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CLIMATE ENERGY AND THE ENVIRONMENT

Climate change is poised to have a profound and devastating impact on India's development agenda. With environmental quality across varied indicators only worsening – most recently in the form of rising air pollution – researchers at CPR offer a series of practical policy approaches in the areas of climate, energy and the environment. They argue that India must rethink its relationship with international climate negotiations and domestic climate policy, execute a well-conceived roadmap for air pollution control, strengthen the country's environmental compliance regime, and enhance electricity access for the poor.

CENTRE FOR POLICY RESEARCH

Rethinking India's Approach to International and Domestic Climate Policy

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India has traditionally approached climate change as a diplomatic issue, insisting that the developed world – because of their disproportionate role in causing the problem – should lead the way in reducing emissions, and provide the developing world the finance and technology to do so. While this approach is entirely justifiable and has served India well in the past, there are compelling reasons for the country to rethink its approach to international and domestic climate policy. First, climate change is likely to have profound and devastating impacts in India, impacts that will make the task of development and poverty eradication considerably harder. Second, there are several cost-effective actions that India can take that serve its development as well as climate interests. Rethinking our approach would translate internationally into our joining, even leading, a 'coalition of the willing' that advocates for an ambitious and strong rules-based global climate regime. Domestically, it would translate into a proactive exploration of lower-carbon opportunities for growth that foster development, while investing in climate adaptation and resilience. Rethinking our approach at the international and domestic levels, however, calls for strong institutions for climate governance.

This paper, after a brief context setting section, lays out elements of an approach to international and domestic climate policy that is likely to serve India well in the long run.

Context

Climate change, often characterized as the 'defining issue of our age', is predicted to have profound 'impacts on natural and human systems on all continents and across the oceans.'[1] These impacts are likely to cause devastation in India, a country with 7500 km of coastline, extensive tracts of low-lying

areas, high population density, poor infrastructure and continued reliance on agriculture for livelihoods. With the 1°C warming that has already occurred since pre-industrial times, Himalayan glaciers have begun to retreat, and there has been a marked increase in the frequency and intensity of heat waves,[2] droughts, extreme rainfall events[3] and floods. If the world warms to between 2.6°C and 3.2°C, as the UN climate secretariat estimates it will based on current country pledges, this will have serious, pervasive and irreversible consequences for India – not just in terms of impacts on peoples and ecosystems, but also on economic growth, livelihoods and wellbeing. Climate change is predicted, for instance, to reduce agricultural incomes by 15-25% by the end of the century in India.[4]

International Climate Policy

India's position in the international climate negotiations is set within larger geo-political developments that also inform and influence its broader foreign and energy policy. With the US retreat from the Paris Agreement, the Brazilian President Bolsonaro's equivocation on it, and the defeat of the Labour Party in Australia which advocated strong climate measures, the momentum that led to the Paris Agreement has begun to dissipate. There is a leadership and imagination vacuum in global climate politics, which India could seek to fill.

For example, India could reach out to China, which has long been its negotiating partner in retaining differentiated responsibility, to forge a mutually beneficial alliance on the global solar energy transition. India leads the International Solar Alliance and provides a substantial market, while China has technological leadership in solar panels and storage technologies. Both countries are involved in the Asia Infrastructure Investment Bank. As the Africa region develops its infrastructure, an India-China alliance could help provide a vision of and the technological and financial means for realizing a low-carbon yet cost-effective future. In addition, and consistent with this approach, India could seek to realize its potential as a leader of vulnerable nations. Doing so would also be viewed favourably in the South Asia region, by vulnerable countries such as Bangladesh, Bhutan and Nepal. Notably, these measures allow India to be a climate leader even as it takes advantage of opportunities for economic and political gain; that is, they do not require the country to sacrifice economic gain and political position for climate policy.

Based on approaches such as these, India could join forces with others to form part of the 'coalition of the willing' in global climate politics. Such a coalition is a particular need at this juncture in the negotiations. With the conclusion of the Paris Rulebook negotiations in Katowice, Poland, in December 2018, the politically charged negotiations on obligations, rules and institutions are at an end, and the regime has shifted gears to the day-to-day business of implementation. The Paris Agreement builds on nationally determined contributions (or NDCs) from countries to reduce greenhouse gases, complemented by a normative expectation of progression and 'highest possible ambition' that calls for these contributions to be strengthened over time.[5] These terms – 'progression' and 'highest possible ambition' – are not defined either in the Paris Agreement or its Rulebook. Further, while the Rulebook fleshes out informational requirements, and operationalises an enhanced transparency framework, global stocktake, and implementation and compliance mechanism, it still preserves, out of political necessity, considerable flexibility, autonomy and discretion for states; this is particularly evident in their near-absolute control over the content of their NDC.[6] States could choose to exploit this discretion and create a political and implementation drag in the process, or they could choose to progressively strengthen their NDCs, enhance the quality of the *ex ante* and *ex post* information they provide, and trigger a virtuous cycle of ever ambitious actions necessary to meet the temperature goal of the Paris Agreement. It is in India's interest to be part of the 'coalition of the willing' – nations that seek to progressively strengthen their NDCs, and enhance their ability to meet the procedural requirements of the Paris Agreement and its Rulebook as well as the substantive objective of the climate change regime.

Specifically, first, India should provide information on its NDC, set against the larger context of its development aspirations and resource constraints.[7] This information should include the planning processes the country has engaged in to reach its NDC, which in turn should include meaningful stakeholder consultations and attentiveness to the human rights impacts of climate change action or inaction.

Second, India should clearly explain how its NDC is fair and ambitious, and on what objective criteria and benchmarks. This approach would allow India to ask how these criteria and benchmarks could be applied to the NDCs of other countries as well, turning its long-held emphasis on the principle of equity in climate change negotiations into a practical and applied measure. It is by providing robust information in the context of its NDC that India can introduce into the global assessment of progress criteria and benchmarks which assess 'relative fair shares'.

Third, in relation to ex-post tracking of progress in implementing its NDC,[8] India should identify objective defensible indicators to assess its progress with its NDC, take proactive efforts to address capacity gaps in implementation and reporting, and gradually improve the quality, precision and detail of the information it provides. India's implementation should demonstrate a high degree of 'due diligence' (best possible efforts) in meeting the objectives of its NDC.

