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The Adaptation Wedge: Capacity-Building Scenarios for India’s Cities

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ABSTRACT
The increasing frequency and severity of floods, heat waves, and storm surges impacting global cities, combined with the growing morbidity in public health, necessitates prompt and effective climate action. Adaptation and mitigation require adequate and appropriate institutional, technical, and societal capacities—all of which are in short supply in most low- and middle-income country cities that are experiencing growth while suffering vulnerabilities. Although national governments are alerted to climate risk and the imperatives of planning, financing, and managing climate transitions, their responses to capacity constraints and approaches to capacity building display neither urgency nor scale. We use a scenario-building methodology to examine this crisis in the context of cities in India. We review the literature and draw upon personal experiences in capacity building, policymaking, and practice to highlight the underestimation of scale and complexity of adaptive capacity required by India’s cities. We discuss systemic barriers that prevent cities from accessing the required human and financial resources, ranging from the seemingly innocuous, such as language, to the profoundly challenging, such as scant knowledge of climate communication in civil society and community-based organizations. Other barriers include the reluctance of local universities to engage with messy real-world problems and India’s protectionist stance on trade in green services. Drawing on the analysis of gaps and barriers, we project a disruptive scenario whereby cities proactively leverage networks and partnerships to augment their adaptive capacities, especially in planning and finance, partly by using city labs that form vital bridges between global expertise and local demand. We describe the potential of information and communication technologies and digital platforms to inform the policies and institutional structures required for capacity building and also catalyze a vibrant ecosystem of resources available to cities in need. We conclude by suggesting that such networks, by seamlessly and speedily connecting

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global expertise to local action, serve the common interests of the entire
global community.

KEY WORDS  Adaptation; Capacity Building; Cities; Ecosystems; Infrastructure

In a recent working paper (Chateau et al. 2023), the International Monetary Fund (IMF) presents a range of critical policy trade-offs that will determine whether India can deliver on its intent to achieve decarbonization of the economy by 2070, a nationally determined contribution (NDC) goal that it announced at COP26 in Glasgow. India needs to factor in the possible rise in government expenditure, the costs associated with prevailing distortions in the economy, and the new types of jobs required to achieve transitions in five most critical sectors: power, industrial, transport, residential, and agriculture. India will also have to protect its population from the impacts on public health caused by environmental pollution because “those activities that drive climate change globally also tend to be significant producers of pollution locally.” The paper notes the grim estimation by India’s National Health Authority that climate change will cause about 250,000 additional deaths per year between 2030 and 2050 because of malnutrition, malaria, diarrhea, and heat stress. The authors cite new research showing that, because of pollution in 2019, premature deaths and morbidity caused US$28.8 billion and US$8 billion, respectively, in output loss, “with the poorest disproportionately affected.” They conclude that “any delays in transitioning from the current emissions path towards a more sustainable one will increase costs and decrease cumulative benefits.”

To illustrate the imperative for India to pursue critical policy trade-offs, the IMF uses a graph (Figure 1) showing the rising trajectory of greenhouse gas emissions if India follows “business as usual” (BAU) to achieve its key NDC target: 45% reduction in emissions intensity (relative to 2005) by 2030. The authors add an “illustrative path” to show the downward deflection toward net zero emissions by 2070 if the deflection begins in 2022 and is sustained.

The deflection of India’s emissions trajectory, the departure from BAU, would represent an increase in decarbonization efforts across the whole of government and all sectors of the economy, involving increasing numbers of actors and increasing scope and scale of actions with every passing year. The scope and complexity of these efforts has been described in detail in India’s most recent Biennial Update Report (BUR) submitted to the United Nations Framework Convention on Climate Change (UNFCC), which also states candidly that “the capacity-building needs expressed by India through the national reporting process to the Convention since 2004 are still relevant but remain mostly unmet and continue to multiply” (MOEFCC 2021). In a 500-page document, this blink-and-you-miss-it statement on page 381 is emblematic of the routine way in which the issue of capacity building receives lip service in many countries. India’s BUR admits that “capacity building is one of the primary requirements for achieving the objectives of the Convention,” but presents as response that “government programs invariably have a component on capacity building/training/awareness creation” and describes a panoply of
workshops and seminars and training sessions funded by bilateral and multilateral organizations to substantiate effort.

