that the energy use of transport, especially road transport, is set to increase manifold in the stated policy scenario between 2010 and 2040. Cities cannot meet clean air targets without effective action on vehicles, which are among the top three polluters in Indian cities and are responsible for public health risks from cardiovascular diseases to cancer to low weight at birth.

Cars mean congestion: Since 2000, new vehicle registrations have doubled every five to six years. The share of personal vehicles in the overall vehicle registration is, on an average, 85-90 per cent. Even though travel demand has soared, the share of public transport in meeting this demand is declining. Across cities, dependence on personal vehicles ranges from 35 per cent to 45 per cent; by comparison, the share of public transport is 25 per cent. Intermediate public transport meets yet another 10 per cent of the travel demand. In fact, dependence on private transport is higher in smaller cities where formal public transport systems are limited or non-existent.

Traffic congestion because of cars is crippling. An analysis by Centre for Science and Environment (CSE) in Delhi shows that traffic speeds go down by as much as 32 per cent during morning peaks and up to 37 per cent during evening peaks. Estimates show that passenger kilometres (transporting a passenger over 1 km) are expected to triple by 2050, with the average trip length and its rate set to increase with city size and income. Demand for private transport is, in fact, set to overtake that of public transport by 2040.

Electric buses sub-optimal: Even as India builds its ambition for electric mobility, especially the electric bus programme, investments would be sub-optimal if the electric buses cannot move freely in cities. Electric buses are a lot cheaper today due to the demand aggregation strategy for bus procurement. They have helped to reduce the cost of operation on a per kilometre basis by 23 per cent to 27 per cent, even without subsidy. With subsidy, the cost of operation of these buses is cheaper by 31 per cent to 35 per cent when compared with buses that run on diesel or compressed natural gas (CNG). Yet it is challenging to scale up electric bus services and mainstream them to become the dominant service in cities.

Metro not meeting ridership target: About 16 cities have metro lines, but most of them are single corridors without a network. Nearly all metro systems have 25 per cent to 35 per cent of their projected ridership on an average. Delhi's Metro Rail Corporation has achieved the highest ridership compared to others, and it is less than half of the projected ridership. Since all benefits and revenue generation are dependent on the actual ridership, none of the systems have achieved the estimated benefits at the time of approval of the project.

When journey gets expensive: Lack of ease of access, last-mile barriers, inadequate integration and passenger information service make public transport inaccessible and unaffordable for the majority of city dwellers. Transport interchanges further increase the cost of journey. A 2018 study by CSE showed about one-third of Delhiites could not afford the minimum bus fare,which made them captive walkers and cyclists.

But where to walk and cycle: Under several government programmes including the Smart City Mission, with the Cycles-4Change Challenge initiative embedded in it, and the Metro Rail Policy 2017, investments have flowed in for creating infrastructure for walking and cycling in cities. But they are not scalable yet. The dispersed initiatives include mostly small and single corridors that have not yet expanded as extensive networks across the city. Cities need safe access and integration, last-mile connectivity, hyper-local mobility and low-emission zones for transformation.

Restrain personal vehicles: Even as cars are congesting city roads, there is virtually no effort in any city to leverage "parking management area plans" to cap and price parking, and apply tax and pricing measures to recover the true cost of owning and using personal vehicles. Free or minimal parking fees are, in fact, hidden subsidies. It is important to remember that lack of pollution pricing is akin to inciting ownership and usage of cars. @down2earthindia

ACTION POINTS

- Build a public transport system that is city-wise and scalable, integrated, connected, reliable and inclusive
- Scale up networks of walking and cycling infrastructure; make last-mile connectivity efficient
- Enforce measures like parking management area plans to cap and price parking, along with low-emission zones to discourage usage of personal vehicles
- Reform taxes to make public transport more cost-effective; recover true cost of owning and using personal vehicles

FIX OUR FOOD

Chemical-dependent farming, lax labelling laws, rising anti-microbial resistance must top the agenda

AMIT KHURANA

IN APRIL-MAY, Hong Kong, Singapore and Nepal banned the import of certain Indian spices due to the presence of ethylene oxide—a carcinogenic chemical used as pesticide. Ironically, this happened at a time when the Food Safety and Standards Authority of India (FSSAI), the country's Central food regulator, increased the maximum limits for certain unregistered pesticides to be used in spices and herbs by as much as 10 times. The outpour of negative reactions was obvious. Time and again, India has failed to set up an effective system for pesticide management.