Finally, in relation to the global stocktake process every five years,[9] India should work with negotiating partners (such as South Africa) and vulnerable nations to ensure that the 'hooks' on equity in the Paris Agreement and the Rulebook are duly exploited. India should submit its vision of equitable burden sharing and 'relative fair shares' to enable a meaningful assessment, albeit a collective one, at the international level of progress towards the global temperature goal.

India's ability to take a leadership position in this 'coalition of the willing' will require a substantial scaling up of the capacity and resources – human, financial, legal, research and institutional – it devotes to engaging in international negotiations, and complementary backchannel processes.[10] The country's delegations to the climate negotiations are considerably smaller than those of other nations of comparable size and stature. The composition of the delegations tend to favour bureaucrats rather than experts, and there are limited formal channels for national positions to be informed by outputs from the growing research community working in these areas in India. In rethinking our approach to climate policy, international and domestic, India must also rethink its engagement with experts, and the processes for doing so.

Ultimately, the effectiveness of the Paris Agreement, given its hybrid architecture, lies in the strength of the NDCs that parties submit. The strength of the NDCs will in turn depend on international processes that can catalyse more ambitious domestic actions, as well domestic political will and institutional capacity for formulating and delivering ambitious NDCs. It is to these domestic issues that we now turn.

Domestic Climate Policy

As the reality of climate change looms, and its impacts become more real, India – as is true of other countries – increasingly needs to view climate change as a developmental challenge, and not simply as a diplomatic one. Simply put, climate change will make development outcomes more challenging. For example, global pressures to limit greenhouse gases and the emergence of new technologies will make it more complicated for India to power its industries and provide electricity to its citizens in conventional ways. Agriculture, on which a substantial portion of the population still depends for livelihoods, may be particularly hard hit. Cities and coastlines may be subject to disruptions from climate-related events. Water cycles may be disrupted, and the timing and availability of water through rainfall and in India's rivers may shift. And heat waves and shifting disease vectors will complicate the problem of ensuring public health. Climate change is not an isolated challenge to be addressed by one part of the government;

it is a problem that requires mainstreaming of climate considerations through all sections of the government's decision-making apparatus.

As this discussion suggests, the institutional requirements of managing climate change are considerable. In the last few years, India has begun planning for climate change – including through a National Action Plan, eight national missions covering adaptation and mitigation, and 32 state action plans and greater investment in scientific infrastructure. Yet, a deeper dive into these efforts reveal that the research and analytical capacity in each of these areas is weak, coordination is limited, implementation is patchy across these efforts, and the strategic thinking for truly transformative approaches is lacking.[11]

Building the capacity of Indian states to address the complex challenges of climate change is but in its infancy. The country needs to go much further down this path, devising and implementing a robust institutional structure that can generate appropriate knowledge, design policy and infrastructure interventions, coordinate across sectoral line departments and across scales of governance, ensure accountability for implementation, and provide an interface to business and civil society groups. Development remains India's number one priority. But development untouched by climate change is no longer possible. Addressing climate change adds to India's problem of developing adequate state capacity. A forthcoming edited volume coordinated by the Centre for Policy Research, *India in a Warming World*, explores how India can truly internalize climate concerns in both its energy consumption and natural resource sectors so as to address climate mitigation and adaptation.

Mitigation

Climate change mitigation, or the limitation of greenhouse gas emissions, has always been tied to India's global negotiating stance. If wealthier countries, and not India, are largely responsible for the problem, why should India undertake costly mitigation actions? A decade ago, the National Action Plan on Climate Change proposed exploring actions that lead to both development and climate benefits. This principle of 'co-benefits' has guided our actions since, but actions that meet this principle have not been fully pursued and developed. Here, India's status as a late developer is an advantage: we have not, as yet, locked into energy production and consumption patterns, and so can take advantage of new technology and knowledge to build a lower-carbon development path.

India's cities provide a particularly good example.[12] The country is urbanizing rapidly, but much of urban India remains to be built. The next couple of decades afford an opportunity to set up cities where transport needs (and hence emissions but also congestion) are lower due to sensible planning that locates work and living spaces near each other; the travel needs that remain are met increasingly with high-quality public transport and walking (rather than private automobiles); new buildings are designed to need less cooling and heating through intelligent design. Planning processes for urban spaces need to be focused on the multiple objectives that a city should meet in these times – of livability, low congestion, efficient functioning and a small environmental footprint.

India's electricity system provides another instructive case.[13] Long ridden with problems of unreliability, poor service and loss-making, Indian electricity is likely to be shaken up by the recent steep decline in costs of renewable electricity to levels where it is competitive with coal power. However, the transition is likely to be turbulent, and create winners and losers. For example, industries may choose to shift to renewables thereby increasing the financial burden on distribution companies. Coal-mining regions may, over time, have to move to other industries.[14]

Notably, these changes are inevitable and are being driven by global technology trends, not by national climate policies alone. Recently, Tata Power became the most recent example of a company that is planning to pivot from coal to solar for economic reasons.[15] But planning for this future under the rubric of a transition

to a low-carbon economy could help unlock possible synergies between green power, energy access and energy security. Alternatively, failure to plan for this transition may be costly, particularly for the poor. Moreover, the likelihood of green, yet competitive electricity opens the door to electrifying other sectors, such as transportation and cooking. But the challenges involved in managing these transitions, in terms of hardware required, institutional rules and making sure potential losers are not left behind, are substantial and require immediate analysis and planning.

India's cities and electricity sector are but two examples. Mitigation also encompasses transportation networks (including for freight), industries, agriculture, forest management and use, and food consumption patterns, to name a few. For India, a consistent approach – built around understanding the synergies and trade-offs across multiple development objectives and climate mitigation – needs to become part of the policy framework across these sectors.

Adaptation

It is increasingly clear that despite our best efforts, countries collectively are unlikely to mitigate sufficiently to avoid at least some – potentially significant – effects of climate change.[16] India, perhaps even more than other nations, has to pay considerable attention to the adaptation and resilience of its economy and society.

