

Economic Resilience of Cities in a Changing Climate

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KEY MESSAGES

Adaptation to climate risks is an emerging concern in Indian cities.

The evidence generated so far suggests that Business as Usual (BAU) is not an option for achieving urban economic resilience in the context of a changing climate.

Active and innovative adaptation, and mitigation, is good for growth, and it is crucial for climate security



The Challenge of Climate Action

Rapid urbanization: we are currently adding over a billion people to urban areas every 13 years, a majority of them in China and India.

- * 90% of the world's GDP is generated in urban areas (Solecki, Seto et al 2013).
- * India already generates 60% of its GDP in cities where 377 million of its people live.
- * Between the upcoming 12th and 15th Five year Plans, 75% of India's GDP and 70% of net new jobs are projected to come from cities (HPEC 2011, McKinsey).
- * The competitiveness of the national economy depends on the competitiveness of India's cities and the sustainability of the urban process.

Growing pressures of climate change: With their high population density, inbuilt socio-economic vulnerabilities, ad-hoc planning, high levels of energy consumption and emissions ---

cities both contribute to, and are deeply vulnerable to, the effects of climate change: rising temperatures, precipitation, sea level rise, water scarcity, and so on

Neglecting the threats of climate change will be costly for economic growth and climate safety.

E.g., one recent estimate by the World Bank suggests that environmental degradation costs India \$80 billion per year, or 5.7% of GDP

(resources that could be directed towards providing jobs and pulling people out of poverty)

Who is likely to act on climate adaptation and under what conditions?

Result 1: Uncertainty in Climate Science and Downscaling to City Scales is a Source of Resistance to Climate Action

- Clarity on how climate impacts impinge on cities is lacking
- City specific climate models needed
- Downscaling of results from models at the national level is rare

- In the face of concrete everyday demands for local services, climate threats are therefore seen as distant, vague and costly – a strain on already limited resources.

Policy Takeaways

- *Make regular collection of economic and climate relevant data at the city level mandatory.*
- *Create city level climate cells with funding, training, and a seat at the table*
- *Tie JnNURM –II to the development of City Climate Adaptation and Mitigation plans linked to CDPs.*
- *Support cities in developing meaningful plans through city-University-Community linkages that is backed by meaningful incentives.*

Result 2: Differences in Climate Consciousness between Gradual and Sudden Onset Impacts can Shape Adaptive Responses (and Need to be Planned For)

- Cities with experience of repeated sudden onset climate related extreme events are more amenable to climate action (e.g. Surat)
- Gradual onset of climate impacts leads to surprises when policy makers are confronted with an escalation of a known hazard. This leads to a much more costly adaptation process for the city after the fact.
 - E.g. the gradual submergence of low-lying areas on Mattancherry is not new; but the recent worsening of the situation by increasing incidence of rainfall has caught the government and residents off-guard.

Policy Takeaways

- *Differences in climate consciousness between gradual and sudden onset impacts of climate risks shape adaptive responses – at the city level as well as at the level of individual firms and establishments*
- *A short term focus and poor planning can lock in urban assets leading to many investments being stranded and others being stretched beyond their capacity.*
- *Climate aware, strategic planning can pay economic dividends today and lower the cost of adjustment over time.*

Key to better adaptation

Result 3: Prudent Investment as well as Good Governance are Key to Better Adaptation

- A city's preparedness determines the extent of its' exposure to climate related risks. Resilience can be augmented both through proactive policies as well as by smart infrastructural investments
- The common perception that climate investment is an additional burden on local government budgets is not always true, particularly for adaption

Policy Takeaways

- *Unbundling and leveraging existing complementarities between provision of urban services and climate resilience can lower costs and generate co-benefits*
- *Careful balance between strong administrative wing at the city level and large scale participation, as well linkage between different scales of government is imp*
- *Strategic and smart investment in low carbon transportation and water networks, and ensuring their security, is crucial to urban resilience. Effective land use and energy demand management are additional elements of resilient growth*

How Does Urban Form Influence Climate Security?

Result 4: Urban form can influence both economic productivity and the cost of climate security

There is widespread agreement that compact, mixed land-use, short-commute cities supported by transit oriented development and strategic, efficient and affordable public transit are smarter in terms of economic performance, resource use, and energy efficiency

What is the evidence from Indian cities?

- Urban form different in Surat and Pune
- Nature of migration different
- Mixed –use compact city vs. polycentric form

Policy Takeaways

- ***The benefits of mixed use, compact, high FSI, cities via a smaller ecological and transportation footprint are not automatic.***
- *Supportive policies – such as adequate green cover, effective transit and a strategic connection between land-use and transportation planning – are needed to reap the ecological benefits of compact growth.*



Result 5: A City's Climate and Economic Security Cannot be Limited to City Boundaries

- **Food, water and mobility security depend crucially upon urban, peri-urban and rural linkages**
 - Example: Surat's flooding linked to forces outside the city (Ukai dam and the intensity of precipitation in the related catchment area)
 - The most effective response to flood management was the End-to-End Early Warning System (EEEWS) which linked Surat municipality with the Ukai Dam management.
 - Case in point: the successful containment of the 2013 floods.

Policy takeaways

- *Urban adaptation mechanisms, in order to be effective, need to extend beyond city limits to other nested spatial, administrative and institutional scales.*
- *Redundancy, overlap and inter-institutional, inter-state networks are crucial to building the information systems that will help plan for and launch effective responses to achieving climate security.*

Some Costs and Benefits of Urban Adaptation

Result 6: Industrial Structure and Industrial Risks: When do firms act?

- If left to the market, firm level adaptation to climate threats are likely to be uneven.
- Firms, like cities, respond selectively to climate risks and primarily when threats impact high value investments and output.
- One of the most neglected industrial risks relates to industrial disasters (chemical spills etc) during extreme events. There are few standards that currently secure these assets in the face of climate threats.

Policy Takeaways

- *Political incentives, Information, technology and awareness can create space for innovation and entrepreneurship in the area of industrial adaptation in cities.*
- *Higher value industries and higher value added activities within firms are the first to be protected, leaving lower value functions and labor-intensive segments more exposed to climate risks. This creates a strong case for public action.*
- *Specific regulations and standards are needed to prevent urban industrial disasters related to toxic spills and other accidents in the context of climate change.*

Result 7: Negative Impact of Rising Temperatures on Industrial Output

Little is understood about how climate impacts industrial productivity, and if it does, little is known through what mechanisms the effects are channeled.

- Our interim results show that rising temperatures have a significant negative impact on industrial output via the channel of worker productivity.
- National data show that worker output falls on average by 2% per degree rise in temperature on hot days.
- In the case of particular industries, in particular places (weaving in Surat), the effect is even higher: In Surat's weaving industry, worker productivity falls by up to 4.5% per degree Celsius on hot days.

Policy Takeaways

- *A greater understanding is needed of how climate threats impact industrial and economic output.*
- *Our early results show that integrated climate models that draw only on agricultural and health, might underestimate the economic costs of climate change.*

Result 8: Climate Adaptation and Public Health Co-Benefits: Negative impact on health and increased risk of disease

- Cities face an increased risk of disease in the facing of rising temperature and humidity. The benefits of adaptation or per person costs saved (including losses averted), when aggregated across the exposed population city-wide, outweighs the cost of adaptation

Policy Takeaways

- *Climate change induced probable increases in temperatures and rainfall are likely to have public health consequences, notably by increasing the disease window in several Indian cities*
- *Policy action will be needed to deal with this growing human and economic risk*