

# Leaving Green Footprints Behind

Impact Story of Climate Smart Cities Project



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## Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

As a service provider with worldwide operations in the fields of international cooperation for sustainable development and international education work, GIZ works with its partners to develop effective solutions that offer people better prospects and sustainably improve their living conditions. GIZ is a public-benefit federal enterprise and supports the German Government and a host of public and private sector clients in a wide variety of areas, including economic development and employment promotion, energy and the environment, and peace and security.

### **GIZ in India**

For over 60 years, GIZ has been working jointly with partners in India for sustainable economic, ecological, and social development. The Government of India has launched numerous important initiatives to address the country's economic, environmental, and social challenges, and GIZ is contributing to some of the most significant ones. For instance, it supports key initiatives such as Smart Cities and the Clean India mission.

GIZ, in close cooperation with its partners in the country, devises tailor-made, jointly developed solutions to meet local needs and achieve sustainable and inclusive development in the thematic areas of

- Energy,
- Environment, Climate Change and Biodiversity,
- Sustainable Urban and Industrial Development, and
- Sustainable Economic Development

# CSC Project Introduction

For the last 4 years the project, 'Climate Smart Cities' has worked to support cities in preparing themselves to tackle the consequences of climate change and become 'Climate Smart'. By improving urban planning, green space and biodiversity, mobility and better air quality, energy and green buildings, water and used water management, basic amenities, and good governance, cities were supported in the implementation of the Smart Cities Mission of the Government of India.

The Ministry of Housing and Urban Affairs (MoHUA) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH have collaborated to improve the national orientation framework and spread techniques for sustainable urban development that has been successfully used in real-world settings. The Climate Smart Cities (CSC) project has specifically collaborated with the State Governments of Odisha, Tamil Nadu, and Kerala, as well as the three Smart Cities of Bhubaneswar, Coimbatore, and Kochi.

Five distinct thematic areas were chosen in cooperation with these partner cities for on-the-ground interventions:



Hon'ble Minister for Housing and Urban Affairs launching the Climate Smart Cities Assesment Framework



GIZ and NIUA joining hands to build capacities of Indian cities for implementation of Smart City Mission

# Thematic Areas

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Urban Green Cover

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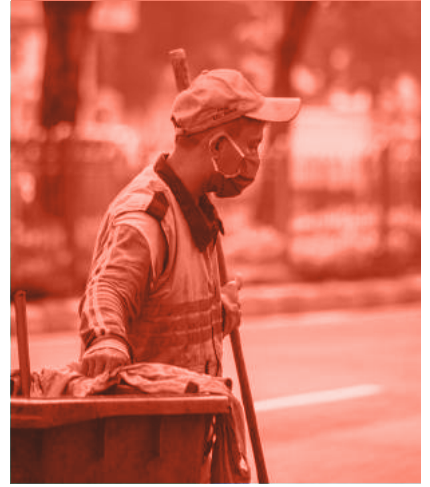
Stormwater  
Management

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Municipal  
Solid Waste  
Management

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Construction and  
Demolition Waste  
Management

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Green Building

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Signing of  
Implementation  
Agreement  
17<sup>th</sup> Dec 2018

CSCAF Inception  
Meeting with 26  
Organizations  
25<sup>th</sup> Jan 2019



Launch of  
Climate Alliance  
Feb 2019

Delegation visit  
to Conference on  
Collaboration for  
Climate Action  
(ICCA), Germany  
May 2019

1st PIC  
Meeting  
6<sup>th</sup> Aug 2019

Planning  
Workshop  
in 3 cities  
Dec 2018

Kick off meeting  
with Implementing  
partners (TU Berlin,  
Difu and NIUA)  
Feb 2019

Feb 2019  
Launch of  
CSCAF 1.0

1st Urban  
Design  
Thinking  
Aug 2019



Jul 2019  
9 CSCAF Online  
Portal and Regional  
City consultation



Indo- German Delegation at Bundeskongress, Germany

Sept 2019



Developing Green Building Framework for Kochi

Dec 2019

1st training of the series of training by GIZ, Difu and NIUA

Dec 2019

Joint Declaration of Interest for ISCN between MoHUA and BMI

Dec 2019



CSCAF Cities Performance Announced

Jan 24-25<sup>th</sup> 2020

Climate Action Plan - Kochi

Feb 2020

MoU with KILA

May 2020

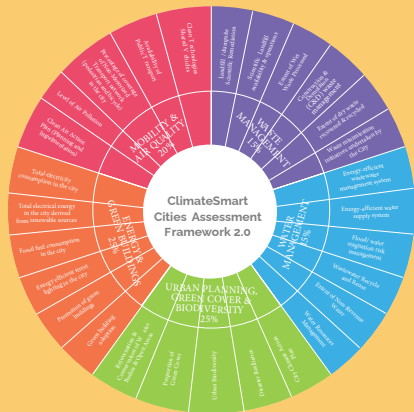
1st of the Upscaling of training by regional training institute held - ESCI, KILA, TNIUS