Doing so is as complex as reducing greenhouse gas emissions, and perhaps even more so. For example, adaptation in agriculture requires preparing India's agricultural systems for heat stress and unpredictable rainfall patterns against a backdrop of existing farmer distress, a creaky system of price stabilisation prone to rent-seeking, and highly inadequate insurance and risk management mechanisms available to farmers. In this context, large existing entry points into food security and employment, such as the public distribution system and the Mahatma Gandhi National Rural Employment Guarantee programme, could usefully be rethought and repurposed from the perspective of providing climate resilience. In brief, the scale and scope of potential climate impacts require mainstreaming of climate considerations systematically across development programmes, rather than an approach that rests on marginal band-aids.

In another example, India's long coastline is particularly vulnerable to climate impacts.[17] Climate change is likely to decrease the productivity of fisheries through changes in ocean temperature and acidity levels, already stressed by non-climate effects such as fertiliser run-off, with impacts on livelihoods of fisher communities. Because these effects are non-linear, beyond a point, coastal systems may be stressed beyond the point of recovery. In addition, extreme weather events and sea level rise are likely to reshape coastal zones and increase risks and costs of inhabitation on coasts. Addressing these challenges includes but goes beyond disaster preparedness. It requires, for example, coordinating the work of different departments, some of which have a protective mandate and others that seek to maximize production: these need to be harmonized around coastal resilience.

Apart from agriculture and coasts, urban areas, forests and water management also pose a complex challenge. In all these areas, the challenges of mainstreaming climate change are simultaneously scientific, economic, social and institutional.

Conclusion

As the spectre of climate change grows ever clearer, it is becoming increasingly obvious that pursuing development without internalizing climate change considerations risks ignoring a big piece of the puzzle. A central element of the new government's agenda must thus be to internalize and mainstream climate considerations.

Fortunately, in relation to international policy, addressing climate change can also bring economic and political gains. It can enable India to work its alliances to become a leader in an impending global clean energy transition. And it opens possibilities for the country to become a political leader, notably of vulnerable nations.

Domestically, there is considerable work to be done. This involves rethinking India's energy system in a world that prioritizes clean energy, including tackling the thorny question of remaking India's problematic electricity distribution sector. To manage impacts on agriculture, coasts, cities, water and forests, the new government will need to invest in dedicated scientific and institutional capacity, tasked with internalizing the climate challenge and the implications climate change holds for development.

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Beyond Poles and Wires: How to Keep the Electrons Flowing?

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India's move to electrify every village and household in the country has been lauded as a success. Building on decades of targeted programmes and public investments by multiple governments, the country completed 100% village electrification in April 2018; a year after, it has electrified nearly all 'willing' households. Despite the time it took to get here, these achievements are important milestones in India's development trajectory. But does connecting households to the electric grid resolve the electricity access challenge? The answer depends on whether electrons flow through the wires and whether all consumers are served equally and adequately.

For electrons to flow and for there to be power for all, a vital policy issue to be considered is about the role to be played by the Government of India (GoI). Given the concurrent status of electricity, can the sector be a 'perfect crucible for making effective the cooperative-competitive federalism experiment that is now India'?[1]

Challenges of Electricity Access

Once connected to the grid, consumers face multiple challenges to stay plugged in and realize the full benefits of electricity services. From the perspective of the poor, there are three key challenges that need to be overcome: unreliable supply, poor consumer service, and unaffordable bills.

Although India has become power surplus, many homes, especially those located in rural and low-income areas, have to bear with intermittent and poor quality supply. While government reports indicate 16-24 hours of supply to all homes, several surveys find lower supply hours, particularly, in the evening hours. Prayas Energy Group's Electricity Supply Monitoring Initiative found that less than 20% of rural locations receive continuous supply during 5-11 p.m. This pattern of unreliable supply can be explained by an inherent disincentive to serve the poor. While India's

average monthly household electricity consumption is as low as 90 kWh,[2] most households consume less than 50 kWh.[3] India follows a consumption slab-based tariff system, where initial consumption slabs are charged significantly below the costs. This is one reason why electricity distribution companies (discoms) lose more than 50% of their cost in supplying to low-consumption consumers.[4]

Metering and billing irregularities are common, particularly in rural areas. The human resources of discoms have declined even as their consumer base has increased, leading to lower frequencies of meter reading and billing. Many discoms raise bills once in two months. In several cases, the first bill after the connection is raised after several months. Accumulated dues are often unaffordable to low-income households and increases the likelihood of payment default and subsequent disconnection. Irregular billing also causes a trust gap between discoms and consumers. A recent survey in Uttar Pradesh finds that consumers who are billed monthly are more likely to pay on time and in full amount; but those who are not billed regularly do not believe that their bill is based on actual consumption and are likely to default on payment.[5]

A major barrier to electricity access remains the concurrence between economic poverty and energy poverty. At the launch of Saubhagya, seven states (Uttar Pradesh, Bihar, Odisha, Jharkhand, Assam, Rajasthan and Madhya Pradesh) accounted for two-thirds of the un-electrified households in India. These states are home to about two-thirds of India's population living below the poverty line (BPL). Discoms in these states are already highly indebted, accounting for 42% of accumulated debts of all discoms as of March 2016. Discoms in these seven states have higher losses and revenue gaps than national averages. Despite continued state government subvention (or payment to discoms), all these discoms have been consistently running at a loss, accounting for about 47% of the loss in the electricity distribution business. In 2015-16, subventions to discoms amounted to 10% of these seven states' collective gross fiscal deficit and accounted for 40% of total subvention from all states. The recent push for financial turnaround of discoms through a centrally designed scheme – Ujwal Discom Assurance Yojana (UDAY) – has not achieved the desired results in many states.[6] The fiscal space of these states and discoms is cramped by the need to accommodate the electricity subsidy. On the other hand, existing subsidized lifeline tariffs in these states are, ironically, higher than in states with high electricity access.[7] Media reports suggest that 3.5 million households in Uttar Pradesh are unwilling to get an electricity connection despite the connection charge waiver and subsidized tariff at 50% of the actual costs.[8]

The Centre's Helping Hand

The responsibility for electrification has been shared by governments at the Centre and states. Successive governments at the Centre have played an important role through sustained policy directives, targeted programmes and financial support. The creation of a dedicated financing agency in 1969 – the Rural Electrification Corporation (REC) – helped boost village electrification in the 1970s and 1980s, when two-thirds of India's villages were electrified. To address low household electrification, the Centre launched Kutir Jyoti Yojana in 1989, with budgetary allocations to provide single-point light connections to BPL households. Rajiv Gandhi Grameen Vidyuti Karan Yojana, launched in 2005, extended free electricity connections to about 22 million BPL households, in addition to others who paid for their connection; it also electrified more than a million villages by 2014. The last 18,000 villages were electrified under Deen Dayal Upadhyaya Gram Jyoti Yojana, launched in 2015. Between 2017 and 2019, the central government sponsored an aggressive household electrification drive – the Pradhan Mantri Sahaj Bijli Har Ghar Yojana (Saubhagya) – to connect more than 26 million households to the electricity grid. With multiple interventions spread over decades and multiple governments, the Centre's thrust has been to connect villages and households to the electric grid, through funding the costs of erecting poles and stringing wires.

