A STUDY OF BANGALORE’S WATER CRISIS: KEY FINDINGS AND POLICY SUGGESTIONS

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University of Minnesota, May 2019

This policy brief summarizes the findings and analysis of a study on water governance in Bangalore, India and offers recommendations to curb the negative impact of urban expansion on the city’s water distribution networks. Today, the Bangalore Water Supply and Sewerage Board (BWSSB) pumps around 1,500 million litres of water per day from the Cauvery river (Rajashekh, 2015). This is distributed unevenly across the city and fails to meet current water demand. Rampant groundwater extraction, a private market of water vendors, and the destruction of Bangalore’s many water bodies, characterizes the precarious water infrastructure of the city. A lack of sufficient water supply is a key reason agriculture has become untenable for many small farmers on the city’s fringe, enabling the government and developers to acquire and convert peripheral rural land into the expanding urban real estate market. Urban expansion onto the agrarian landscape - fields, forest and pasture commons, complex water-catchment system – has undermined water-intensive agrarian livelihoods as well as important avenues of recharge. This intensifies the prevailing insufficiencies surrounding water supply and access.

KEY FINDINGS

- Bangalore has experienced water shortages for many decades, but only recently have the conditions deteriorated so severely that most officials and experts now call it a severe water crisis.

- Urban expansion has led to an increasing reliance on imported river water from the Cauvery 100 kilometres away, the over-tapping of groundwater supplies, and the drying up of and encroachment upon local water bodies.

- The pollution and concretization of Bangalore’s surface water bodies has destroyed complex water catchment systems that are necessary to replenish aquifers and maintain rural and urban ecologies and livelihoods.
Based on our interviews, we find that a lack of water for agricultural purposes on the urban periphery makes it easier for land brokers, government agencies, and private developers to acquire agrarian land and encroach upon rural-maintained water systems. In other words, the water problem contributes to agriculture’s decline as a viable livelihood and makes farmers more reliant on land brokers. In turn, the expansion of urban development into rural area puts increasing stress on the urban water system.

THE RESEARCH

This research project sought to historicize Bangalore’s contemporary water crisis and investigate rapid urbanization and acute water shortage within the context of global-city making. Findings are based on in-depth interviews with researchers, activists, and bureaucrats on questions of water management and governance, and with farmers and brokers of land and water on livelihood conditions, water usage, and land acquisition and conversion. Members of the research team have been studying the transformation of the city’s northern periphery since 2008 using document analysis, expert interviews, and field visits. This policy brief draws from this larger study as well as targeted interviews conducted in 2016-2017.

HISTORICAL OVERVIEW

- Bangalore sits on a dry plateau far from south India’s major river systems. When the British military arrived in the late 1700s, they expanded the existing system of small lakes and canals to capture seasonal monsoon rains. Two major reservoirs were constructed in the late 1800s and early 1900s, catalyzing a period of urban growth for Bangalore.

- In the 1970s, a World Bank loan helped construct a power intensive pump-and-delivery system from the Cauvery river more than 100 kilometers away. This shift to importing river water resulted in the neglect of the complex locally maintained reservoirs, lake, and canal system.

- During the early 2000s, the population of Bangalore increased dramatically. The 2011 census shows that in ten years, the city had grown by 47 percent in area and population density increased from 2,985 to 4,378 people per square kilometer. With the crippling of Bangalore’s water tank infrastructure, the over-dependence on scarce supplies from the Cauvery river, and the depletion of groundwater aquifers across the rural periphery invites us to rethink Bangalore’s history, its changing socio-ecological basis, and the varied forms of governance practices.

- Officials of the state bureaucracy acknowledge the water crisis in their districts, but at the same time promote urban expansion projects that require rural land and ecosystem conversion. Interviews with villagers on the northern periphery show that the water problems make farmers more willing to part with their land and see their livelihood as untenable. In interviews, officials acknowledge their efforts to turn Bangalore into a global city are not feasible in terms of ecological and social sustainability. Key informants, land brokers and candid bureaucrats describe how the conversion of agrarian land into urban and peri-urban real estate has become an end in itself, rather than a serious effort at “development. Field visits to research sites over a period of eight years show very little construction and few industries have been set up.
THREE FRAMES

Based on primary and secondary research we developed three frames to analyze Bangalore’s water ecosystems.