Jun 2020

2020

Launch of  
C-Cube  
Jun 2020

Launch of  
CSCAF 2.0  
Jun 2020



Review of C&D  
Byelaws  
Feb 2021

Capacity Building  
Workshop for  
Climate Action  
conducted

21<sup>st</sup>-22<sup>nd</sup> Dec 2021

Trainings  
and concept  
on MRV  
Feb 2021



Jun 2020  
1st of the  
webinar  
series from  
ISCN started

Sept 2021

Advisory on Heat Island  
Mapping submitted to  
MoHUA



Sept 2020  
Signing  
of MoU with  
TNIUS

Sept 2021

Adoption Policy (afforestation  
of OSR site - Mini Urban Forest)  
Coimbatore



Route Planning Study for Ward 4 Kochi - Submitted

Mar 2022



Indo-German Visit at WUF 11, Poland

Jun 2022



Handover of Stormwater Master Plan for Ward 4 and Nayapalli - Bhubaneswar

Aug 2022

22<sup>nd</sup> Dec 2021  
MoU with NIUA



Draft DPR Bio Park at Marutha Nagar

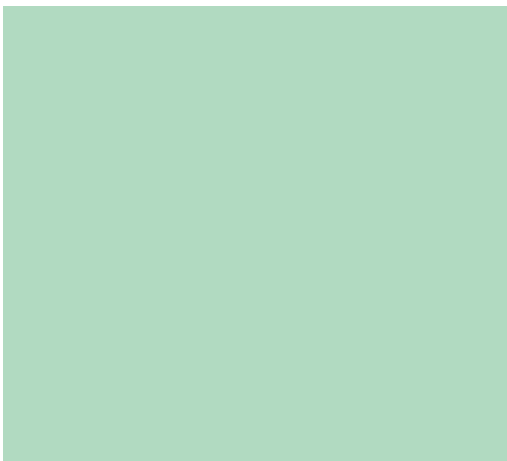
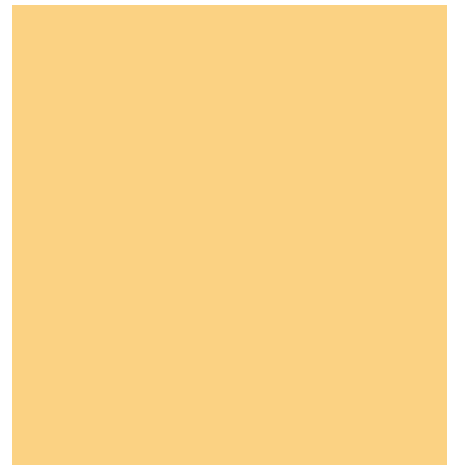
Mar 2022

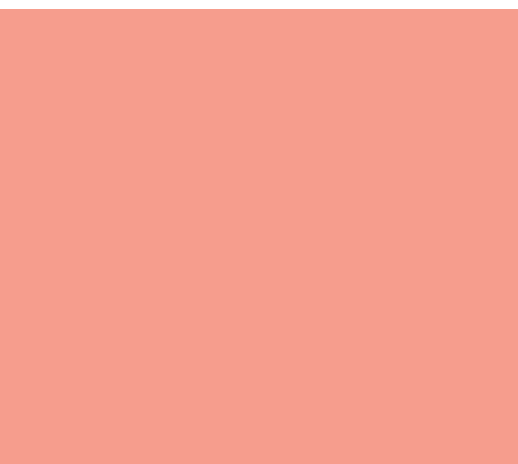
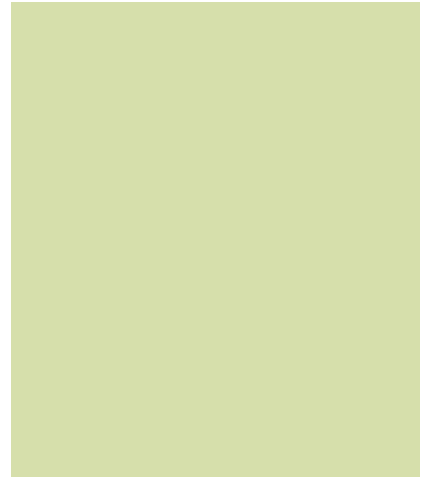
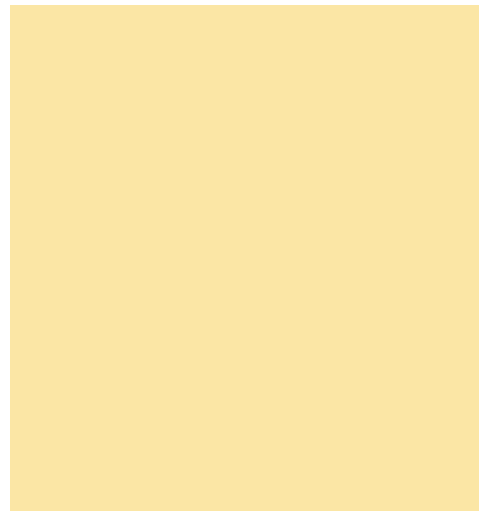