**Figure 1. Business as Usual (BAU) and Deflection Toward Net Zero**

![Graph showing BAU and Net Zero emissions](image)

*Note:* BAU = business as usual; NDC = nationally determined contribution; NZE2070 = net zero emissions by 2070.

*Source:* Chateau et al. (2023).

This paper originates from the author’s long-standing observation that capacity building receives routine mention and mundane treatment in global discourse on climate adaptation whereas it is a critical factor and binding constraint that deserves greater attention. The author’s interest in writing the paper was triggered by the mention on page 384 in India’s BUR, in a list of “significant achievements” of the National Mission on Strategic Knowledge for Climate Change, an activity with which he was closely associated and which he found to be unproductive and without impact.¹ The passing mention of capacity building in the BUR—about 5 pages of a 500-page document—suggests that the subject continues to be given short shrift. This lack of attention is pervasive in climate discourse. The NDC Stocktake by the UNFCC finds that “75 per cent of Parties identified capacity-building as a prerequisite for NDC implementation” and lists the activities of “training, education, upskilling, awareness-raising, research, innovation, development, and providing incentives and support to businesses and entrepreneurs” to describe the response to the “prerequisite” (UNFCC 2023b). Similarly, the stocktake of each country’s long-term low-emissions development strategy (LT-LEDS) also mentions that “capacity-building was deemed crucial to the implementation of the LT-LEDS operational strategy” and notes that the parties include “education and training, entrepreneurship, awareness-raising and transfer of know-how” among “a broad range of capacity-building measures” (UNFCC 2023a).
Capacity building is a difficult area for research and action. Although it is routinely measured by numbers of activities, neither the knowledge nor the skills produced because of capacity building are measured and monitored. The critical role of capacity in the success of development programs globally was highlighted by the World Bank in 2009, when it published the Capacity Development Results Framework as a “sorely needed” guide to assist all stakeholders to address “the lack of clear definitions, coherent conceptual frameworks, and effective monitoring of results” that pervade capacity-development work (Otoo, Agapitova, and Behrens 2009). The World Bank noted that, despite the widespread agreement on the general principles of effective capacity development, “the results of efforts to develop capacity have persistently fallen short of expectations.”

This paper considers capacity building as an exhaustive process that begins with identification of needs and concludes with confirmation that capacity-building efforts have had the required impact. We recognize capacity building as a critical requirement for the success of India’s efforts to decouple its development from BAU. Adequate and appropriate capacity must be available in all institutions, sectors, and actors to implement and support decarbonization. Adaptive capacity is required for all critical trade-offs mentioned by the IMF, including improving the quality of government expenditure, reducing the costs associated with prevailing distortions in the economy and shifting to “green” jobs. Working on this premise, decoupling presents a challenging scenario for India, wherein the difference between the BAU trajectory and the deflection to net zero is affected by the availability and quality of national and subnational capacities. We describe the world of decarbonization efforts by drawing attention to the region of the graph (Figure 2) between the BAU and net zero pathways and call it the adaptation wedge, which consists of the entire range of decarbonization activities that together function as the force of deflection.

Figure 2. The Adaptation Wedge

Note: BAU=business as usual; NDC=nationally determined contribution; NZE2070=net zero emissions by 2070.
We discuss this scenario in the context of India’s urbanization, which is a defining trend of India’s development and growth and, as such, poses a key challenge for decarbonization. The successful implementation of policies and programs for low-emissions urban development as envisaged by India in its LT-LEDS would define the prospect of the adaptation wedge.

Excluded from our discussion is the issue of developing innovative and indigenized technologies for net zero, such as “moon-shot technologies” in offshore wind, green hydrogen, and energy storage systems. It is sufficient to note, however, that even in technologies for decarbonization, capacity constraints pose an acknowledged but hard-to-assess risk. A recent attempt at assessing the opportunity uses a model\(^2\) that assumes “a reduction in technology costs via local deployment due to enhanced learnings in the industry and supported local innovation over and above the projected reduction in global technology costs over time.” The authors note, however, that the model “does not provide insight into soft costs for developing research and development infrastructure along with capacity building efforts” (Jerome et al. 2023). This limitation in the model illustrates how capacity constraints continue to evade action.