The state governments, with oversight on electricity distribution, have manoeuvred to keep electrons flowing through the wires. The key to the states' approach is redistributive welfarism: charging commercial and industrial consumers higher rates to keep electricity affordable for farmers and low-income homes. However, the pattern of electricity provisioning has been intricately shaped by electoral priorities, creating perverse incentives for serving the poor. The result is a low-level equilibrium where the poor are locked into cheap but intermittent, low-quality electricity. Because quality is low, many consumers feel empowered to default on their dues. The forces of inertia have prevailed over reform interventions to rationalize prices and enable cost recovery. Moreover, intermittent supply impacts business competitiveness. A survey conducted in Bihar, Odisha, Rajasthan and Uttar Pradesh suggests that 40% of rural enterprises rely on non-grid electricity sources as grid supply is unreliable and expensive.[9]

The Centre's thrust on connecting villages and households to the electricity grid has been realized, but is only a step towards universal access to modern energy. In 2014, a joint initiative between the Centre and the states – 24×7 Power for All – was launched. It had a state-by-state strategy with a shared goal to ensure round-the-clock supply to all consumer categories starting from April 2019. Despite a strong political mandate, the goal seems to be far from realized. Achieving universal access to electricity will require addressing problems around reliability, affordability, quality of supply and service that are persistently present across states. The new government at the Centre will need to revive its helping hand to support its state counterparts in dealing with diverse electricity access challenges that are entrenched in state-level political economies.

The Way Forward

The challenges to universal electricity access are at the state level and are, in part, beyond an individual state's capacity to address. Given that the poorest states will have higher costs of universal access, the Centre needs to lend a hand. Simultaneously, the central government will need to steer planning and governance for better coordination and coherence across states. The Centre will thus continue to play a significant role in pursuing the goal of universal electricity access. Towards this, we suggest the following priority actions for the new government.

Beyond Redistributive Welfarism to Productive Power

To achieve universal access, India's electricity policy needs a paradigm shift from 'redistributive welfarism' (that prioritizes subsidized costs for the poor while compromising on the quality of service) to 'productive power' (that empowers and enables the poor to pay for better quality service through productive use of electricity).

Last year, the government proposed a set of amendments to the National Tariff Policy (NTP). These were aimed at a shift away from consumer category-wise tariff to a progressive load and consumption-based tariff for all. While this will not address the cross-subsidy burden on large commercial and industrial consumers, it will make electricity affordable to small industries and entrepreneurs that are currently charged a cross-subsidizing tariff.

Implementing these proposed amendments to the NTP in a time-bound and phased manner to make electricity affordable for productive use by the poor will be an important step. Availability of reliable electricity is necessary, but not sufficient to mobilize its productive use. The Centre will also need to develop a broad strategy around 'productive power', seeking to promote rural industries and businesses (such as agro-processing and cottage industries) with the required financial and infrastructure support.

Revisiting the Definition of Electrification

The existing definition of electrification, set out in 2004, emphasizes the existence of a basic electricity infrastructure, keeping the focus on grid expansion and household access to the grid. Now that the grid has reached nearly all homes, it is important to revisit the

definition, with a focus on ensuring access to reliable and affordable electricity for all.

Holding Discoms Accountable for Performance

Providing productive power requires that discoms are held accountable for performance. While the Electricity Act of 2003 (EAct) has made provisions for standards of performances (SoPs) to be met by the discoms, compliance and monitoring remain low, with significant discrimination across consumer categories. There is a need to implement a stricter legislative mandate for SoP compliance and equal treatment of consumers. Available technologies could be harnessed to monitor discoms' performance in this regard. The Centre has been promoting smart meters for automation of billing and consumer accountability. These meters can also be used to monitor supply quality and for consumer information. In 2013, the Centre made an attempt to make discoms and the respective state governments accountable by presenting a Model State Electricity Distribution Management Responsibility Bill. Rajasthan is the only state government to have enacted this bill. Some of the provisions of this bill were included in UDAY, but without any legislative mandate. These efforts can serve as a template for developing a framework to hold the discoms accountable for their performance.

Better Consumer Protection

The EAct included provisions for consumer protection. While the institutions for consumer grievance redressal – Consumer Grievance Redressal Forums at discom level and Ombudsman at state level – have been put in place, these avenues remain dysfunctional and often influenced by the discoms.[10] There is a need to strengthen these institutions to protect the interests of consumers, hold the discoms accountable, and build trust between the two. This will require raising consumer awareness on the existence of forums for grievance redressal and making these forums accessible to all. Regular analysis of grievance records is required to understand patterns and discoms' performance. These analyses must be accessible to the public and used to make discoms accountable. The grievance redressal forums need to be redesigned to function independently from the discoms.

Alternative Service Delivery Models

The technological transformation in the sector, led by greater penetration of renewable energy, is likely to cause disruption in the electricity distribution structure. Discoms are likely to lose predictability in business and their significance as instruments of redistributive welfarism.[11] There has been resistance to past attempts to restructure the distribution business for efficiency gain – through promotion of franchisees and cooperatives, and separation of carriage and contents. The future uncertainties in electricity distribution necessitate planning for alternative service delivery models to ensure that the poor are not left out. The Centre needs to play the role of a catalyst by steering the planning at the state level, without imposing a single, standard model. Diversity in approaches and models will be crucial to manage state-level economic forces and specific electricity demands.

Strengthening the Rural Distribution Network

While the electricity grid has been extended to all corners of the country, the distribution network in rural areas remains fragile and prone to frequent breakdown. Although rural areas presently have low energy demand, the potential for demand growth is high. Distribution networks will require significant upgrades to meet future demand. As the discoms have little incentive to invest in rural networks and many states lack fiscal capacity, the Centre will be required to continue investing in the rural distribution network, until such time as rural consumers climb onto the virtuous cycle of receiving better service and being willing to pay more for quality. The Centre has been supporting urban distribution network upgrades through successive programmes[12]. Similar interventions are required to upgrade rural distribution and ensure quality supply to consumers based in rural areas.