Stakeholder Consultation for Institutionalising Climate Action in cities

Sept 2022

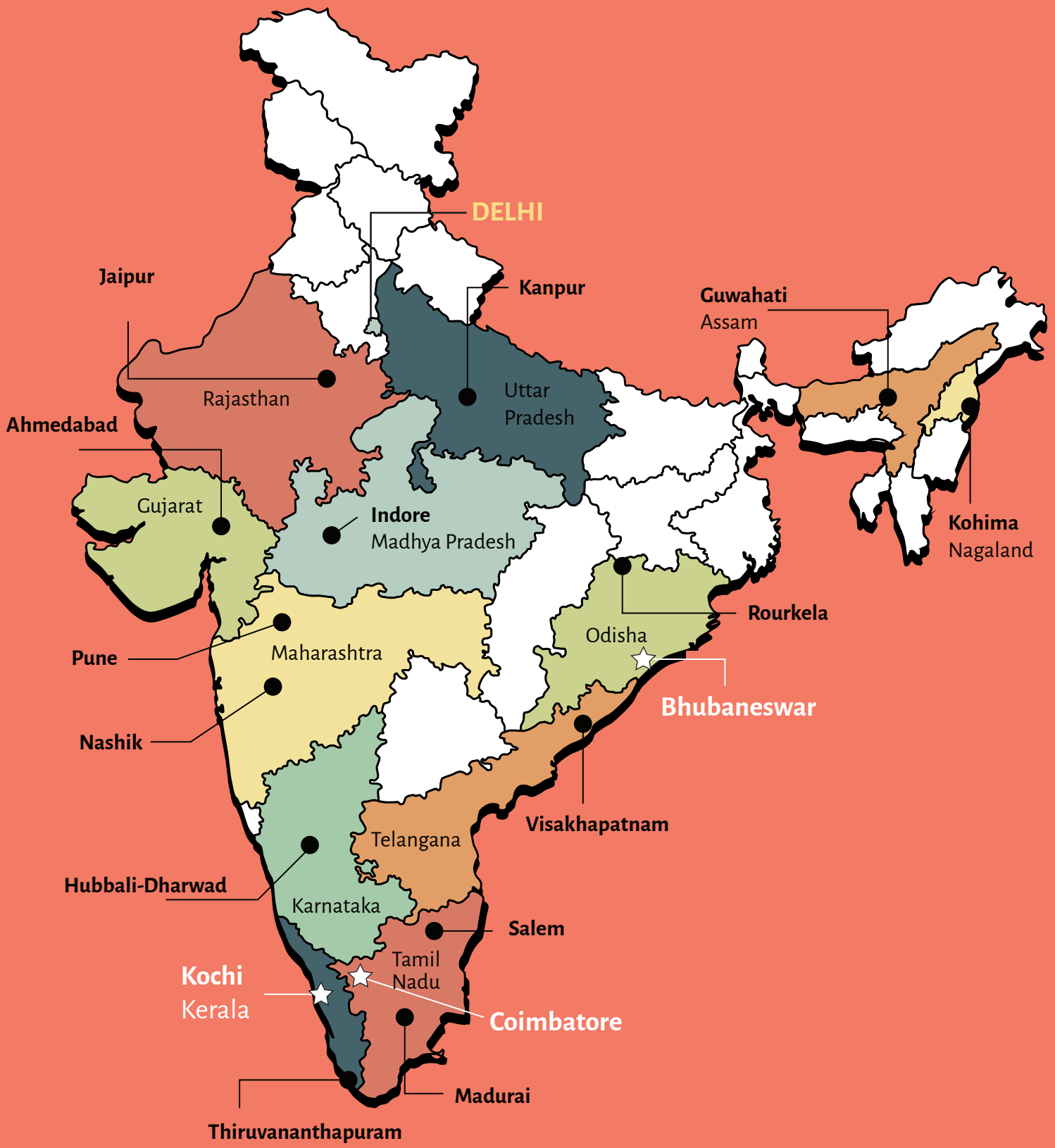
2022





The **Climate Smart Cities (CSC)** project was conceived jointly by the Government of Germany and the Government of India for integrating climate friendly aspects into the planning and implementation of the Smart Cities Mission, Ministry of Housing and Urban Affairs (MoHUA). The CSC project is funded by the Federal Ministry for Economic Affairs and Climate Action (BMWK) under the International Climate Initiative (IKI), in collaboration with the Federal Ministry of Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and the Federal Ministry for Housing, Urban Development and Building (BMWSB). The project is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, as part of the German Development Cooperation.

