



ClimateResilientCITIES Action Plan - Coimbatore

Climate resilience refers to the capacity of socio-ecological systems to maintain function in the face of climate change stresses and enhance sustainability through mitigation and adaptation actions.

Cities consume over two-thirds of the world's energy and account for more than 70% of global CO₂ emissions. With cities projected to house over 60 % of the global population by 2030, the carbon footprint of cities is only going to increase. Planning for urban resilience should reconsider carbon intensive activities and propose not only mitigation actions that reduce emission sources but also those that help the city to adapt to the challenges of climate change, such as sea level rise, temperature changes, precipitation changes or extreme events.

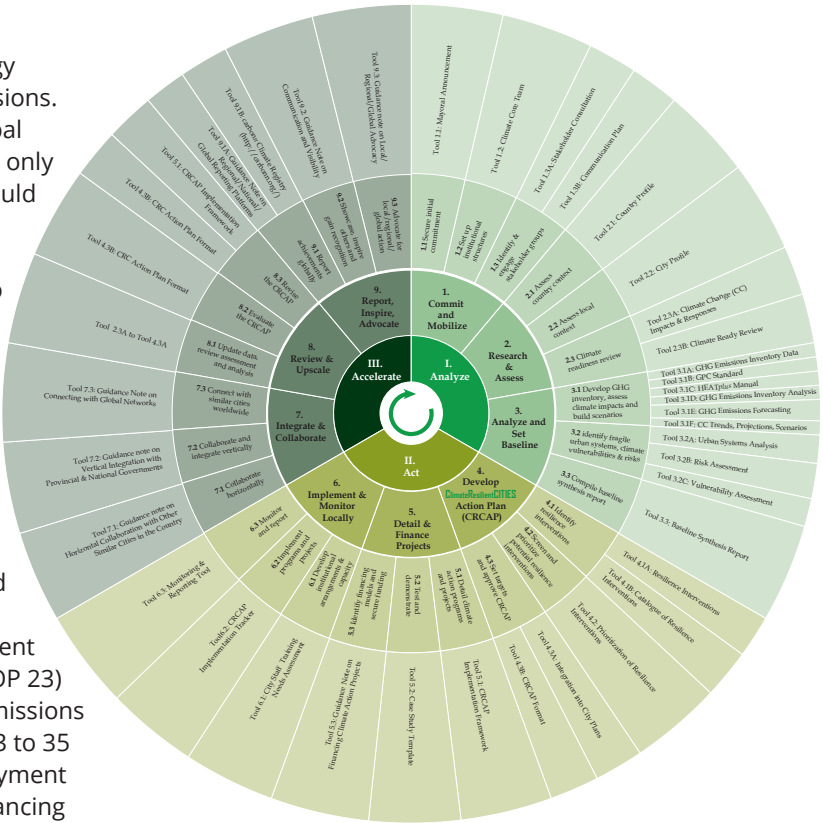
India is a rapidly urbanizing country. Urban India accounted for 11.4% of the country's population in 1901. This had increased to 28.53% in 2001 and exceeded 30% in 2011, standing at 31.16% in 2018. The Indian national government is committed to Greenhouse Gas (GHG) emissions reduction and ensuring sustainable urban development. Subsequent to the Conference of Parties on Climate Change (COP 23) at Paris, India has determined to reduce its GHG emissions intensity — GHG emissions per unit of GDP — by 33 to 35 per cent below 2005 levels by the year 2030. Deployment of renewable energy, promoting clean energy, enhancing energy efficiency, climate resilient urban development, sustainable transportation and increasing forest cover to create additional carbon sinks are some of the proposed actions.

In line with national priorities, the CapaCITIES project also aims to strengthen the capacities of Indian cities to identify, plan and implement measures for reducing GHG emissions and for enhancing resilience to climate change in an integrated manner.

Methodology

The ClimateResilientCITIES methodology is an action planning process tailor made for local governments, providing step by step guidance for the development of a Climate Resilient City Action Plan that addresses both climate change adaptation and climate change mitigation. This process builds on ICLEI's Cities for Climate Protection (CCP) campaign, ICLEI's flagship mitigation program, the GreenClimateCities (GCC) program and ICLEI's adaptation toolkit, the ICLEI Asian Climate Change Resilience Network

(ACCCRN) Process or IAP toolkit. This ClimateResilientCITIES methodology, shown below, is implemented in all the four project cities.