**INDIAN CITIES: NEGLECTED FRONTLINES FOR CLIMATE ACTION**

India’s cities are demand generators as well as outcomes of the country’s transitions in energy, digital technology, agriculture, industry, and transportation planning that are driving the growth in the Indian economy. Cities are nodes in an integrated economy that connects producers to consumers and farms to forks through supply chains (Ernst & Young 2020). They function as growth hubs, demand generators, and suppliers of innovation, skills, and finance for India’s development transitions, but aged and inadequate infrastructure, poorly delivered municipal services, and constrained local finances make them highly vulnerable to cascading risks. Cities offer better health, nutrition, education, and access to drinking water and sanitation facilities than do rural areas (Sridhar 2016). They attract migrants who enrich the workforce but are denied easy access to housing and services, contributing to unregulated growth on the peripheries and further burdening the environment and already-strained public infrastructure and services.

The urban population has grown by more than 250 million people since 1991, the year when India commenced liberalization of its economy. By 2036, India is expected to add another 344 million people to its urban areas, accounting for 70% of the overall increase of the country’s population and accounting for more than 70% of the jobs (Agarwal 2020). The ten fastest-growing cities in the world are all located in India (Coalition for Urban Transitions 2021). Although the overall rate\(^3\) of urbanization in India is lower than for other low- and middle-income countries and South Asia, it is averaged across a crowded landscape of 7935 towns, cities, and urban agglomerations, ranging from populations of five thousand to more than twenty million, with the smallest towns proliferating the most and mostly without municipal administration.

In 2016, the World Bank described India’s urbanization as “messy” and “hidden,” considering its unplanned and unregulated nature and the underestimation caused by a distorted official definition of what is urban (Ellis and Roberts 2016). The environmental
impacts of such a messy growth trajectory will naturally affect the domestic population and economy the most, but the knock-on effects will be felt globally. According to India’s LT-LEDS released at COP27 in Sharm-al-Sheikh in 2022, “It is estimated that 75% of India’s GDP in 2030 will be generated from urban regions [and] a major part of India’s emissions are from cities” (MOEFCC 2022). India’s emissions footprint is expected to expand over the coming decades as India closes its infrastructure gaps, upgrades old infrastructure, and provides energy, housing, and services to the urban population. Its emissions are expected to increase by 50% by 2040, the highest by any country (Busby et al. 2021).

In 2018, India contributed about 7% to global carbon dioxide emissions from fuel combustion, the third highest worldwide after China (28%) and the United States (15%), but its per capita emissions are one third of China’s and one tenth of the United States’ emissions (Union of Concerned Scientists 2023), an outcome of its demography providing a large denominator as well as the frugal life led by the average Indian citizen. Although these current differentials and the promotion of behavior change through Mission LiFE (Lifestyles for Environment)⁴ may create room for India to deflect its emissions trajectory, mitigation will be sustained over the next few decades only if the various sectors of the economy are progressively decarbonized and made resilient to the hazards and shocks related to the climate, which can cause losses and damages that wipe out the gains from mitigation. Adaptation is an imperative for India because its development trajectory relies on urbanization and the economies of agglomeration. The country must push the adaptation wedge harder, forcing a faster and more decisive deflection of the emissions curve. This imperative is made more urgent by the risks faced by India’s cities.

Unprecedented rainfall and flooding caused devastating floods in Chennai in 2015, costing US$3 billion in losses to India’s economy. Extreme weather events in 2019 cost the country an estimated US$69 billion (Eckstein, Künzel, and Schäfer). Climate change has forced fourteen million people to migrate in 2021 (Nandi 2020). Air pollution from coal-fired power plants, seasonal crop burning, construction dust, and automobile emissions claimed 1.67 million lives and 1.4% of GDP in 2019 (Busby et al. 2021). Three-fourths of India’s population is exposed to high- to medium-hazard risks, of which a third are in about five hundred cities (Jain and Bazaz n.d.). More than eighty million people living in informal settlements are particularly vulnerable during extreme hazard events because of the “accumulation of risks” that they face because of limited resources to cope with frequent low-intensity losses in the past, thus creating “a vicious cycle of poverty and disaster risk” (IPCC 2012).