The Subsidy Conundrum

Even though the key to electricity reform in India is tariff rationalization, there is no doubt that, for the time being, electricity supply to the poor needs to be subsidized. These subsidy needs are concentrated in poorer states with limited fiscal space. In an interesting development, in the proposed amendments to the EAct

and NTP, the Centre has proposed to make subsidies a collective responsibility of the central and state governments. This is an important shift away from the earlier model where subsidy was the sole responsibility of the concerned state governments. If implemented, this would allow the subsidy-based approach to electricity to continue, with a shift from a rate payer-based cross-subsidy system to a tax payer-based fiscal subsidy system.

The Centre also seeks to promote direct benefit transfer (DBT) for subsidy payment to ensure better targeting. A reform in the subsidy mechanism, seeking to better target and rationalize subsidy, is an urgent need. But the proposed approaches are not free from limitations. Managing electricity subsidy demands with tax revenue will require the electricity sector to assert its claims for support in competition with several other possible uses of these funds; it will also limit the ability of states and regional political parties to make electoral use of electricity pricing, introducing political uncertainty. In addition, identifying and targeting legitimate subsidy demands to use DBT remains a challenge.[13]

The Centre's past guidelines to reduce and eliminate cross-subsidies in a timebound manner and raise revenue from low-paying consumers have been resisted by states. Rather, cross-subsidization and the gap between costs and revenue have gone up in several states. The new government must prioritize the subsidy conundrum and develop a transition plan to gradually reduce subsidies without compromising essential service for the poor. It should consider state-specific political economy forces and must embed a strategy to promote 'productive power' to enable the poor to pay. Large-scale adoption of specific tools or solutions should be based only on successful pilot experiments, after careful consideration of the costs and benefits; a strategy to manage the costs to losers from subsidy reform must be included.

Erecting poles and stringing wires across a country like India is an important step. But the work remains incomplete until high quality reliable power that enhances rural productivity is made available to India's poor. This must be the agenda, going forward.

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Clearing our Air of Pollution: A Road Map for the Next Five Years

SANTOSH HARISH, SHIBANI GHOSH AND NAVROZ K. DUBASH

The Big Challenge

Air pollution levels are unsafe across the country, all-year round. While pollution levels spike to dangerously high levels during the winter in north India, those in several parts of the country are poor or worse for large parts of the year. High pollution levels are not restricted to cities; several industrial areas along with rural areas across the Indo-Gangetic plain are also polluted. There are several kinds of pollutants in the air: particulate matter, carbon monoxide, ozone, oxides of nitrogen and sulphur. Fine particulates (PM2.5) form a useful proxy indicator for air pollution. The population-weighted annual average concentration of PM2.5 across the country, estimated using satellite data, was 91 microgram/m3 in 2017 – more than twice the national standards.[1]

Air pollution is a public health emergency. The health impacts of poor air quality are staggering and of growing concern as we discover the full range and degree of its effects with new research. Air pollution is estimated to reduce the average life expectancy of a child born in India by at least 1.5 years.[2] In 2017, air pollution is estimated to have contributed to one in eight deaths in India.[3] Cardio-respiratory diseases and lung cancer in adults, and acute lower respiratory infections in children, are the more commonly known impacts of air pollution. In addition, new research indicates a much wider range of health impacts of air pollution such as on birth weight, child growth, obesity and bladder cancer. There is growing evidence on the adverse impacts of pollution on cognitive abilities in children.

Multiple sources contribute at different regional scales. Industries, power plants, vehicles, waste burning, road and construction dust, and household sources are significant sources of air pollution. At the national level, household burning of polluting fuels for cooking and heating purposes forms the single largest contributor to average PM2.5 exposure (in addition to the exposure to PM2.5 within these households themselves).[4] Industries and power plants that burn coal are the second and third largest sources of exposure at the national level. Within cities, other sources like transportation, construction dust and waste burning play an important role. Because of these different geographical scales of influence, pollution control measures need to target different sources at appropriate levels. These different sources and scales make the role of the central government critical in framing policy at regional and national scales, coordinating implementation across states, and providing necessary financial and technical assistance.

The Existing Policy Framework

The National Clean Air Programme (NCAP), launched by the Ministry of Environment, Forest and Climate Change (MoEFCC) in January 2019, looms large over the newly elected government's policy landscape. The NCAP identified 102 non-attainment cities – which have particulate matter levels that exceed the annual standards – and set a reduction target of 20-30% by 2024. However, in its approach, the NCAP is a status quo-ist document, which adheres to city-specific templates from the past, and wholly misses addressing governance gaps. It reinforces India's policy response to air pollution, which has largely been reactive and overly reliant on administrative solutions. The existing regulatory design has proved to be entirely inadequate to meet the scale of the problem, and the monitoring and enforcement capacity of government agencies (such as the pollution control boards) is insufficient, especially for dispersed sources of pollution like vehicles, stubble and waste burning. An effective air pollution control strategy must break away from the status quo, and instead strategically prioritize key, implementable actions.

Air pollution reduction needs greater commitment from the executive. So far, pollution control has largely been driven by the judiciary. The new government should assume leadership in crafting and implementing an effective national air pollution reduction strategy. This could take different forms. One important example is empowering and giving greater autonomy to pollution control boards (PCBs) to discharge their responsibilities and act against polluters. Currently, interference in the functioning of these boards is visible in multiple ways: (i) the boards are typically led by generalist bureaucrats despite court judgments that have backed domain experts for chairpersons and member secretaries;[5] (ii) their funding is often dependent on grants-in-aid by the state governments; and (iii) routine administrative decisions like hiring need approval from the environment department. State PCBs also seem to be facing a trade-off between their functions of monitoring and enforcement, and promoting 'ease of doing business'. All of these curtail their ability to discharge their statutory mandate effectively.