The so-called default values for unapproved pesticides undermine the pesticide registration process set up by the Central Insecticides Board and Registration Committee (CIBRC) under the Union Ministry of Agriculture and Farmers' Welfare. This means that many other pesticides that are not approved for spices or herbs for reasons such as lack of safety data, can still be used. This is wrong. Considering the limited routine surveillance in India and reluctant disclosure of food surveillance data, such use will likely go unchecked. To make it worse, the tenfold raise in maximum levels

ACTION POINTS

Manage pesticide across its lifecycle by setting maximum residue levels, monitoring residue in food, exposure to farmers

Upscale and incentivise the transition towards agro-ecology practices such as natural or organic farming with a greater ambition and programmatic, implementation support

Much sharper action needed to make agriculture practices more climate friendly

of pesticides will legitimise a much higher presence. All this for spices and herbs that are integral to Indian diets and kitchens.

But if the new government takes cognisance, this can be a big opportunity to fix pesticide mismanagement in the food system. This will safeguard the trade and livelihood prospects of producers, while protecting Indian consumers from exposure to toxic pesticides. This means, our food laws must not allow use of any pesticide in a crop for which it is not approved. This also means that the maximum residual limit of a pesticide in a crop must be set, once it is approved. It should be done based on the science of acceptable daily intake (ADI) of a particular pesticide. Our agriculture extension services need to be aligned to help farmers reduce pesticide use and check industrial tactics that promote irrational use.

The core of the solution lies in sustainable agriculture approaches that help phase out pesticides. The Centre and states have a critical role in adopting and promoting holistic agriculture. They must promote and incentivise the transition towards agro-ecology practices such as natural or organic farming. Key to this is helping farmers connect with markets to sell produce at remunerative prices. With less than 5 per cent of the net sown area under organic or natural farming, India can do much better, much faster.

We also need sharper action to make our agriculture practices more climate-friendly and resilient to shocks. It is critical that our farmers are adequately protected against the vagaries of extreme weather events, which are much frequent now. Here too, the agro-ecological practices offer multiple advantages, thereby calling for greater budgetary allocations. By moving away from chemical-dependent practices, soil health improves and water and energy are conserved. Further, cost of inputs and dependence on markets decrease while maintaining or increasing productivity and better incomes. Reduction in use of chemical fertilisers will not only help reduce on-farm and off-farm agriculture emissions but also the burden of subsidies that the governments have to bear. Money saved here can be a big reason to consider investing more in agro-ecological practices.

To reduce greenhouse gas emissions, rice cultivation and dairy sector in particular need attention. In the case of rice, part of the success will depend on how governments overcome the challenge of upscaling water management-based practices like the alternate wetting and drying and the system of rice intensification. In the dairy sector, the success will depend on how well the governments are able to strike a balance between productivity, emissions and resilience, such as through indigenous breeds and nutrition-based interventions in feed and fodder.

A carefully considered and phased approach would suit the Indian scenario better. Options that can help reduce emissions and offer co-benefits can be more useful. Successful mitigation will happen if the solutions designed and promoted are farmer-centric, simple and cost-effective, and offer clear incentives for adoption. India's approach to mitigation needs to remain integrated with adaptation.

UNHEALTHY FOODS

Around the same time when the reports on pesticides in spices came out, there were also reports about higher levels of sugar in a popular baby food in India as compared to those sold in foreign nations by the same company. Such double standards by foreign

multinationals are possible only due to weak regulations that have led to a blatant disregard of the nutrition needs of infants. No wonder, with high levels of addictive sugars, many consider baby foods as the first junk food. Earlier, reports about high level of sugars in a so-called health drink had created a furore. This is because our laws on packaged food marketing and claims have gaps that can allow such drinks to be promoted as healthy due to fortified vitamins and minerals, while ignoring the unhealthy ingredients like sugars in them. The nutrition labelling laws for packaged foods help companies hide more than they tell and mislead consumers.

If the new government is serious about containing the non-communicable disease epidemic, it must aim for a front-of-pack labelling law which informs the consumer choice in a simple and effective way and can push food companies to use less sugar, salt or fat. In addition, India needs a framework to check marketing and advertisements of these ultra-processed packaged foods. If sports and entertainment celebrities continue to endorse such foods, and the advertisements are bombarded across all kinds of media, it will be impossible to develop healthy food habits in children.

ANTIBIOTIC RESISTANCE CRISIS

Antibiotics are becoming ineffective because bacteria are becoming resistant to the drugs used to treat them. The phenomena, called antimicrobial resistance (AMR), is considered a silent pandemic and a threat to humanity. Antibiotic misuse and overuse in animal-food systems is one of the key drivers of this crisis that can cause 50 million deaths worldwide annually by 2050, show studies.