ClimateResilientCITIES Methodology

The City of Coimbatore

Coimbatore is the second largest city in Tamil Nadu, with a population in excess of 1.5 million (2017), covering an area of 257 sq. km. The city is situated on the banks of Noyyal river, surrounded by the Western Ghats. It is one of the fastest growing cities in India and is a major hub for textiles, industries, commerce, education, information technology and manufacturing. There are a number of cotton production and textile industries located in and around the city, giving it the name of 'Manchester of South India'.

Population:	1,050,721 (2011 Census of India)
Area:	257 sq. km.
No of Wards:	100 wards
Gender Ratio:	997/1000 males
Literacy rate:	91%

Climate Resilient City Action Plan for Coimbatore

The Climate Resilient City Action Plan has been developed for the city, through the CapaCITIES project. It includes both mitigation and adaptation measures.

Vulnerability Assessment

The baseline situation analysis of the urban systems in the city has been carried out in Coimbatore. Vulnerability of each of these systems to climate change impacts of increase in temperature and increase in precipitation, were assessed and climate risk was analysed. Water, landuse, sewerage, solid waste and transport were identified as the vulnerable urban systems. Vulnerability of wards and actors was analysed for each of these urban systems. Vulnerability maps were then prepared and overlayed together to identify the vulnerability hotspots.

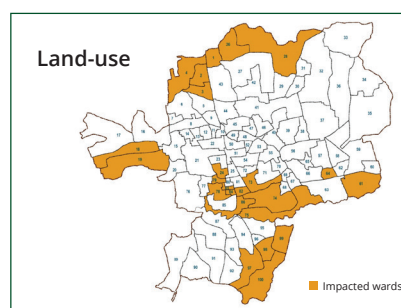
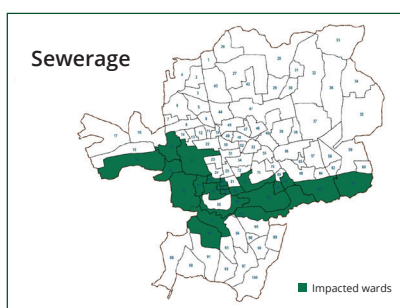
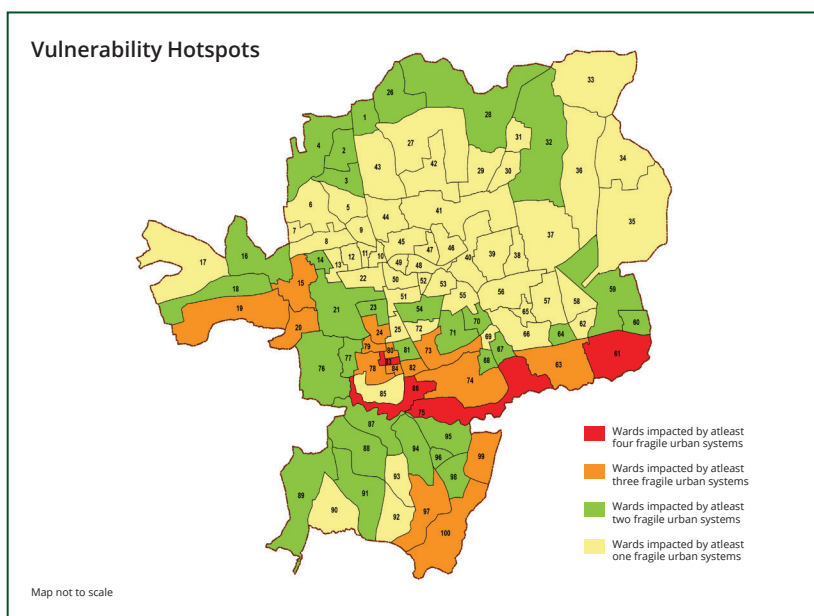
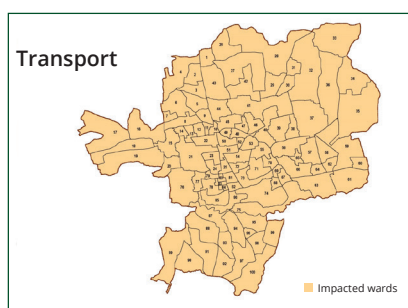
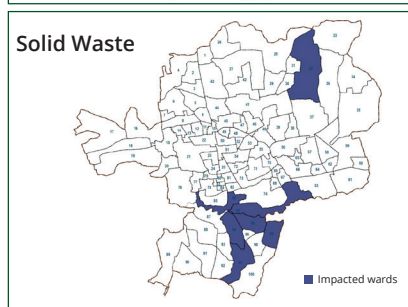
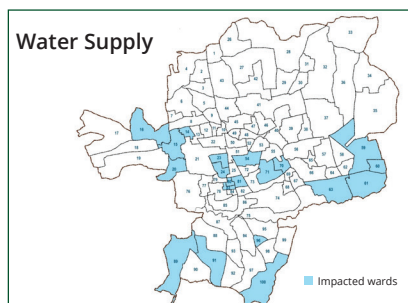
Climate Projections: Coimbatore will see an increase in average maximum temperature by 3.3°C; increase in average minimum temperature by 3.4°C by the end of the century and increase in rainfall upto 0.5% by 2050, with increasing frequency of short duration high intensity rainfall.