The new government should also enable resolution when there are complex political and economic factors contributing to a polluting activity. For instance, consider the case of stubble burning where Minimum Support Prices, groundwater management, farm mechanization, the agrarian crisis, and unfavourable meteorology all contribute to episodic peaks in pollution in north India. Banning burning or subsidizing technical solutions such as 'Happy Seeders' are unlikely to solve the problem, unless some of the structural factors mentioned above are tackled through political negotiation.

A New Policy Agenda

Strengthening the National Clean Air Programme (NCAP)

NCAP was a missed opportunity to outline a systematic strategy. Beyond the national outreach and the reduction targets, it is a compilation of ongoing efforts, and leaves the details of new efforts to future action plans. Specific gaps include:

- NCAP is largely a continuation of the traditional policy approach of developing long lists of unprioritized action points. It does not put implementation capacity at the heart of designing our mitigation policies, thus risking non-implementation.

- The programme is urban-centric, focusing on a limited group of cities, and following the National Capital Region template by relying on city action plans. However, air pollution is not restricted to cities, and air quality in cities is typically influenced significantly by sources from outside. Addressing this problem requires moving the conversation towards addressing pollution at regional 'airshed' levels, and having more flexible system boundaries for air pollution control. The NCAP does not outline a road map for defining these airsheds and developing processes that cut across jurisdictions and departments.

- NCAP misses addressing governance gaps directly. It introduces new committees at the central and state levels, and declares that individual ministries will 'institutionalise' action points in their charge. However, it does not specify what institutionalizing entails, and who would be held responsible if targets are not met, and what legal or financial implications would follow.

To strengthen the NCAP, there is a need to focus efforts on a prioritized shortlist of solutions in the short term, improve the enforcement capacity of the PCBs while increasing their accountability, and begin extensive consultations about governance reforms needed in the longer term. We elaborate on these below.

Prioritizing concrete actions

Given the number of sources that contribute to the problem, and the many mitigation efforts needed (several of which are included within NCAP), how do we prioritize policy efforts? Prioritizing solutions needs active consideration of the implementation capacity needed to introduce measures and enforce them. In addition, we need to ensure that the programme does not adversely impact vulnerable groups.

In particular, with dispersed sources of pollution, such as transportation, households, waste burning and construction dust, administrative solutions that require monitoring and enforcement are likely to fail. Instead, enforcement could work better for policy changes targeted at higher, more centralized levels, where possible. For instance, with vehicles, although there is a pollution control mechanism in place, several issues inhibit inspections from being a reliable way to keep the on-road fleet within standards. These include low rates of compliance among vehicle owners in getting tested and compromised inspections (poor calibration of testing equipment and corrupted inspection results). Policy changes aimed higher up in the manufacturing process, such as the requirement to comply with Bharat Stage VI norms, are likely to be better implemented.

Keeping these factors in mind, three key priority areas within the NCAP are identified below.

- **Power plant emission norms**

  India's formal regulatory infrastructure has traditionally focused on 'point sources', with good reason. Industries and power plants burning coal are the second and third largest sources in India (only behind the numerous but highly dispersed household sources of emissions), in terms of contributions to average national exposure to air pollution and the resultant burden of disease.[6] Power plants are the largest source of sulphur dioxide and a major source of nitrogen oxide. Sulphur and nitrogen oxides are key precursors that react with other substances to produce secondary particulate matter. MoEFCC introduced new emissions standards for power plants in 2015, which required the installation of pollution control equipment. Although the power plants were required to comply with these standards by 2017, the Central Pollution Control Board (CPCB) later announced that the compliance date had been pushed to 2022, as per a timeline prepared by the Central Electricity Authority. Ensuring that these

standards are complied with, and the requisite control equipment installed by this revised timeline, if not at an accelerated rate, is critical.

- **Revamp Ujjwala to increase LPG use**
  The Pradhan Mantri Ujjwala Yojana (Ujjwala) is an important initiative. While primarily an energy access programme, it has also tackled household solid fuel use, which is the largest contributor to pollution exposure in India. Ensuring universal continued usage of clean cooking fuels should therefore be a critical pillar of our air pollution control efforts. To facilitate continued usage of LPG, the government needs to ensure that prices are affordable for the beneficiaries, and in parallel, run campaigns to change behaviour and attitudes. This is unlikely to be a rapid transition, but some important first steps have been taken.

- **Invest in public transportation**
  Reducing transportation emissions would require a combination of ensuring easy access to affordable public and non-motorized transport, while simultaneously working on reducing emissions from the vehicles on the road. Investments in clean public transport can reduce transport emissions as well as make mobility easier and cheaper, thereby improving the quality of life in cities. Planning the public transit strategy for the long term is key.

Strengthening regulatory capacity

The formal air pollution regulatory architecture in India is built around the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, and rules and notifications issued under these. As per existing law, the state PCBs have very limited flexibility to take action proportional to the polluting activity.[7] Currently, they can send show cause notices, shut down industries through a closure notice or by shutting access to utilities, cancel regulatory consents, or initiate criminal prosecution by taking the industries to court. With court cases taking several years to reach any meaningful conclusion, PCBs rarely pursue this route, and restrict themselves to either a rap on the wrist through show cause notices, or shut down the industries – making enforcement expensive and ineffective.

Strengthening the ability of the PCBs to tackle point sources could provide a pathway to a broader reform process. In the long term, India needs a modern environment governance structure with teeth, nimbleness and resources to plan and drive a multi-sectoral strategy. NCAP is largely silent on how this structure could look, and on a road map for reforms. We outline below near-term and long-term milestones to strengthen regulatory capacity.

In the near term, PCBs must be resourced better, and in parallel, be made more accountable through disclosure efforts.

- *Increased resources of PCBs:* Human resources currently available in PCBs are not sufficient to meet their mandate. There is a need to rapidly expand their capacity, particularly on the technical side. In the short term, existing vacancies in the CPCB need to be filled with qualified people. Working with CPCB and the states, filling up vacancies in the state PCBs should be another area of priority. Increased staff resources should translate to increased inspections and monitoring.

- *Increased accountability through public disclosure of regulatory data:* The operations of the PCBs are extremely opaque, and it is unclear to the public where the big polluting sources are, and whether they are compliant with regulatory norms. Ensuring that PCBs release regulatory information (details of consents granted, inspections, online monitoring data, enforcement actions, etc.) into the public domain would make the industries and state PCBs more accountable to local communities, civil society and the media.

