

# A Missing Variable in India's Urban Bet



Clockwise from the left:  
Amit Kapoor & Meenakshi Ajith

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**HERE IS SOMETHING** quite remarkable about the moment India finds itself in, urbanistically speaking. There is a renewed interest in cities, with budgets and initiatives aiming to address a full spectrum of issues. Urban infrastructure spending has grown substantially, and the political will to treat cities as serious engines of national growth rather than afterthoughts appears more durable than it has in a long time. Yet, a major blind spot runs beneath all of it. Literally.

## Delhi, Mumbai, Chennai, Kolkata & Bengaluru Sinking

The earth beneath Delhi, Mumbai, Chennai, Kolkata and Bengaluru is actively sinking. Recent research using eight years of satellite radar data across Delhi NCR, Mumbai, Chennai, Kolkata, and Bengaluru which together hold nearly 80 million people found that 878 square kilometres of urban land is actively subsiding. Nearly 1.9 million residents live in zones sinking at more than four millimetres a year. Over 2,400 buildings across Delhi, Mumbai, and Chennai are already at high risk of structural damage. If trends hold over fifty years, that number could cross 23,000.

India is not alone in this phenomenon of 'sinking cities'. The World Economic Forum, in its report on *Resilient Economies in 2025*, estimated that land subsidence affects two billion people worldwide, with economic exposure of \$8.17 trillion. Without significant mitigation investment, flood risks driven by sinking land alone could cost coastal cities \$635 billion a year by 2050. This is not an unsolvable problem, but cities worldwide have consistently underestimated it because

subsidence progresses gradually and invisibly, masking its true scale until critical thresholds are crossed and the consequences become severe. By then, the ground and much of what was built on it may already be beyond recovery.

## Lessons from the Past

The good news is that land subsidence is a problem that cities have solved before, and the lesson from the cities that have managed it well is less about technology or money than about sequencing: infrastructure investment and groundwater governance need to move together, not separately.

Tokyo is the most instructive example. By the late 1960s, parts of the city were sinking at up to 24 centimetres a year, a direct consequence of the unchecked industrial groundwater extraction that had accompanied Japan's post-war economic miracle. The response was to regulate what was being taken from the ground while simultaneously expanding above-ground infrastructure with strict legislation on groundwater use and a systematic shift to surface water supply, mandatory green roofs and rainwater infiltration

Photographs by Naval Kishor



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systems. Within decades, subsidence rates slowed dramatically, and Tokyo is now held up as the global benchmark for what coordinated urban resilience looks like.

Shanghai also followed a similar logic. A 2013 municipal regulation set a strict annual subsidence cap of six millimetres, required geotechnical risk assessments before new construction in vulnerable zones, and mandated cross-departmental monitoring of ground deformation as a condition of continued development.

The city's average annual subsidence rate is now reported at five millimetres. While it is not zero, subsidence is still managed, measured, and built into

planning. What both cities share is something India's current framework lacks which is a formal loop between what is built above ground and what is happening beneath it.

## Groundwater as a Private Asset

The gap is partly legal and partly institutional. The Indian Easements Act of 1882 was never substantively reformed, and it treats groundwater as a private asset tied to land ownership. Under Section 7(g), whoever owns the surface holds a broadly unrestricted right to extract whatever lies beneath it. The consequence, multiplied across millions of urban borewells, is an aquifer system under extraordinary stress.

Only about 14 per cent of India's overexploited groundwater blocks are officially notified for regulatory purposes as per World Bank. The Model Groundwater Bill, which would have reframed groundwater as a common pool resource, was proposed in 2017. State adoption remains slow. The recently approved Urban Challenge Fund (UCF) asks cities to demonstrate economic, social, and climate outcomes. It asks for revenue mobilisation plans and third-party KPI verification.

It does not require a hydrogeological assessment before construction, nor any post-completion monitoring of ground deformation beneath funded



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infrastructure. India's building regulations address soil stability at the design and construction phase. Once a project is complete, there is no formal mechanism to track whether the ground beneath it is moving.

Once again, the good news is that India now has the tools to address this issue effectively. The NISAR, which is the joint NASA-ISRO synthetic aperture radar satellite, operational since January 2026 can detect surface movement at centimetre-level precision every 12 days, in any weather, at national scale. India can monitor what is happening beneath its cities in real time. With this data and infrastructure investment,

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#### **Subsidence Monitoring**

Initiatives like UCF could, without significant structural change, build subsidence monitoring into its project KPIs requiring baseline geotechnical assessments before construction and periodic satellite-based ground deformation reviews over each project's operational life. The World Bank and Asian Development Bank, both of which released new urban knowledge frameworks for India in the past year, have pointed toward exactly this kind of integration.

Cities like Tokyo and Shanghai did not solve subsidence by spending more. They solved it by governing more carefully by insisting that what happened underground was as much a matter of public concern as what rose above it. India has the science, the satellite data, and the evidence from cities that have navigated this before.

The question is whether the ambition being invested in urban infrastructure will extend to the ground it is being built on. **BW**

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*Amit Kapoor is Chair, Institute for Competitiveness and Meenakshi Ajith is development policy lead, Institute for Competitiveness*