India’s action on adaptation has been slow even as it demonstrated at COP26 that it was the only G20 economy on track to achieve its NDCs. It formulated a National Action Plan on Climate Change in 2008, but only half of India’s 53 million-plus cities, which host more than 40% of the urban population and more than 13% of the overall population, have prepared adaptation plans, and even those are limited to sector-specific projects addressing singular risks, thus missing the opportunity to capture co-benefits (Singh et al. 2021). Poor urban planning has been identified as a major cause of hazards such as water scarcity (G 2019) and flooding (Singh and Upmanyu), but it is equally evident in the inferior quality of housing neighborhoods and open spaces and in the difficult access to schools and healthcare facilities and public transportation.
India has been described as a “reluctant urbaniser” (Puri and Shah 2018) because of the primacy accorded to agriculture as the driver of the national economy. Cities faced neglect for close to seven decades until 2014, when the government formed by the Bhartiya Janta Party created an assertive rhetoric around urbanization, committing unprecedented levels of public funding to urban development. Whereas the first ambitious urban program, the National Urban Renewal Mission of 2005, had focused on 64 cities and committed US$20 billion over eight years, the Modi government claims to have spent in six years (2015–2021) eight times what was spent in the preceding decade (2004–2014; Business Standard 2021); however, although the main urban programs were launched for completion within five years, they were given extended timelines for completion in almost double that time. Furthermore, the outcomes and impacts of these huge investments will remain moot because, as per the G20’s Global Infrastructure Hub (GIH, n.d.), India “does not undertake post-completion reviews for infrastructure projects” which “could help determine whether projects have achieved their objectives efficiently and identify areas of improvement.”

The GIH’s findings resonate with a recent analysis of India’s urban programs that highlights capacity challenges as a core concern and risk for urban development. The paper notes that Indian cities implement diverse programs through “overlapping authorities and administrative powers” (Bhatt and Roychoudhury 2024). Although the main programs, the Smart Cities Mission, the Atal Mission for Rejuvenation and Urban Transformation, Housing for All, Swacch Bharat Mission (Clean India Mission), and Digital India, have corresponding organizational structures and funds, there is no perceptible convergence of these programs on the ground. . . . Coupled with the lack of capacity and capability at the municipal level, this often results in a lack of collaboration. ULBs [urban local bodies] and city and state governments have seldom focused on building such skill sets, and the lack of expertise has led to project delays. (Bhatt and Roychoudhury 2024:379–80)

Capacity constraints make the execution of programs inefficient and working at cross-purposes, “leading to duplication, bureaucratic delays, and mission creep” (Bhatt and Roychoudhury 2024:379). In addition to inefficient implementation, capacity constraints also manifest in the deficient quality of India’s infrastructure, which the GIH rates as a humbling 68.1 on a scale of 100. Deficient quality can have a deleterious effect on adaptation measures and the value for money that India can extract from spending on resilient future-proofed infrastructure, which “returns four dollar worth of benefit for every dollar invested” (World Bank 2019). India needs to reap the “triple dividend” that accrues from climate adaptation—the avoidance of losses, the induced economic and development benefits, and the social and environmental co-benefits of adaptation actions—but needs to secure its strategy for enhancing adaptive capacities, especially because the second and third dividends, the economic, social, and environmental gains from adaptation, “accrue regardless of whether the actual climate risk materializes” (Heubaum et al. 2022). The
likelihood of reaping the triple dividend is limited further by the chronic challenges facing the infrastructure sector in India.

INDIA’S INFRASTRUCTURE CHALLENGE

A study by McKinsey & Company published in 2009 identified “inefficient project execution” as a key contributor to the poor progress of infrastructure creation in India and the cause of a cumulative loss of 10% of GDP between 2008 and 2017 (Gupta, Gupta, and Netze 2009). The study found that “major bottlenecks” were caused by the fact that “provider skills are weak across the value chain,” mentioning the “below-par design and engineering skills” and “weak risk management skills.” More than a decade after this seemingly harsh assessment by McKinsey, the issues of capacity constraints and mission creep recur in the context of the National Infrastructure Pipeline (NIP), through which India seeks to develop 6,835 projects across all infrastructure sectors, including 17% in the urban sector, with an estimated expenditure of US$1.4 trillion between 2020 and 2025. The World Bank (2022) has estimated that India’s cities will require US$55 billion per annum, consistent with the NIP’s annual estimates but required for an extended time of 15 years. Quarterly status reports on the progress of the NIP are prepared by the Infrastructure and Project Monitoring Division of the Ministry of Statistics and Program Implementation. The report for the September–December 2022 quarter for “Projects costing US$20 million & above” finds that of 1,575 projects—comprising 1,130 “major” projects, each costing between US$20 million and US$135 million, and 445 “mega” projects, each costing about US$135 million and above—893 were delayed and 396 had accumulated cost overruns of US$61.75 billion, amounting to 21.42% of their sanctioned cost.