Longer-term reforms will require extensive dialogue; therefore, it is important for the government to start deliberations early. We outline below three broad elements for change that should be considered in the reforms process.

- *Remove legal barriers for effective enforcement:* There is a need for statutorily empowering PCBs so that they can initiate systematic and proportional responses to polluting activities. Amending the law to allow for a more diverse regulatory toolbox, which includes both existing powers and additional ones such as levying financial penalties, would increase the flexibility of the PCBs and make them more responsive.

- *Institutionalized airshed-level management:* Tackling air pollution effectively requires looking beyond administrative boundaries and focusing on reducing emissions across the 'airshed' over which pollutants disperse. This will need new modes of coordination across city and state administrations, and across line departments; it may also require the creation of new authorities with wider jurisdictions. Airshed level regulation will require a regulatory rethink and would involve extensive consultations which should commence on priority.

- *Development of a sector airshed approach:* The long-term strategy will need a careful application of sectoral approaches at the airshed level, or the national or state level, which utilize an appropriate combination of administrative, technical, economic and behavioural solutions.

4. Concluding Remarks

Air pollution is a complex problem, with multiple sources operating at different regional scales, under the jurisdictions of disparate agencies, and requiring a variety of mitigation measures. We need to unambiguously acknowledge the terrible impacts of air pollution on our health, move beyond the urban-centric approach, and tackle each of the big sources with a sense of urgency. The policy for tackling air pollution needs to shift from the reactive approach we have taken so far to one that is more systematic: focusing on some efforts in the near term, and beginning the process to reform our environment institutions to make them better resourced as well as more nimble and effective in the longer term.

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Regulatory Reforms to Address Environmental Non-Compliance

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In India, industrial, energy and infrastructural projects are legally mandated to seek environmental approvals under a range of central and state level laws such as the Environment Protection Act, 1986, Air (Prevention and Control of Pollution) Act, 1981, Water Prevention and Control of Pollution Act, 1981, and the Forest Conservation Act, 1980. Project approvals under these laws include environment and social safeguards or 'conditions', such as reducing the pollution load due to project operations, reforestation to make up for forest loss, and prohibition or limits on groundwater extraction. Projects are expected to comply with these safeguards during construction and through the period of operations. In case of mining projects, backfilling and ecological restoration of the land also form part of the safeguards. In effect, the purpose of conditional project approvals is to minimize and mitigate environmental and social harms caused by large projects.

During the first four decades of implementation of India's post-independence environmental laws, there was little or no emphasis on the status of compliance with conditions by projects. The focus was on the needs of the economy and national development on the one hand, and on the other hand, the social conflicts caused by land displacement. Even though legal clauses related to environmental compliance existed in these laws, projects operated with impunity, causing widespread degradation of the environment.

It is only in the last decade that environmental non-compliance by projects and the inability of existing institutions to enforce laws have come under the scanner. Since 2010, the office of the Comptroller and Auditor General (CAG) has produced environmental audit reports and reported on non-compliance. The courts have observed large-scale legal violations in spe-

cific sectors such as mining. Non-governmental studies have also recorded high rates of non-compliance.

Unable to brush the problem under the proverbial carpet, the government engaged in a series of hurriedly thought out mechanisms to deal with it. These include:

- Self-regulation through the use of pollution monitors or devices to capture and relay information on pollution and other performance indicators directly to pollution control board authorities

- Provisions for penalties, fines, bank guarantees and other financial disincentives based on the 'polluter pays' principle

- One-time amnesty schemes to violating projects and grant of short-term or temporary approvals to violators in an effort to bring them into compliance

But these measures have neither improved environmental performance of projects nor stemmed the flow of complaints and legal cases by affected people against polluting projects.

Why Should Compliance Be Addressed Urgently?

Robust and well-thought-out environmental compliance mechanisms are hardly seen as a necessity for India's development. In fact, governments have approached the idea of regulating projects as a liability and a drag on economic growth. They have been slow to implement existing regulations and selective enforcement has earned them the reputation of creating a 'license raj'. This can be seen in the Supreme Court's ongoing efforts to enforce the mandatory emission standards on coal power plants. Even though the standards have existed for several years as part of the consent permits issued under Air and Water Acts, the central government systematically dragged its feet on getting projects to comply with the norms.

Today, the impacts of unregulated projects have made it politically unfeasible for governments to ignore their effects on the economy and on people. The recent conflict due to the operations and proposed expansion of the Sterlite Copper Smelter in Tamil Nadu is a case in point.[1] The project was India's largest copper production plant but also causing toxic emissions, soil and water pollution. Despite numerous complaints and legal cases against the project's pollution, the company was allowed to continue its operations for 20 years. Last year, when the company sought permissions to expand its operations, there were massive local protests for over 100 days; they finally turned violent when the local police shot down 13 protestors. Sterlite also became a political flashpoint with the opposition party making it an important issue in their 2019 election campaign in the state.

There are numerous cases that are being litigated in court for non-compliance with environmental safeguards. These have resulted in huge financial implications for projects and for related economic sectors as a whole. The Goa mining case led to the total state-wide ban on mining since 2012. The National Green Tribunal imposed penalties of over INR 873 crores as fines for environmental violations in the first quarter of 2019 – an amount that is close to the total fines imposed last year.

Poor compliance causes critical environmental blowbacks in the form of severe water shortages, productivity losses and toxic air. While these conditions have been building up in most parts of the country, climate change dynamics add to these local conditions, making their impacts far more acute and complex. For example, areas already affected by large-scale water extraction for industrial purposes, coal washeries and thermal power plants could also face frequent and more lasting droughts. The visible effects of environmental impacts in eroding the positive gains of development have already caused a shift in mainstream economic thinking that traditionally ignored the economic cost of

degraded and damaged habitats. It is accepted that crisis management is hardly possible any more, and that there is a need to plan reforms and strategies for economic and environmental transformation. Environmental compliance systems will form a key part of these reforms.

The case for compliance as a bulwark of environmental regulation has never been more compelling than in the time of climate change. So far, the success or failure of compliance has revolved around the compulsions of domestic politics, but it is now tied to the geopolitics of climate change. After years of wrangling over who should do what to check global warming, nations finally thrashed out the Paris Agreement, which obliges every signatory to put in place, by 2020, a set of measures to meet their respective carbon mitigation targets. However, without a systemic and robust protocol to ensure compliance, India runs the risk of falling short of its targets. Therefore, it is imperative, not to mention politically expedient, for the political party coming to power after the 2019 general elections to set up, in the first place, a credible and effective mechanism of compliance with domestic regulations before it goes about honouring its Paris commitments.

