

## One man's effort to reclaim the Garden City

A possible solution to the ecological nightmare that Bengaluru has become lies in the mini-forest nurtured by T.V. Ramachandra on the campus of the Indian Institute of Sciences



Bengaluru grew at a faster pace than any other Indian city in the last decade, reaching a population of roughly 9.5 million in 2011 from 6.5 million in 2001. Photo: AFP

**Bengaluru:** The year was 2010.

T.V. Ramachandra was in his Center for Ecological Studies (CES) office at the Indian Institute of Sciences (IISc) when he received a death threat on the phone. The caller said he wouldn't see daylight the next day.

Ramachandra had just been to an unused quarry site in South Bengaluru's Anekal area to study how the municipal body was illegally dumping the city's garbage on rural suburbs, creating landfills and associated ecological problems and minting money for garbage-removal contractors and local politicians.

The professor's response to the caller was to point out that he was a scientist and he already knew that the next day would be dark and cloudy so there wasn't much of a chance of seeing the sun the next day.

"It's important to be patient and sane in this big city because there are a lot of senseless things happening in the name of development," Ramachandra, 45, said, walking towards a corner of the IISc campus

where he has created a two-hectare forest from scratch.

Ramachandra is one of a set of green warriors who have been valiantly trying to be sane in Bengaluru, a city that is in many ways an ecological nightmare.

Today's Bengaluru is a far cry from the "Garden City" it once was—a pensioner's paradise. Bengaluru grew at a faster pace than any other Indian city in the last decade, reaching a population of roughly 9.5 million in 2011 from 6.5 million in 2001.

One consequence of the unfettered growth has been Bengaluru's steady drop in livability indices, accompanied by inexorable environmental degradation.

The city's roads are in a state of gridlock. The level of respirable suspended particulate matter (RSPM) in the city's air exceeded the national permissible level by a range of 12% to 283% at 13 out of its 15 air monitoring stations in 2014-15. Its concrete area increased by 1005% from 1973 to 2016 and its green cover shrank 66%. The number of lakes in the city has dropped from 900 to around 150; they contain more sewage than water.

In a city where people didn't have to think twice before drinking water straight from its water bodies, 59% of tap water is not potable because it contains 19% *Escherichia coli* (E-coli) bacteria.

Bengaluru has paid the price for decades of rapid, unplanned urbanisation.

The leafy, sprawling canopy of trees in Ramachandra's mini-forest on the IISc campus makes for a welcome refuge from the sweltering heat of the city where, on the roads, vehicles jostle for space amid the concrete pillars of an elevated train system.

Ramachandra talks about how the mini forest came about.

"It was a scrub jungle full of parthenium weed. The idea was to see whether the urban soil of Bengaluru will allow us to grow some of the tree species endemic to the Western Ghats and thus conserve some native woodland trees," said Ramachandra.

"Once the land was granted, we took 49 species from our research stations in the Western Ghats and an additional 500 saplings from our own nursery. In the next 10 years, it became the big forest as you can see now," he said, standing below a gigantic woody liana climber that is usually found only in the rainforests.

Not just the climber, the mini forest is home to many exotic species of plants and birds rarely found beyond the Ghats, including four families of the slender loris, a small, slow-moving nocturnal primate protected under the Indian laws.

The campus, which used to get groundwater at 150 ft deep earlier, now receives water even from 15 ft beneath the surface, said the professor. The forest has also had an impact on the micro climate inside the campus, reducing the temperature by two degree Celsius, he said.

The model can be replicated anywhere across Bengaluru, he claims. M.A. Khan, principal of KK High School in Varthur, one of the most polluted areas in the city, agrees.

After his students created a variant of the mini forest at the school, the water table in the school has shot up to 450 feet, even as the rest of Varthur region is still at 1,000 feet, says Khan.

Ramachandra was born in an agrarian family which migrated to Bengaluru from Uttara Kannada district in search of a job. His developed an interest in nature when he spent his school vacations in his ancestral village close to the forests of the Ghats.

During one such vacation, his sister, who was living with his aunt, died suddenly.

"She passed away a while after returning from school one day. We still don't know how. Perhaps she had some poisoned fruits from the forests. It shocked me to learn that nature can punish one mercilessly," said Ramachandra.

His faith in nature was put to the test again when a large number of fish perished in the city's Sankey lake in 1992. The episode led him to focus on Bengaluru's lakes, and study the effects of urban sprawl.

After procuring a B.Tech degree in electrical engineering from CMS college in Bengaluru, Ramachandra enrolled for an integrated PhD programme at IISc. The focus of the programme was to develop an ecologically sound energy plan for certain protected regions in the Ghats. He has been with the institute since then, and is now the head of the Center for Ecological Studies.

In the following years, Ramachandra published several reports which shed light on various aspects of the crumbling city. From his 2004 study report on encroachment of Sankey lake bed to a 2014 analysis on Agara Bellandur wetland ecosystem, his reports have found their way to newspapers, sparked heated debates in courtrooms and triggered administrative action against private companies and government institutions guilty of violating rules.

"His story is actually the story of eternally vigilant citizen groups, academicians and activists rising up against a rapacious intent of real estate builders to kill Bengaluru as we know it," said V. Ravichandar, an urban expert who was brought in by the government last July to suggest ways to improve the city's governance.

Ramachandra's latest study—a visualization of the future of the city taking into account the remote sensing data of growth in the last few decades—says 94% of Bengaluru will be concretized by 2020.

"Bengaluru is a classic example of senseless development. By 2020, the city will be still here, without the air or the water," he says.

Worse, about 10 other cities including Chennai are going the same way, he says. Clearly, what Bengaluru is suffering today, India will be suffering tomorrow, says Ramachandra.

"What Bengaluru has witnessed is not development. Bengaluru's transition to Bengaluru, increasing its spatial extent from 310 sq. km to 741 sq. km, without any sort of holistic planning, is a classic example of unrealistic, unplanned, tragic urbanization. We should not allow our cities to develop like this," he says.

"I have seen a Bengaluru which was greener. Decades ago, I was afraid to go to the city's Whitefield area because it was an isolated patch of dense forest," he said. "Now I fear to go there because of pollution."