The reasons cited for delays are well known and have an endemic character: delays in obtaining approvals, licenses, permissions, and right-of-way for the execution of works; delays in land acquisition and access to project sites; and difficulties in local operations. The reasons for cost overruns include price increases and inflation, changes in exchange rates and duties and taxes, changes in scope of projects, underestimation of original cost, spiraling land-acquisition costs, and delays in the tendering and ordering and supply of equipment. Mission creep is also evident in the concurrent listing of 5,678 “non-NIP” projects by the Department for Industrial Policy & Promotion, including 3,573 “stressed assets” that are under the purview of the Insolvency & Bankruptcy Code of 2016, of which 2,645 are ready for new investors.

Poor project planning and execution are symptomatic of a deeper malaise, a lack of attention to consequences and an unwillingness to take account of risks, characteristic of techno-financial subcultures that thrive in regimes of low accountability and transparency. The inefficient execution of the NIP reflects the lack of appropriate capacity in the infrastructure sector, jeopardizing India’s development and its growth ambitions. While the NIP is sufficient reason for India to place higher stakes on capacity building, it is critical that India build a strategy for creating the adaptation wedge, the capacity to sustain low-carbon infrastructure development, retrofitting, and operations and maintenance for the next several decades. A unified approach is essential for developing and sustaining infrastructural assets and services. The challenge is compounded by two additional factors.
First is that, in the Indian context, the economic and developmental outcomes targeted by the national government may not be aligned with the motivations of the state and local governments that enjoy significant autonomy in matters related to land management, district and local administration, and various material and financial aspects of infrastructure development. Second, India’s commitment to net zero by 2070 implies that the infrastructure development must drive growth in new ways, ensuring low carbon transitions in energy, industry, agriculture, transportation, and urbanization.

**ADAPTIVE CAPACITY MATTERS FOR INDIA**

India’s climate response has been a subject of expanding domestic attention since 2004, when India submitted its first National Communication (NATCOM) to the UNFCC, prepared after a two-year-long deliberative process involving a comprehensive list of national and subnational departments of government, research organizations, and experts (MOEFCC 2004). The NATCOM captured India’s comprehensive stocktaking at the end of a decade following the establishment of the Framework Convention in 1992. As per Article 6 of the Convention, governments were committed to “educate, empower and engage all stakeholders and major groups on policies relating to climate change” (UNFCC n.d.). These commitments were iterated in the Kyoto Protocol of 1997, and the capacity-building agenda has been repeatedly affirmed and strengthened through adoption of Frameworks for Capacity Building in 2001, the Durban Forum for Capacity Building in 2011, and the subsequent launch of the Capacity-Building Portal in 2012. The Paris Agreement of 2015 introduced Article 11 and called on all countries to define their capacity-building–related goals and guiding principles and set the procedural obligations. Developed countries were asked to support capacity building in developing countries and developing countries Parties “to regularly communicate progress on implementing capacity-building plans, policies, actions or measures.” The Conference of Parties also endorsed Article 12, which “recognizes the importance of climate change education, training, public awareness, public participation and public access to information.” A Paris Committee on Capacity-Building was established at COP 21, and the commitment to capacity building has been iterated at every subsequent occasion. The work on laying down frameworks, protocols, procedures, and indicators continues unabated, having reached a stage where the monitoring and evaluation of capacity-building efforts is being refined (Brooks and Adger n.d.).

It might seem from the plethora of documents regarding capacity building produced since 1992 under the UNFCC and by the Intergovernmental Panel on Climate Change (IPCC) and numerous other multilateral agencies and international bodies and organizations that the adaptation wedge is a reality, that India and other countries have taken the required actions to build the necessary capacity for effective climate transition. That this constraint does not receive any mention in the IMF’s recent assessment of India’s net zero challenges could indicate either of two scenarios: one, that the IMF does not consider capacity as a constraint, or two, that the IMF assumes India will make all the required efforts for building capacity and thus the constraint does not need highlighting. The latter seems unlikely, given that BAU is producing a carbon-intensive trajectory and
that the infrastructure and urban sectors are delivering poor outcomes. It is most likely that, while capacity building has been repeatedly mentioned as a need, it has received limited attention and the official statements of intent have not translated into actions.