Climate risk and vulnerability assessment of fragile urban systems in Coimbatore

Fragile Urban Systems	Climate Risks	Climate Fragility Statements	Risk*
 (Water)		- There will be increase in demand of water. This will lead to more ground water extraction lowering ground water table - GDP, economy (industry and agriculture) and health will be impacted	Extreme
 (Land-use)		- Change in green-blue cover in the city will change the micro-climate - Increased heat island effects will lead to impacts on health, food and cattle feed production	High
 (Sewerage)		Overflow of sewage lines and dilution of waste water will impact efficient of waste water treatment	Extreme
 (Solid Waste)		Decomposition rates in treatment facilities will be affected impacting ecosystems, increasing GHG emissions, odour, sanitation and health issues	High
 (Transport)		Private vehicular volume will increase, increasing the temperature and emissions	High

* Risk Score (likelihood x consequence) – Low: 1-4; Medium: 5-10; High: 11-20; Extreme: 20-25

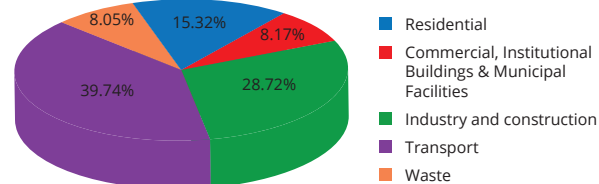
 temperature increase;  rainfall increase



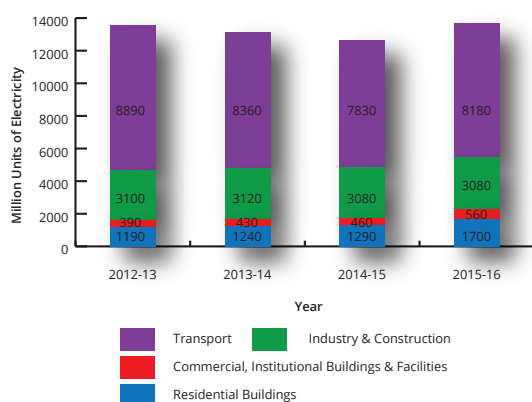
GHG Emissions Inventory

Economy-wide GHG emissions inventories for the city were developed for years 2012-16. The 2015-16 inventory indicates GHG emissions of 4.89 million tonnes of carbon dioxide equivalent (tCO₂e), which translates to an average per capita of 3.03 tCO₂e GHG emissions. This is almost double the 1.56 tCO₂e per capita GHG emission for India in 2010.

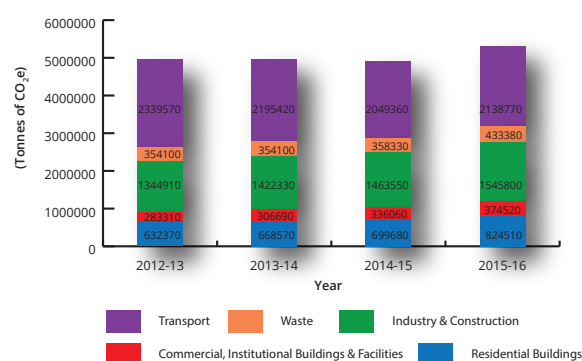
Sector-wise Share of GHG Emission in Coimbatore, 2015-16



Annual Trend in Energy Consumption



Annual Trend in GHG Emissions



Action Plan

A basket of climate adaptation and mitigation actions has been detailed in the Climate Resilient City Action Plan of Coimbatore. While the CapaCITIES project focuses on the sectors of water, transport, buildings and solid waste, the Climate Resilient City Action Plan addresses economy wide sectors. A snapshot of the Climate Resilient City Action Plan is illustrated below.

