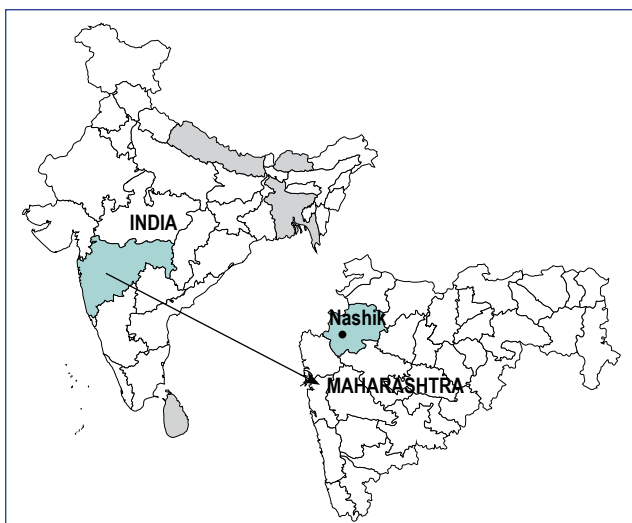


City Resilience Strategy: Nashik

Nashik is a tier-two metro city, the fourth largest city in Maharashtra (after Mumbai, Pune and Nagpur) and is one of the fastest growing cities in India. Its proximity to Mumbai helped catalyze industrial activity from the early 1970s and it now forms a part of the industrial and manufacturing triangle in Maharashtra. The city is located at 19° 33'N and 20° 53' N and 73° 16'E and 75°6' E, occupying an area of 259.13 sq. km at 600 m above the mean sea level.



Temples and holy places situated on the banks of river Godavari have made Nashik one of the holiest places for Hindus. Nashik is a major pilgrimage centre, and is especially famous for its twelve yearly 'Simhastha Kumbh Mela'. Its floating population is more than 100,000. Three other rivers pass through the city i.e. Kashyapi, Darna and Nasardi (Nandini). As per the Census of India, 2011, the city houses a total population of 1,486,973. Nashik has fertile land and perennial sources of water, and is famous for its grapes.

The climate in Nashik is quite pleasant and mild. Winter temperatures range from 5°C to 25°C. Summers are hot with temperatures ranging from 30°C to 41°C. Nashik District is vulnerable to various hazards like floods, earthquake, drought, and hailstorm. Within Nashik city are low lying areas on either banks of Godavari and the population residing within about 200 m of the banks is highly vulnerable to flooding. The other rivers Waldevi and Nasardi rivers that flow through Nashik and Darna River which runs along the present southern boundaries of Nashik Municipal Corporation (NMC) are also prone to flooding.

Climate Risks

The two climate risks identified through the ICLEI ACCRN Process (IAP) for Nashik are:













Changing Climate Conditions	Climate Scenario Summary Statements
High intensity rainfall 	There is a suggestion of a projected rise in the intensity of monsoon rainfall particularly along the coast of Maharashtra and the Western Ghats. The number of days with 'high' or 'very high' rainfall (greater than 25 mm per day) is projected to increase over the Maharashtra region.
Increased temperature 	There is a projected increase in temperature over the entire Maharashtra region for the monsoon season, with a range between 1.5°C and 3°C.



Photo credit: ICLEI South Asia

Vulnerability Assessment

The fragile urban systems and their corresponding climate fragility statements for Nashik are:

Fragile Urban Systems		Climate Fragility Statements
		<ul style="list-style-type: none"> May lead to a water stress situation due to increasing demand, which will be further exacerbated by the impacts of water loss due to un-accounted for water.
		<ul style="list-style-type: none"> Increase in the number of days with rainfall greater than 27mm/day will result in increased incidences of water logging in parts of the city. This would lead to an increased maintenance costs for the municipal corporation.
		<ul style="list-style-type: none"> Can cause water logging and flooding which will disrupt movement of vehicles on roads.
		<ul style="list-style-type: none"> May lead to melting of roads, rutting and potholes which will exacerbate poor road conditions, and will also lead to more use of private AC vehicles for comfortable commuting leading to further traffic congestion and increased GHG emissions.
		<ul style="list-style-type: none"> Improper disposal of sewage can compound health problems of local communities, especially those in slums, during water logging incidences.
		<ul style="list-style-type: none"> Improper disposal of solid waste can cause blockages in drainage systems resulting in a potential increase in water logging incidences.
		<ul style="list-style-type: none"> May increase the risk of landfill fires.

Through the vulnerability assessment, the adaptive capacity of the key actors identified in the IAP was scored based on three parameters: capacity to organize and respond, availability of resources, and access to information. Actors who receive a low adaptive capacity score are classified as vulnerable while those who receive medium and high scores are classified as supporting and can aid the local government in resilience building activities. The table below presents an overall analysis of actors across the different fragile urban systems.