Who Should Regulate Projects and How

Successive governments have emphasized the quantitative aspects of economic growth. They have focused on increasing the number of projects approved during their tenure and reducing the time needed for impact assessment and granting approvals. These projects have been accompanied by severe impacts as pollution and environmental degradation are viewed as the trade-off for growth. However, with over 16,000 centrally approved large projects operational and several others promised or in the pipeline, the scale of the problem has today expanded exponentially in both industrial and 'greenfield' or less industralized areas. The government can neither ignore nor delay tackling this problem. Compliance with environmental and social safeguards is a necessary if not sufficient condition to improve the quality of our economy's growth. The question, therefore, before the new government, will no longer be 'if' projects need to be regulated but of how to regulate and who will regulate. Given below are three sets of policy reforms with the potential to shift the government's approach to the problem of environmental compliance of projects and achieve better results.

Compliance-based approvals

Agencies implementing environmental laws view the procedures for grant of approvals as linear systems rather than cyclical ones. This problem is best illustrated by the number of flowcharts put out by them explaining these procedures. Compliance comes downstream in these processes and there is little room for feedback. Project performances on compliance almost never influence government decisions on project expansions, extensions or applications for permission by violating companies to set up projects in new areas. For example, the Kulda opencast mine operated by Mahanadi Coalfields in Sundargarh district of Odisha has violated several conditions of its approvals. Yet, it received approval for expansion and capacity addition twice in two years, for a period of one year each. The validity of environment clearances for mining projects is otherwise 30 years. This decision of the Expert Appraisal Committee (EAC) set up under the Environment Impact Assessment (EIA) notification, 2006, to review such projects was ad hoc, with no precedence and legal basis.

The lack of systemic mechanisms to address non-compliance in recent years has also created huge pressure on the bureaucracy to show legal compliance without affecting the financial status of ongoing operations. For this they have offered one-time amnesty to violating projects under the EIA, Coastal Regulation Zone and biodiversity laws. But these measures only improve the record of compliance on paper and not in reality. Now with so many projects already operational, it is crucial to place a very high bar on projects being granted approvals. The basis of regulatory procedures should shift from approvals

to compliance. Only those projects that have an established record of high compliance or which can surpass the compliance performance of others in the field, and certainly meet the legal standards, should be granted permits and approvals. The permissible standards for pollution are already pending major reforms. But these changes will prove futile if projects are not held to the highest compliance standards.

Third-party monitoring

The present practice of monitoring a project's compliance in effect involves two parties: the project proponent and the regulatory authority. This system has so far not been able to address the problem of non-compliance and has instead led to concerns of collusion and corruption. A review of this practice has resulted in recommendations that monitoring should be done by an independent third party. The environment ministry proposed an amendment to the EIA notification in September 2018 to include this recommendation. This is yet to be finalized. The 'third party' proposed in this amendment is expert government institutions.

In reality, the genuine 'third party' in this context is the communities who experience effects of non-compliance such as loss of livelihoods, poor living conditions and displacement. Although they have the greatest stake in remedying the damages caused by non-compliance, they are nowhere in the picture when project monitoring is done. This is contradictory to the participatory turn in environmental governance in several countries since the 1970s and the constitutional mandate for it in India. Data from our research on cases of environmental non-compliance in four states shows that when communities have been involved in collection of evidence, reporting of violations and official monitoring by regulators, environmental compliance can improve significantly. Their participation also helps regulators understand community priorities for remedial actions. Regulatory bodies in these states are beginning to recognize the benefits of community participation and are more open to including communities in procedures such as site visits conducted by them for monitoring.

But practices that foster community participation ¬– such as social audits of projects (which provide access to monitoring data and formal spaces for interaction with affected people) – are yet to be systematized in environment regulation.

Integrated regional networks for compliance

India's environment regulations have largely been implemented with a project-centric approach. Approvals are granted to projects after their impact studies, cost-benefit analysis and environment management plans are assessed by regulatory bodies. These assessments routinely understate the potential impacts of projects, making them seem benign or operations whose impacts can be easily mitigated. Such assessments also generate quicker approvals from regulatory bodies, thus helping to meet the government's economic growth targets. For long, activists and experts have demanded cumulative impact studies so that the full range of project impacts can be ascertained prior to the grant of approvals. But such comprehensive studies have been done only in a few cases. Cumulative studies are needed not just at project levels but also for regions that are affected by environmental degradation.

Similarly, a project-based monitoring system is resource intensive and not very effective in terms of the overall outcomes. But if regulators could be reorganized as integrated regional networks, they could use the resources available to them more efficiently to improve environmental standards regionally. Multiple regulatory agencies within the concerned region could pool their expertise and human resources towards coordinated responses. Such a mechanism can bring an inter-displinary approach to compliance monitoring. The regions identified for such integration could cut across administrative boundaries such as districts or states. It could be at the level of large industrial sites like Special Economic Zones (SEZs) with multiple projects operating within them, metropolitan regions, entire districts or geographical regions already identified as critically polluted, or entire airsheds or river basins.

Although envisaged by law, such a regional approach to environmental governance has only been used in a few cases. It has been used in emergency responses to environmental pollution, such as the moratorium on industrial activity in Vapi, Gujarat, or the ban on mining in Goa. But a regional approach to systematically improve post-approval compliance of projects has not been envisaged. This is mainly because compliance with safeguards has rarely been the focus of regulation and institutional reforms to improve environmental compliance have never been on the government agenda. The ministry could develop pilots to understand the optimum scale at which such integrated compliance networks could deliver the most effective results. Given that the scale of the effects of non-compliance is such that they are no longer restricted to project areas, a regional approach is needed to improve the outcomes of regulation.

Conclusion

Environmental compliance is a critical part of environment regulation. While regulatory actions have prioritized economic growth for several decades, the costs of environmental degradation due to industrial and developmental projects are no longer possible to ignore. These issues have become politically and economically salient in recent years. This paper makes three sets of recommendations for how environment regulation can approach the issue of persistent and pervasive non- compliance by projects. These reforms are critical to avoid the costly and harmful disruptions of development.

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