India’s NATCOM is replete with references to the capacity building required for all actors in the economy, identifying a key constraint in India’s efforts to reduce its carbon footprint; however, two decades after the NATCOM, India’s LT-LEDS of 2022 contains several identical averments that spell out an expectation that the international community should fund the adaptive capacity required by India, in addition to the required finance and technology transfer: “From a global carbon equity perspective, India is justified in seeking that developed countries undertake early net-zero, well before 2050, by investing heavily in negative emissions, and providing adequate climate finance, technology transfer and capacity building support” (MOEFCC 2022).

The onus placed on the developed countries is remarkable when compared with the self-confidence expressed in the NATCOM in 2004, especially because India has made significant achievements in mitigation through solar energy generation, energy efficiency, and promotion of electric vehicles, albeit the results of innovation in procurement and industrial policy, not the adaptations that result from improved and distributed capabilities. The LT-LEDS repeatedly mentions the triad of finance, technology transfer, and capacity building as obligations that the developed countries must fulfill and the necessary conditions for the adaptation and resilience building that must be undertaken “to maintain India’s development gains and human development outcomes and sustain its growth and development.” It can be surmised that the linking of India’s sustainable development with foreign assistance could be a tactic to support the larger agenda of developing countries at COP 27, the demand for a loss-and-damage fund, which has recently been realized at COP 28 in Dubai; however, although the tactic achieved geopolitical goals, it does not constitute an approach to fulfilling the need for adaptive capacity within the country. It perpetuates the lack of attention to capacity building for climate action that characterizes a more entrenched attitude.

The National Institute for Transforming India (NITI Aayog) undertook a highly significant initiative in 2020 by convening deliberations with an advisory committee comprising prominent experts concerned with urban planning and capacity building and publishing a report of their findings in September 2021, titled *Reforms in Urban Planning Capacity in India*. The report was a first-of-its-kind appraisal of the need for improving the supply of urban planners who can deal with the complex and challenging task of planning Indian cities, which have mostly grown in an unplanned manner. The report sets the context by acknowledging that the infrastructure of many Indian cities and towns is under “immense stress” because of “unregulatable development” (NITI Aayog 2021:2). The report mentions climate change and poverty as additional stresses.

The advisory committee focused its attention on the creation of a supply chain of urban planning professionals from public- and private-sector educational institutions while it “noted that there are numerous other challenges in urban sector such as weak finances in ULBs, infrastructural shortages, impacts of climate change, lack of regional planning, weaknesses in land record management and asset management etc.” (NITI Aayog 2021:29).
When juxtaposed with the LT-LEDS report, which includes the issues of urban planning, urban design, municipal administration, and allied issues as relevant to achieving low-carbon development, the NITI Aayog report reveals the lack of foresight in failing to recognize that urban planning is the most critical enabler of adaptation, and again highlights a telling feature of India’s climate response: the silos in which different ministries and departments operate and the resulting lack of coordinated response to an issue that poses risks for India’s development.

BUILDING THE ADAPTATION WEDGE

The adaptation wedge needed by India is not unique. Other low- and middle-income countries may have similar trajectories. What sets India apart is the size and scale of the wedge described by the divergence between the BAU trajectory and the transformation needed to achieve net zero. Adaptation and mitigation require adequate and appropriate institutional, technical, and societal capacities—all of which are in short supply in most low- and middle-income country cities that are experiencing growth while suffering vulnerabilities. We explore a few of the most obvious scenarios that India must consider in securing the adaptive capacities that it needs, fully recognizing that India is not the only national government whose response to capacity constraints and approach to capacity building “display[s] neither urgency nor scale” (OECD 2021).

Scenario 1: Limited Capacities (BAU)

We have already discussed the severely risky scenario that is BAU, also known as the do-nothing scenario. It is clearly untenable, and hugely risky, for India to allow the costs of inaction to mount at the rate that we have witnessed in the case of the NIP. The significant economic loss due to the opportunity costs of unbuilt infrastructure is compounded by the social costs linked to climate refugees and the impoverishment of those who are vulnerable to the impacts of climate change.