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- ★ Project Cities | 3 Cities
- Additional Upscaling Cities | 14 Cities

# 01

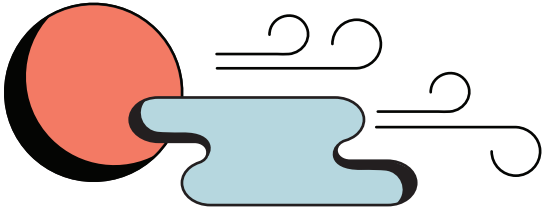
## Climate Change is Real

### India– Caught in the Climate Warp

- **As of 2021, India ranked as the seventh most vulnerable country on the climate risk index.** IPCC warns that the impact of a 1.5C increase in global temperatures will “disproportionately affect disadvantaged and vulnerable populations through food insecurity, higher food prices, income losses, lost livelihood opportunities, adverse health impacts, and population displacements.” More intense and frequent heatwaves and humid stress, an increase in both annual and summer monsoons, and an exponential surge of cyclonic events are forecast for the Indian subcontinent (IPCC, 2021).

- India being the second most populous country and significant vulnerable population needs to take guard against this global threat

- The Council On Energy, Environment, and Water (CEEW) estimates that **95% of coastal districts in India are at risk of extreme weather events.** Vulnerable communities with low adaptive capacities are disproportionately affected by climate events.



# 95%

of coastal districts in India are at risk of extreme weather events

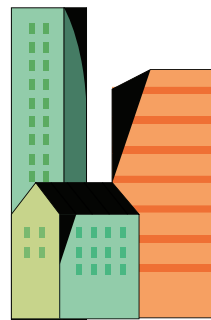
- Cities currently account for more than 33 percent of the urban population in India and are engines of growth as well as centers for economic, social, and cultural development. With rural to urban migration mostly driven in quest of economic and ease of living factors, the urban areas are projected to add 416 million urban dwellers by 2050. By 2030, India is expected to be home to seven megacities with a population of above 10 million. Population and the size of the economy are two major drivers of absolute greenhouse gas (GHG) emissions. This has placed India 4th after China, United States, and European Union in the list of total GHG emissions.

## Perils of Rapid Urbanisation

- In the past 30 years, India's urban population has more than doubled, reaching **481.980.332 inhabitants in 2020**, constituting **34,93% of the total population (The World Bank, 2020)**. By the year 2030, the percentage of the urban population is expected to reach 50%.

India's urbanisation has been vital for its fast economic growth in recent years with over **60% of the country's GDP being generated in cities and towns**. However, the drastic increase in urban population creates new challenges for urban infrastructure. Transportation, energy, and housing, for example, are stretched to their seams, unable to cater to the growing needs.

Urban areas through their physical structures further increase climate extremes. The changing climate makes



# 60%

of the country's GDP being generated in cities and towns

our cities vulnerable and imposes huge risks towards increased water stress, heat island effect, increased frequency and severity of extreme weather events such as urban floods/ draughts.

Almost every major city in India has been affected by urban floods at one time or another during these past years, leading to loss of lives, infrastructure, and economy. While all cities in the Indian subcontinent are at risk, cities located on the coasts or on riverbanks face additional issues from rising water levels in seas or rivers.

The importance of India's cities in its growth story makes the country's development doubly challenging. It is imperative that the Indian government complete its ongoing development agenda if it is to accommodate the growing population and combat the persistently widening socio-economic disparities. It is critical that this development-induced growth is within ecological boundaries so that it cannot further jeopardise the economy and people.

Development and environment are not mutually exclusive and are beneficial for each other. India's current political agenda is decisively charting the course for the country to find the path to new and environmentally sensitive growth. A step in that direction is the visionary 'Smart Cities Mission'.

"Indo-German Cooperation is already having a huge portfolio of bilateral, regional, and global climate and biodiversity projects with India, funded by the International Climate Initiative (IKI), and will continue expanding and intensifying this cooperation. India is a very important global partner in the combat against climate change. We look forward to continue our strong and long-lasting cooperation and a successful conference on these crucial topics."