**Catchment-based**: Characterized by decentralized but networked water tanks, lakes and channels. Until the 1960s, the city sustained itself on the basis of its local tank-and-channel waterscape. This decentralized network does not cohere as an official infrastructure but is constituted by dissimilar water bodies constructed informally over hundreds of years. It includes natural and human made lakes and take as well as channels, riverlets, and open wells. There were approximately 20,000 reservoirs, lakes, and tanks in and around Bangalore in the mid-nineteenth century (Nagendra, 2016). Until the city developed a formal public water infrastructure in the 1960s, these disparate catchments were the sole source of water.

*Credit: Sudhira HS*

The map above shows the dense and decentralized terrain of surface water in Bangalore in the pre-independence era.
Centralized-imported: Post-independence Bangalore emerged as a hub of government funded public-sector industries. The water flowing from the local system of networked tanks and wells and the two major reservoirs constructed in the colonial era (Hesaraghatta and Tippagondanahalli) with their Arkavathy river base became insufficient for these expanded industries and were replaced by a second water regime, one of imported water pumped from the Cauvery river which today supports only 50% of the city’s water needs. By one estimate, if averaged across the population, the city’s residents would have access to 75 liters per capita per day (LPDC), which falls short of the 150-200 LPDC regarded as an international standard for a metropolitan city such as Bangalore (Raj 2013).

Crisis-driven: The third regime emerged after the Indian economy liberalized in 1991 and has been shaped by the imperatives of global-city making. Bangalore went through an intense period of expansion, driven by the boom in the software industry. Over time The city’s original catchment-based water infrastructure was damaged, replaced by an unequally distributed water system privileging elite users and drawn from the Cauvery river unable to keep up with demand. Interviews and analysis of secondary sources show that this lack of public water has propelled an unregulated groundwater extraction industry, managed by competing water vendors who are exhausting the water aquifers across the region. Private water vendors engage in the rampant digging of borewells which has led to the depletion of ground water. In 2015, 105,500 private bore wells were officially registered, while over 200,000 bore wells were estimated to be unregistered (Basu, 2015). The mining department compared withdrawal and recharge and found that groundwater is being overdrawn by 378% (Basu, 2015). We find that water tables in key research sites have fallen. 

Photo credit: Devika Narayan 2017
A NEW POLICY FOCUS

Urban expansion and lack of planning has occurred with little consideration of Bangalore’s precarious water sources and ecosystems. The desire for urban real estate by elites and investors has overshadowed the need for sustainable water provisioning and agrarian social justice. The policy focus on expensive and unsustainable Cauvery water can be tempered by creating a new emphasis on the complex regional waterscape once constructed and maintained to allow for the development of the 19th century and 20th century city. This also requires a new social-justice approach to small farmers and villagers once responsible for management and protection of the rural water commons, people who struggle to cope with the hollowing out of the agrarian economy.

The pollution and destruction of Bangalore tank-and-channel networks has impaired complex ecosystems vital to the replenishment of aquifers. Policy initiatives must respond to social movement demands to address the illegal dumping of waste and pollution into lakes, encroachment onto lake beds, construction over water channels, and the conversion of watersheds into speculative urban real estate.

An integrated, holistic approach to Bangalore water infrastructure would involve:

- Systematic lake restoration
- Protecting vegetation and enforcing land use regulation
- A comprehensive sewage management infrastructure
- A long-term vision for groundwater management
- Strict penalties against institutional polluters (including culpable government agencies)
- A social justice agenda that prioritizes the needs of displaced and surviving low-caste farmers and villagers who should be central to any plans for the reinvigoration of hydrological infrastructure and ecological landscapes.

For a more detailed analysis of the findings of this study please see: Goldman & Narayan, 2019.
References