Just like most countries, India is revising its national AMR action plan for the next five years. The first five-year action plan had only limited success. The need of the hour is a prioritised, stronger action at the Centre and in states to reduce antibiotic overuse and misuse in rearing dairy, poultry and fish for food. We must phase out the use of antibiotics as growth promoters and their use for so-called disease prevention, which does not prevent disease. We need to regulate feed and unsupervised availability of antibiotics for use in farms. We must have standard treatment guidelines for different food-animal sectors. Antibiotics for saving human lives in hospitals and intensive care units must not be used in animal farms.

This will need a multi-sectoral and holistic approach. It also means promotion of antibiotic alternatives. The work done by the National Dairy Development Board through the use of traditional herbal (ethnoveterinary) medicines can be scaled up in the dairy sector and similar efforts can be explored and encouraged in other sectors. We also need to understand, invest and incentivise approaches that help attain biosecurity and required vaccination levels along with better rearing conditions and housing systems. These ultimately help reduce the occurrence of diseases at farms and thereby the need for antibiotics. This also requires better diagnostic and veterinary services.

We need to aggregate and put in the public domain data on how much antibiotics are used in animal food systems and the extent and kind of resistant bacteria and antibiotic residues found in food from animals and fish. FSSAI's milk survey of 2018 revealed presence of residues of several antibiotics. In 2014, Centre for Science and Environment, Delhi, highlighted antibiotic residues in chicken meat. In 2010, it found antibiotic residues in honey. @down2earthindia

ACTION POINTS

A front-of-pack nutrition labelling law can push food companies to use less sugar, salt or fat

Framework needed to check marketing of processed packaged foods and celebrity endorsement

Phase out use of antibiotics as growth promoters and for disease prevention. Critically important antibiotics must not be used in animal farms

Offer farmers a new deal

FOR THE new government, the focus must shift to the crisis under which rural India, or Bharat, is reeling. This will ensure India as a whole is *viksit* or developed. Reviving the rural economy should be the top priority, as Bharat has the largest number of consumers that contribute significantly to the national GDP (gross domestic product), mostly driven by consumption. Rural India is the biggest workforce and its primary vocation, agriculture, is also the biggest employer and accounts for over a sixth of the national GDP.

India is undergoing a deep economic crisis, caused by near stagnation in the rural economy. Farmers currently earn more from wages than cultivation. Farming does not even support sustenance. Moreover, various assessments show those who took up distress earning activities like migrating to urban areas to work in construction and other daily-wage jobs, are returning to villages and have by default joined agriculture. This means an already stagnating sector has more people to support, which leads to lesser earning, negatively impacting consumption. This explains the sluggish rural consumption expenditure that critically impacts overall national private consumption expenditure. It also explains the rising unemployment and underemployment.

In the just concluded general elections, unemployment, price rise and farm distress emerged as key issues. Some notable electoral reversals can be attributed to these issues. In the past five years, farmer protests have been much discussed. While farmers continue to produce record amounts of crops ensuring the country's food self-sufficiency, their own economic status has effectively dipped. Their grievances include the declining return from farming and the added crisis of erratic weather events damaging crops. Protesting farmers mostly demand two forms of support: policies ensuring fair price for produce and insurance against crop losses, primarily due to weather incidents. The market is not in favour of farmers but it can be through government policies that aim to support them. Instead, to protect consumers against a price rise, the government allows large-scale import of agricultural produce.

The government has a plethora of schemes and strategies to ensure that farmers are protected from market vagaries. From setting up a price stabilisation fund to maintaining prices of certain products to insuring crops against weather uncertainties, the Union and state governments have implemented over 200 schemes that cover the complete agricultural cycle. But none of them cater to even 15 per cent of India's farmers. So, the first item on the agenda of the new government should be to repurpose "farmer-friendly" schemes to farmer-enabling support, as seen in sectors like manufacturing.

Agriculture as an economic sector has never received the kind of strategic nurturing it deserves. Since the Green Revolution, India has witnessed many changes in its economic profile. New economic sectors have emerged in the last five decades, and the way India adopted them to evolve as an emerging economy is an example of the support agriculture needs. Take the case of information technology (IT). Within two decades of its arrival as the new-age economic sector, India put all its governance might to emerge as an IT leader. On the other hand, the government's approach towards farmers and farming has never been of consistent support, except for politically-correct schemes and budgets.

Repurpose 'farmer-friendly' schemes to farmer-enabling support to boost rural economy

It is clear that the shift to the non-farm sector is not that fast or remunerative. This policy has been India's official pathway to ensure employment and livelihood to the booming workforce. Now that this is not effective, the new government must adopt a new approach: make agriculture profitable again. This has the co-benefits of ensuring gainful employment as well as a boom in the rural economy. But this needs a new deal for the farmers who, like those in the new economic sectors, should be enabled to prosper. DTE @richiemaha