- Dr Antje Berger  
Counsellor, Climate and Environment,  
Embassy of the Federal Republic  
of Germany, New Delhi

## ● Refocusing Policies to Pursue Green Agenda (Political Framework)

At the United Nations Climate Change Conference (COP26) in Glasgow in November 2021, India's Prime Minister Narendra Modi announced the country's ambitious **target to achieve net-zero carbon emissions by 2070 and take its non-fossil energy capacity to 500 GW by 2030.**

To achieve its goals, India has stated its intention to keep climate change at the centre of its policies.

India had announced five commitments or Panchamrita at **COP26** that it will focus on in its bid to tackle climate change challenges.

These are:

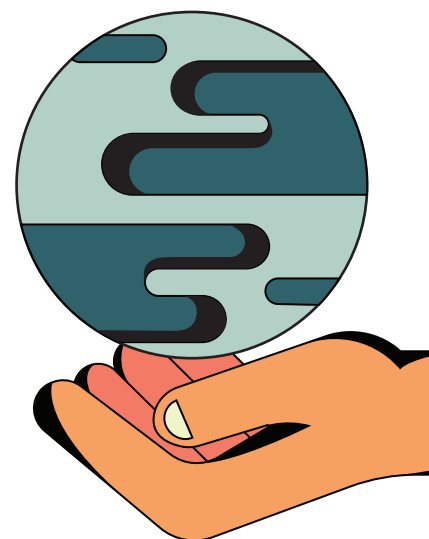
- By 2030, India will increase its non-fossil capacity to 500 gigawatts (GW).
- India will fulfill 50 percent of its energy requirements with renewable energy by 2030.
- India will reduce one billion tons of the total projected carbon emission between 2021 and 2030.
- By 2030, India will reduce its economy's carbon intensity to less than 45 percent.
- India will achieve the target of net zero emissions by 2070.



# Tackling Climate Change Becomes a National Agenda

In 2016 India ratified the Paris Agreement and committed under its Nationally Determined Contributions (NDCs) among others to reduce the emission intensity of its Gross Domestic Product (GDP) by 33-35% from the 2005 level by 2030, improve upon various parameters including increasing the share of non-fossil. fuels-based electricity and enhancing the forest cover. India's Nationally Determined Contribution (NDC) revolves around India's policies and programmes on the promotion of clean and renewable energy, the development of less carbon-intensive and resilient urban centres. To enable this, The Government of India had launched eight missions under the National Action Plan on Climate Change

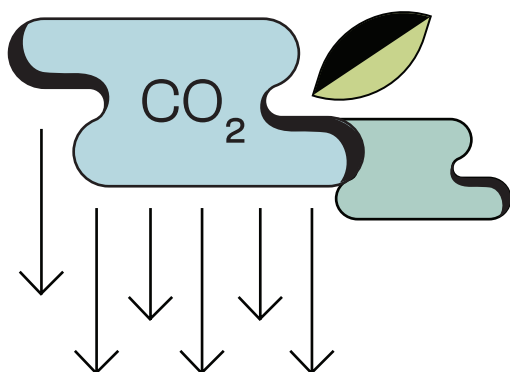
(NAPCC) to find out the mitigation option for climate change. The National Mission on Sustainable Habitat (NMSH) is one of the eight climate missions of the Government of India anchored with the Ministry of Housing and Urban Affairs in 2010. Lately, the Ministry of Housing and Urban Affairs has also revised its National Mission on Sustainable Habitat (2021-2030).



## Prioritising Climate Change in Cities

**National Mission on Sustainable Habitat (NMSH)** became the first political strategy of the country aimed at reducing GHG emissions in urban areas. The Mission identified various urban sectors with a significant impact on the GHG footprint of the cities and a high potential for the reduction of urban emissions. The identified areas for intervention include:

- Residential and commercial sectors
- Water supply, wastewater, and solid waste



- management,
- Urban transport, and
- Urban planning.

By increasing functional efficiencies in these areas, GHG emissions could be considerably minimised.

NMSH is one of the eight missions under the NAPCC, but the only one without any budgetary allocation. Funds for implementation are allocated to four area-specific Missions that implement the goals of NMSH. The four Missions are:

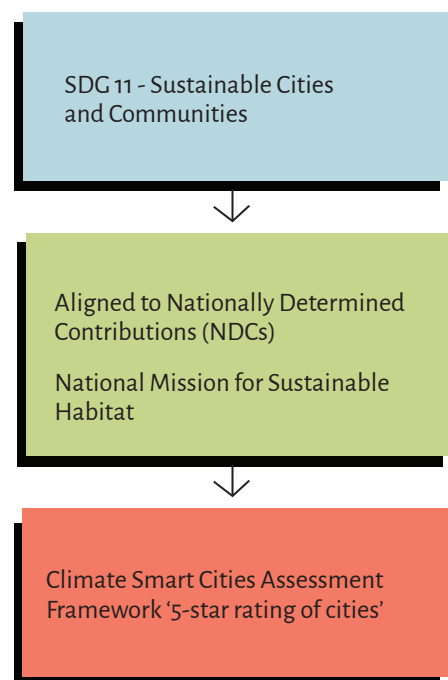
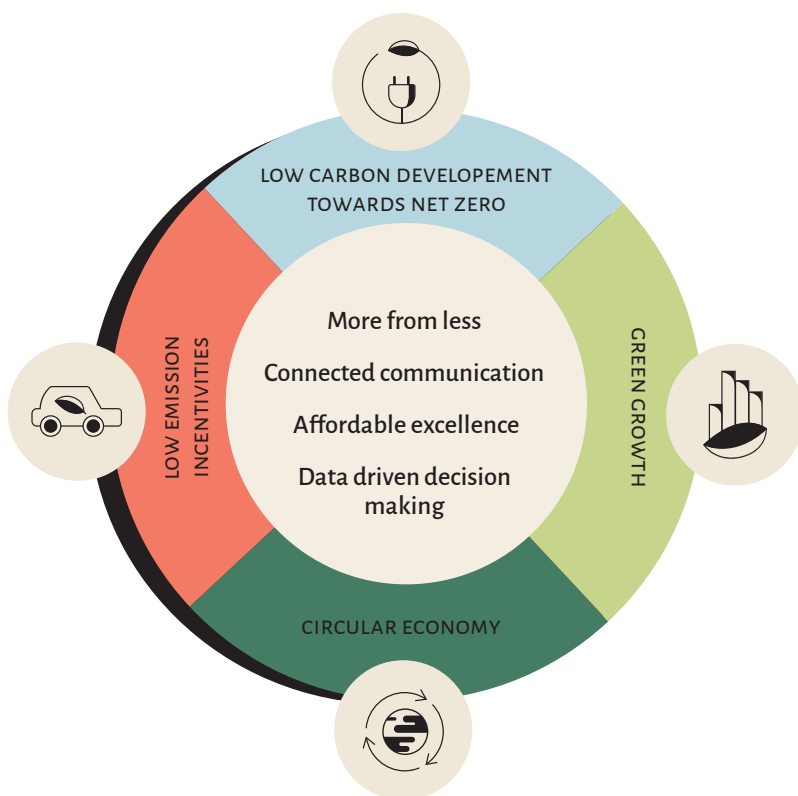
- Atal Mission of Rejuvenation and Urban Transformation (rejuvenation)
- Swachh Bharat Mission (sanitation)
- Smart Cities Mission
- Urban Transport

# Urban Transformation in Mission Mode- Smart Cities Mission

The **Smart Cities Mission (SCM)** becomes the primary governmental instrument for India's ecological urban transformation. The SCM was officially launched in June 2015 and is being implemented by the Indian Ministry of Housing and Urban Affairs (MoHUA). The schedule with the funding of urban infrastructure and structure upgradation in 100 cities. The SCM programme strategy, which is a combination of Area Based Development and Pan City Development, with the implementation of City-Wide Smart Solutions, through the Integrated Command and Control Centers, is proposed as the focal point of administrative control in these cities. It functions as an upscaling project under which compact areas of cities

are being developed as pilot models. These pilot projects are showcased as successful examples of implementation strategies that can be replicated at the pan-city level as well as in other cities of India.

All 100 Smart Cities have been selected on the basis of a competition-based method. Cities were ranked based on their project proposal for the Smart City Plan (SCP). However, the climate relevance and mitigation of GHG emissions have not been institutionalised as mandatory under the selection criteria of the program. Though the SCM originates from the objective of enhancing ecological sustainability as introduced in the NAPCC, achieving it is not the explicit focus of the mission.



"For India, Smart Cities are built around its people and their aspirations. To achieve this, urban planning should consider the needs of the present and the future, and create sustainable development frameworks ensuring that resource consumption does not impact our future generations. Therefore, we must improve their chances of leading a quality life."

- Mr Kunal Kumar, IAS  
Joint Secretary and Mission Director,  
Smart Cities Mission,  
Ministry of Housing and Urban Affairs,  
Government of India

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"Germany appreciates India's role in assuring the success of the Paris climate commitments and the country's significant progress in implementing India's Action Plan of Climate Change. This year India and Germany signed the Partnership on Green and Sustainable Development. Germany is a continuous and reliable partner to India's green and sustainable growth strategy."

- Dr Steffen Koch  
Minister and Head of Department  
for Economic and Global Affairs  
Embassy of the Federal Republic  
of Germany, New Delhi

# 02

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## The Climate Smart Cities Project- National Measures

### A Program to Connect Intent with Implementation

**The Climate Smart Cities project was conceived as a plan to include climate aspects in the Smart Cities Mission.** The Smart Cities Mission is a broad mission and covers the entire integrated development aspect, including digital, inclusion, economic equality and ease of living. It has an environmental aspect too, under the 'sustainability' component as a pillar of the mission. The Climate Smart Cities project looked into the climate aspects, both at the area-based level as well as pan city with an eye on future upscaling to their cities.