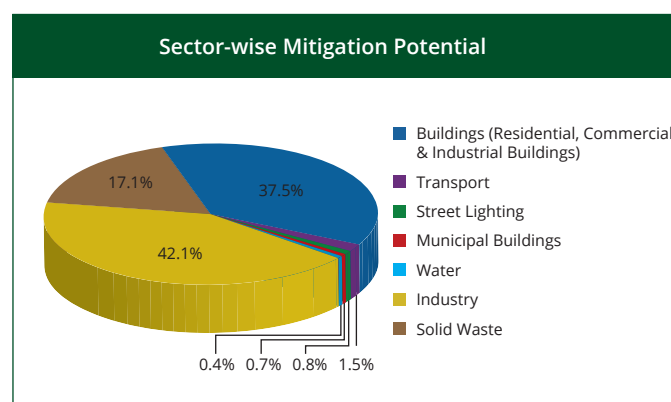
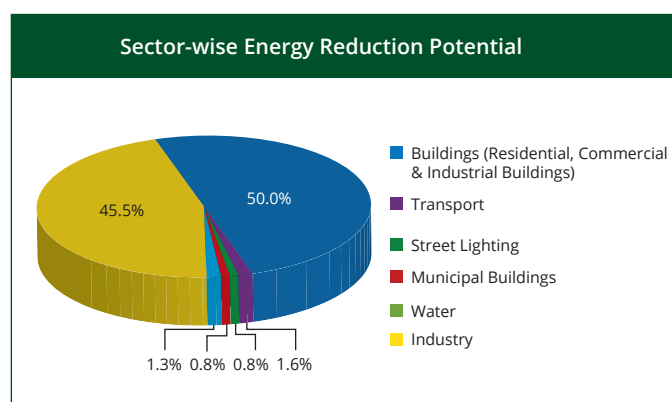
Sector	Example Resilience Interventions	Total Mitigation Potential (tCO ₂ e)	Overall Resilience Impact
Buildings (Residential, Commercial and Industrial Buildings)	- Solar PV systems - Energy Efficient (EE) fixtures (LED lamps, EE fans etc, power factor correction and others) - Declare and maintain reserved sites as Urban Green Spaces. - Have proper policy to lay the utilities on the road sides on one side so that the other side could be used for tree planting	512,800 (37.5% of total)	Reduction of GHG emissions and impacts on urban heat islands, health, increase in carbon sinks, improvement of air quality and the micro-climate through better urban planning
Municipal Buildings	- Solar PV systems - Energy Efficient fixtures (LED lamps, EE fans etc, power factor correction and others)	9,900 (0.7% of total)	Reduction of GHG emission footprint and increase in social adaptive capacity through promotion of climate actions
Industry	- Energy Efficient pumps - Energy efficient industrial motors	575,960 (42.1% of total)	Reduction of GHG emission footprint of industries
Solid Waste	4 Biomethanation plants of total 200 TPD - Waste incineration facility of 215 TPD - Establish zone wise collection and processing centers - Encourage community driven private start ups to manage solid waste in the city - Develop and implement user charges	233,600 (17.1% of total)	Reduction of GHG emissions and socio-economic co-benefits through improved health and livelihood of vulnerable sections, the biomethanation plants and waste incineration facility will benefit more than 40 percent of the population of the city



Sector	Example Resilience Interventions	Total Mitigation Potential (tCO ₂ e)	Overall Resilience Impact
Transport	- Deployment of electric buses - Public bike-share system	20,800 (1.5% of total)	
Water	- Reduction in Non Revenue Water (NRW) - Analysis of available water sources so as to plan, eg Aquifer maps - Waste water treatment plant connections and network for dual supply - Separate uses of water with IUWM principles	5,000 (0.4% of total)	Improved water resource management, better health and lower GHG emission, reduction in NRW has a conservation potential 92 MLD and will benefit more than 60 percent of population of the city
Street Lighting	Energy Efficient Street Lighting (21000 street lights)	11,000 (0.8% of total)	Reduced GHG emissions, coupled with improved safety in the city
Total		1,369,060	

The Climate Resilient City Action Plan (2018-2023) proposes actions with an annual GHG emission mitigation potential of 25% by 2022-23, over the 2015-16 (financial year) baseline.

Sector-wise Mitigation Impact



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