Actor Analysis for Nashik City

Vulnerable Actors	Supporting Actors
<ul style="list-style-type: none"> Slum dwellers on river bank and near major city <i>nallahs</i> (drains) NGOs Student Tourists/pilgrims Farmers Workers/Daily Wage Earners 	<ul style="list-style-type: none"> NMC Storm Water Department Public Works Department Irrigation Department Maharashtra State Road Transportation Company Government of Maharashtra / Maharashtra Pollution Control Board

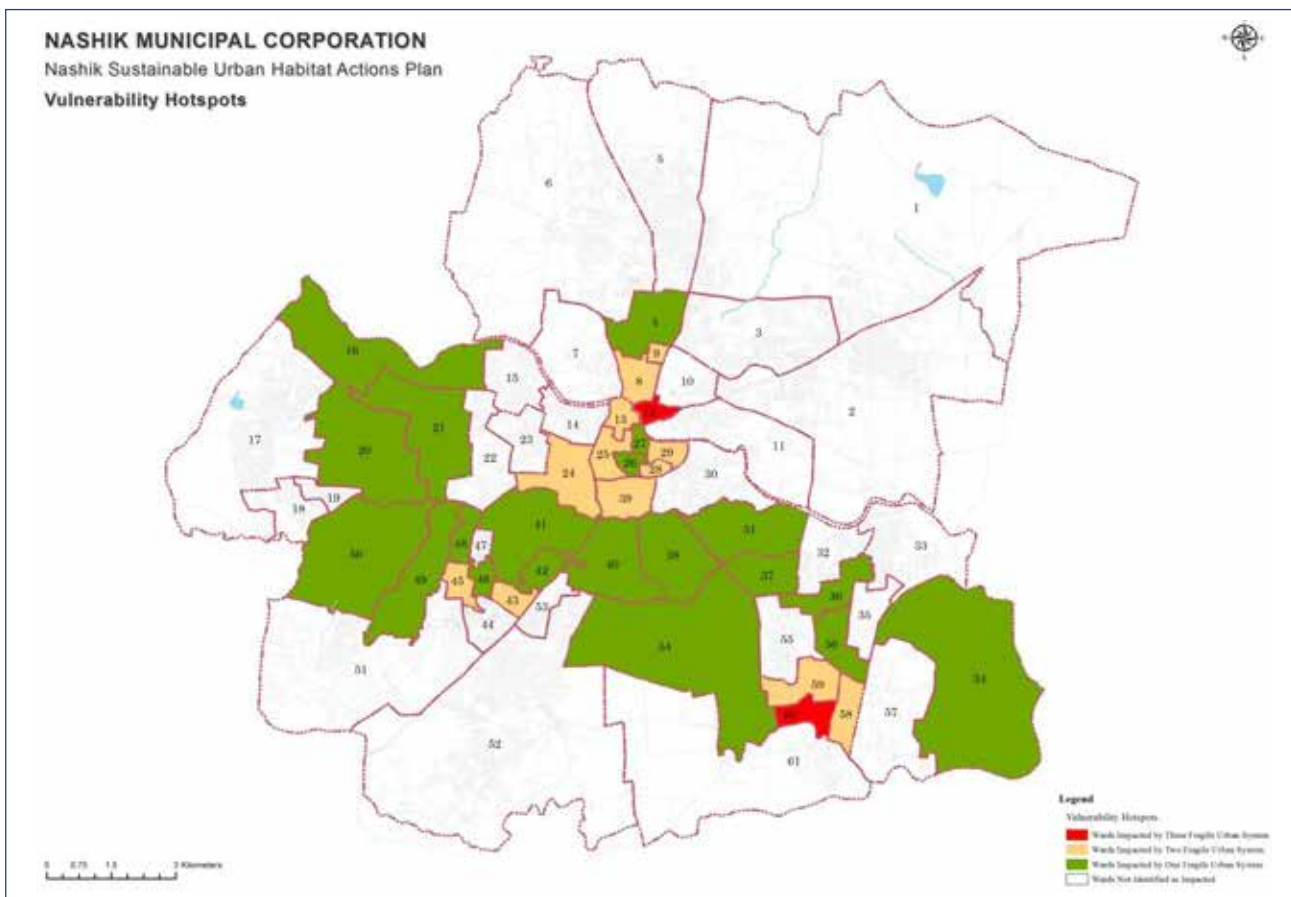
NMC, the primary stakeholder, emerged as a supporting actor across all urban systems, since it has sufficient manpower and financial resources to work on climate change.

The adaptive capacities of the fragile urban systems are assessed on the basis of five broad categories – economic, technology/ infrastructure, governance, social, and ecosystem services. Each of these five categories was rated as high/medium/low and averaged across all the urban systems to generate an overall score for each parameter in the city as detailed in the following table.

Overall Adaptive Capacity of Systems in Nashik City

Adaptive Capacity Parameters	Adaptive Capacity Score		
	Low	Medium	High
 Technological/ Infrastructural	Low	Medium	High
 Economic	Low	Medium	High
 Governance	Low	Medium	High
 Societal	Low	Medium	High
 Ecosystem services	Low	Medium	High

In Nashik, prabhags 12 and 60 relatively need more attention as they are impacted by multiple fragile urban systems and are referred to as the vulnerability hotspots as has been demonstrated in the map.