Under CSC, the attempt is to connect the Smart Cities Mission with its goal of creating sustainable urban environments. The CSC aims to achieve this by anchoring climate-friendly urban infrastructure projects and area-based development in the planning

"The Indo-German Development Cooperation portfolio transcends energy, urban development, natural resource management, agriculture, biodiversity, skills and economic development among others. GIZ India strives to make climate action the linchpin of all interventions in these areas of common interest"

- Dr Ulrike Reviere  
Country Director, GIZ India

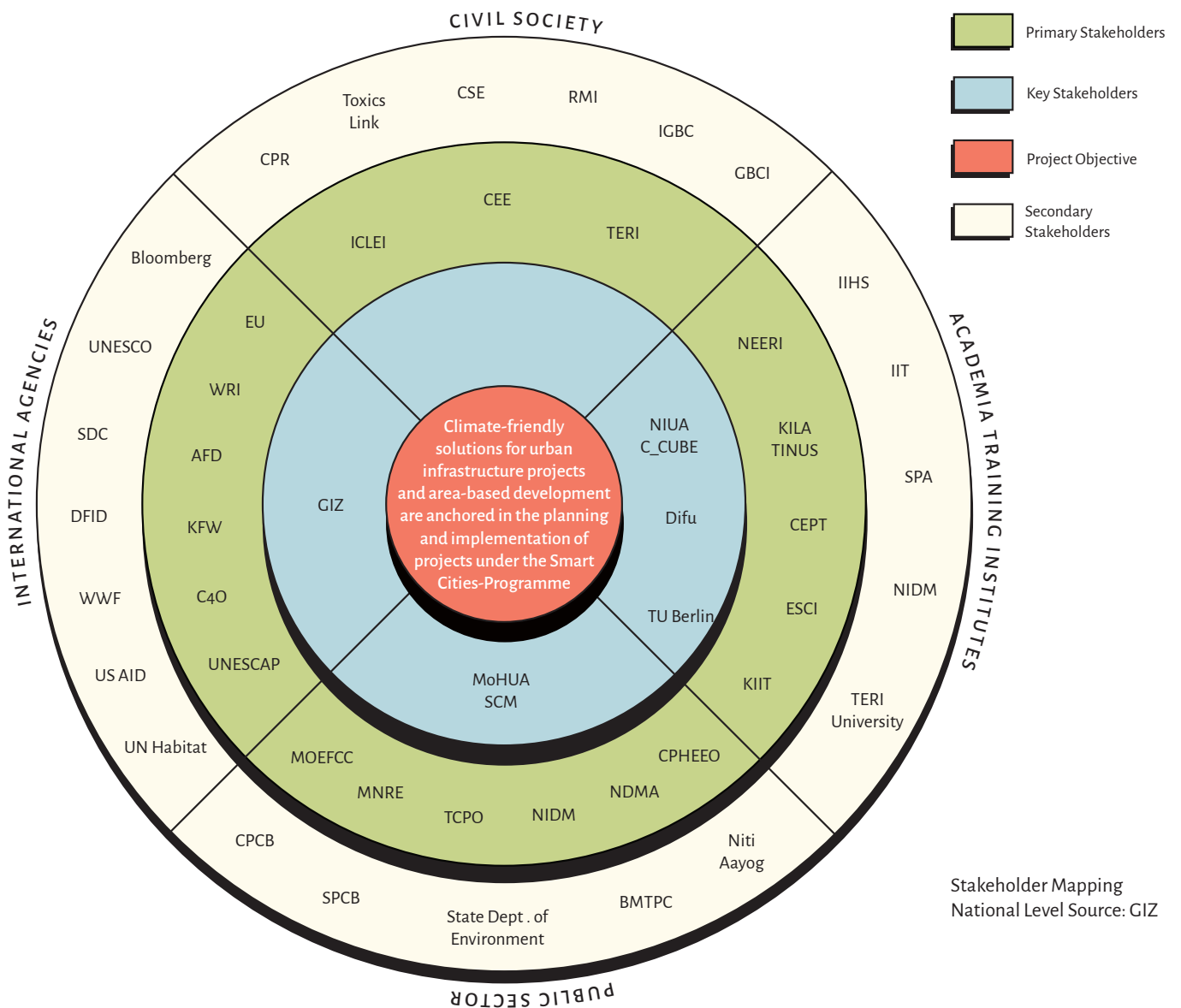
and implementation of projects under the Smart Cities Programme. Further, the project contributes to the achievement of the National Determined Contribution (NDCs) to the Climate Goals as well as the Sustainable Development Goals (SDG) 11. It acts as a facilitator by

promoting cooperation between national and sub-national actors by technically supporting international advisory and exchange formats and by supporting the implementation of measures.