Scenario 2: Incremental Capacity Building

India can also ill afford the incremental capacity-building efforts that are currently ongoing without forming a coherent and coordinated response to the challenge of low carbon growth. These efforts are scattered across numerous departments of government and are usually managed by Indian think tanks and nongovernmental organizations funded by philanthropy. Governments in India have not invested in the creation of any mechanism that creates a unified and consistent strategy for building adaptive capacity and improving the delivery of infrastructure and the management of urban development. This scenario is also untenable.

Scenario 3: Transforming Capacity

We return to the prospect that we mentioned in the introduction—that India’s cities can become enablers of decarbonization—and we describe a scenario of transformation rather
than of inaction or incrementalism. We describe four imperatives for transforming the adaptive capacities in the country.

The first imperative is to recognize the potential for targeted and strategic investments in capacity building that can become a resource for the entire country. These investments need to be made in locations that offer the potential for scaling up, usually an outcome of investments in universities and centers of excellence. Lest these become mere academic centers, it is important to select locations that have vibrant economic activity and concentrations of skilled and talented human resources. An analysis of India’s economic geography in 2014 has shown that eight high-performing states will account for 52% and forty-nine metropolitan clusters in 183 districts will account for about 77% of India’s incremental GDP growth from 2012 to 2025. These clusters will also have 73% of India’s income pool (McKinsey & Company 2014). Cities are a vehicle for mainstreaming climate action into all sectors of the economy, as centers of innovation that support start-ups that create hundreds of thousands of jobs in sectors as diverse as construction, green technology, and agriculture (Mani 2021). Such cities are the drivers of regional economies and are the magnets for migration and investment. Different states also respond differently to climate change, but diverse states are also home to diverse cities with vastly different carbon footprints (ICLEI-South Asia and British High Commission n.d.) and levels of resilience, often because of the building technologies in use locally. Though successful cities may be in regions that are languishing, the adaptation wedge can induce transformation in their economies by introducing green businesses and industries and training the local youth for green jobs. There is already evidence of such transformation in some regions of India.

The second imperative is to make capacity-building efforts relevant to the specific risks that motivate actors to build the adaptation wedges they need to deflect the growth trajectory in their specific contexts. Capacity building must create an understanding in all local actors about the need to understand and assess the risks they face, including the obvious loss and damage associated with assets and economic operations but also extending to the risks of reputational damage and failures of policies, markets, and technologies. Capacity building must target the understanding and skills required for scenario planning, life-cycle analysis, and ecosystem-wide risk management (Slade 2020).

The third imperative is to leverage innovation ecosystems, bringing together the combined power of local governments, business and industry, institutions, and civic communities. This “quadruple helix” has been illustrated in the blueprint of a digital National Urban Innovation Stack prepared by the Ministry of Housing and Urban Affairs of the Government of India in 2019. In the IPCC’s Sixth Assessment Report, the Working Group III on Urban Systems and Other Settlements has recommended that local governments should explore partnerships with other governments, networks, and stakeholders in order to tap the resources they need for their local projects (IPCC 2022). Such ecosystems—which can also be described as city labs—are also necessary to cover the full scope and potential for capacity building, which is currently limited to intermittent and uncoordinated events. In August 2023, the European Climate Adaptation Platform (Climate ADAPT) described the full breadth of capacity building for adaptation, which should comprise the following activities:
• Education (e.g., through schools, universities, and other education service providers)
• Training (e.g., courses, seminars, webinars, and e-learning)
• Networking (e.g., conferences, workshops, sharing platforms, communities of practice, and networks of excellence); specific coaching
• Technical assistance (e.g., expert missions and twinning)
• Attention of groups at risk

A recent research study regarding the learning needs of small- and medium-sized municipalities around the globe—also the bulk of India’s cities—finds that their understanding of the challenges and barriers of climate change adaptation “remains limited” (Fila, Fünfgeld, and Dahlmann 2023). They will therefore require the full breadth of capacity building, and given their limited resources, an ecosystems approach will be necessary. The Capacity Building Commission set up in 2021 has initiated a nationwide mapping of functions, roles, activities, and competencies required by all officers of government working at all levels of government in India. Once this activity is completed, it will provide information about the cohorts that require capacity building for infrastructure and urban development. Mapping the capacities of the private sector will remain a challenge, but new methods are emerging, such as the listing of suppliers of “green” services on the government e-marketplace. A quick sampling shows that, for example, 40 suppliers have registered to provide the service “Achieving Climate Action Targets.” There are other listings of suppliers for conducting water and energy audits and suchlike services.