Among the soft measures identified through the IAP, awareness generation on water conservation, prevention of littering, and promotion of use of treated waste water were identified as important means to reduce resource consumption and wastage. Policies on vehicle free zones, regulation of hawkers, promotion of non motorised transport and land use planning can help to ease mobility related issues in the city. Land use planning and zoning regulations can also help avoid destruction of property in case of hazardous events. Among the hard measures, implementation of the City Sanitation Plan, decentralised waste water systems and segregated collection and disposal of waste were identified as important measures.

Key Interventions Identified for Nashik City

Infrastructural Measures	Non-Infrastructural/ Policy Measures
<p>Water Supply</p> <p>Implement the recommended actions for water supply as per the City Sanitation Plan for Nashik city, for example:</p> <ul style="list-style-type: none"> ● Implement automated Supervisory Control and Data Acquisition (SCADA) based monitoring at Water Treatment Plants and distribution stations for effective monitoring and baseline information capture on water flows. ● Install Bulk Metering at various points in the water supply network. ● Implement regular meter reading to effectively implement volumetric water tariffs. <p>Costs associated (Installation of SCADA systems, training, metering costs): INR 100 lakhs.</p>	<ul style="list-style-type: none"> ● Undertake regular checks to detect water losses in the system due to leakages and thereby reduce the amount of non-revenue water. <p>Costs associated (Staff training, leak detection machines): INR 15 lakhs.</p> <p>Co-benefits: Energy saved and emissions reduced due to more efficient pumping.</p>

Infrastructural Measures	Non-Infrastructural/ Policy Measures
Solid Waste Management	
<ul style="list-style-type: none"> Establishing dry waste collection centres at the divisional level. <p>Costs associated (A 1,200 ltrs container costs approximately INR 40,000. At least 10 such containers are proposed at each of the divisions in Nashik with conveyor belts and shed for the dry waste.): INR 50 lakhs.</p> <p>Co-benefits: Resource recycling and reuse.</p>	<ul style="list-style-type: none"> Public awareness generation campaigns to improve solid waste management practices at the household and community levels e.g. segregation of waste at source. <p>Costs associated (Sustained campaign for a period of 6 months involving mayor, commissioner and other relevant staff of the municipal corporation. This will include one kick of meeting, small awareness rallies at the divisional level, a big awareness rally at the city level, advertising banners, radio jingles, recognising and awarding the households from each sector etc.): INR 10 lakhs.</p> <p>Co-benefits: Community participation.</p>
Sewerage	
<ul style="list-style-type: none"> Supply of treated waste water to industrial and other consumers (would require tertiary treatment). <p>Costs associated (Approximately INR 2 lakh per km. The total sewerage length is 1,826 km): INR 3,641 lakhs.</p> <p>Co-benefits: for fresh water supply, as well as self-reliance for water requirements for industrial usage, sustainable operation and maintenance of Sewage Treatment Plants.</p>	<ul style="list-style-type: none"> Strengthening institutional and technical capacity of city staff for effective operation and maintenance of sewerage system and for recycling and reuse of waste water for non-potable uses. <p>Costs associated (Appropriate trainings should be given to the municipal staff on this): A 3 days training program for engineers will cost approximately INR 2 lakhs.</p> <p>Co-benefits: Improved competence and technical know-how.</p>
Storm Water Drainage	
<ul style="list-style-type: none"> For developed areas of Nashik where space is a constraint, the existing storm water drainage system to be renovated and maintained regularly to improve efficiency. <p>Costs associated: A detailed project report to be prepared to identify the specific areas and the actions to be taken.</p> <p>Co-benefits: Improved quality of life of citizens.</p>	<ul style="list-style-type: none"> Policy decision for controlling construction below flood line (blue line and red line) levels near Godavari and Nasardi rivers and rehabilitation of slums/properties already constructed in these high risk areas. <p>Costs associated (Local government notification instructing the same): INR 5 lakhs.</p> <p>Co-benefits: Supports disaster management planning in the city. Livelihood and asset protection.</p>
Transportation	
<ul style="list-style-type: none"> Provision of cycle tracks to encourage eco- mobility. <p>Costs associated (6-8 bike racks with shed and 8 bikes per shed, at a spacing of 300 m between each shed. Proposing 10 locations / shed spread across 3 kms It will cost INR 4 lakh per shed): INR 40 lakhs.</p> <p>Co-benefits: Improved quality of life of citizens.</p>	<ul style="list-style-type: none"> Improved traffic management systems e.g. regulation of traffic flow to avoid congestion. <p>Costs associated (Cost of doing a activity survey to know how pedestrians are navigating across the area, map based surveys to record the position of hawkers, pedestrian counts at major junctions, land use survey to know the demand or potential demand for parking, why and when there will be more demand etc.): INR 15 lakhs.</p> <p>Co-benefits: Public safety enhanced.</p>

Photo credit: Google Images