The fourth imperative is to create the project-preparation facilities that have the capabilities required to design and deliver the infrastructure projects that can enhance India’s productivity and, consequently, its economic growth. Such facilities are required in all states of India and all metropolitan cities. This will entail a comprehensive stocktaking of the national and state-level capacities, institutional delivery mechanisms, and private-sector capabilities. A roundtable discussion between infrastructure experts organized at COP26 in 2021 concluded with the realization that new capacities will be required in every part of the product-delivery ecosystem to deliver large and complex projects “rapidly, cost effectively, and with a low carbon footprint.” To meet the heightened quality demands of investors, “owners or operators and engineering, construction, and specialty service providers will need to undertake organizational transformations” (McKinsey & Company 2022). Similar conclusions were reached by another roundtable that focused on decarbonizing the built environment. The G20 Global Infrastructure Hub’s “Infrastructure Monitor 2021” noted that “the bankability of an infrastructure project is mostly determined at the project-preparation stage and in almost all regions there is a need to improve project preparation capability. This is particularly the case in low-income countries.” This is particularly important because the costs related to project preparation are rising constantly because of new regulatory, technological, and ESG (environmental, social, and governance) requirements. Although the multilateral development banks have increased their support for project-preparation facilities in emerging economies since 2015, these are
usually tied to their lending programs. There is no recourse for countries like India but to focus attention on domestic needs and to support such facilities through domestic funds.

CONCLUSION

The defining characteristic of a wedge is the acute angle through which its force is fully exerted. In the case of India’s emissions trajectory as depicted on a graph, the wedge marks a notional departure from business as usual. The wedge is, as such, a forceful combination of many such points of departure and innovation. It is formed of many wedges united by a fractal logic.

The adaptation wedge whose shape and size we have attempted to describe in this paper is meant as a metaphor for inspiring action on a subject that deserves much greater attention from researchers, institutions, and all organizations engaged in the broadly defined pursuit of human development, of which cities are an inseparable part. As centers of learning and innovation, universities are adaptation wedges by their nature, their impact deriving from their ability to respond to new needs and foster the innovations in knowledge, processes, and technologies that can cater to those needs.

Universities can initiate three actions that can immediately serve the larger causes and imperatives that have been described in this paper. First is to increase the numbers of professors of practice that bring the necessary balance of field experience to the scholarship that defines places of learning. Second, they should take the lead in establishing quality standards for professionals and scholars who must proliferate across the world to create the adaptation wedge. A lesson can be learnt from the alacrity with which the Association of Climate Change Officers (ACCO) has been created in the United States. The ACCO has already introduced the Certified Climate Change Professional (CC-P) credentialing system, an excellent example of the professional self-regulation and accreditation that maintains standards, advances best practice, and serves public interest. Third, universities need to form more, and more effective and productive, international networks that can move knowledge faster across borders. All universities should consider establishing transformation centers that become the vehicles for providing handholding through networks to all parts of the decarbonizing world. They can be the staging grounds for experimentation and, because many are in cities, can treat their host cities as test beds. Universities can choose to be the cutting edges or the fulcrums for the adaptation wedge; in either case, they must perform a seminal role in the transformation of sustainable and resilient cities.

NOTES

1. In 2018, the author chaired the Global Technology Watch Group on Sustainable Habitat, which was one of eight sectoral groups convened to produce reports presented at COP26. Not a single report is available on any website of the Indian government.

2. Energy Policy Simulator is a system dynamics model adapted for India in collaboration with Energy Innovation LLC and World Resources Institute India.

https://scholar.valpo.edu/mssj
DOI: 10.22543/2766-0796.1146
4. Mission LiFE was added to India’s updated NDC in August 2022 and is called a “mass movement” in the LT-LEDS.
5. Using a conversion rate in November 2023, whereby one crore Indian rupees (INR) equals roughly US$133,514.

REFERENCES


nSVC/DownloadWatermarkedAttachment/attach_import_a8477af4-1d6a-442f-
af2f-7e7b02e5c31%3F%3D377433eng.pdf&updateUrl=updateUrl7576&ark=/
ark%3A/48223/pf0000377433/PDF/377433eng.pdf.multi&fullScreen=true&local
e=en#page=626.