## Multi-Stakeholders Action Program

**Climate Smart Cities Assessment project** adopted a multi-stakeholder collective exercise currently being taken up in the Smart Cities Mission. However, the key to its success lies in an honest and conscious self-assessment by the cities to be validated by evidence, audit, and expert assessment.

The program is a collaborative effort at the national, sub-national, and city levels. At each level, multiple stakeholders are collaborating in the planning and implementation of smart and climate-friendly measures for infrastructure and area-based development and measuring and monitoring of their GHG emissions (See Figures below).



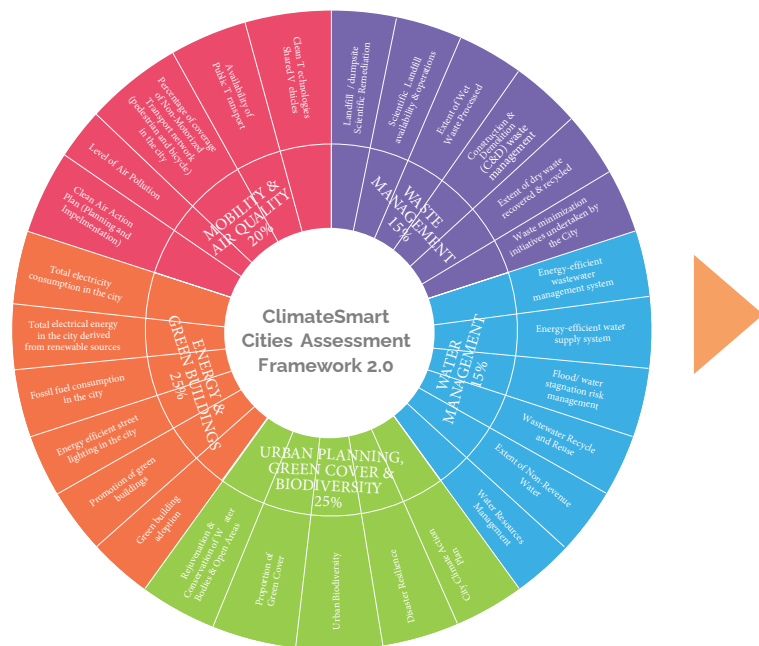
# CSCAF as the Central Strategy

The ClimateSmart Cities Assessment Framework (CSCAF) is central to Smart Cities Mission Sustainability strategy to mainstream local climate actions. The Framework is designed as a tool to assist cities to understand and gauge their current climate scenario on 28 indicators across five sectors delineated as urban planning, green cover and biodiversity, water resource management, waste management, energy and green buildings and mobility and air quality. The cities are assessed on where they stand regarding climate change at present on each indicator and then allocated one of 5 progressive stages from 1-5. For each indicator, stepwise guidance is provided to enable cities to take appropriate actions to achieve higher scoring on the concerning indicators. CSCAF facilitates cities to develop climate improvement strategies by adopting, implementing and disseminating best practices adopted by each through knowledge-sharing. It also promotes the cities to develop standards comparable to international best practices on green, sustainable, and resilient urban habitats.

## CSCAF in Action

The development of CSCAF was an intense and rigorous process of discussions and consultation spread over a period of six months in 2019 wherein more than 10 workshops and stakeholder consultations were held. The participants in the workshops included climate change and urban governance experts along with city officials of the smart cities.

GIZ played a vital role during the development process of the framework, which started with a brainstorming session that took place in January 2019 in New Delhi. Twenty-six plus national and international stakeholders were involved in planning for climate action, around both adaptation and mitigation measures, and were invited to discuss the potential



Climate Smart City Assessment Framework 2.0 | Source: NMSH, MoHUA

pillars of an urban climate change framework. Earlier climate projects and research work were discussed to understand the issues and challenges faced, the reasons for success or failure, as well as learning from academia and research. The proceedings of these discussion sessions helped in the development of the guidelines for the Framework.

After the successful development of the first version of the CSCAF and pilot tests in three cities; four cluster workshops and four regional conferences were organized with the participation of more than 300 officials from more than 90 cities. The main objective of the workshops was to achieve a joint understanding of the indicators of CSCAF. These interactive workshops promoted the exchange of information and deliberated on the Framework to make it more robust and actionable for the cities.

Launched in February 2019 by MoHUA in cooperation with NIUA and GIZ, CSCAF was initially made accessible to all 100 cities. In the first phase, the assessment helped establish a baseline for 96 cities that participated. This process spread over six months involved more than 27 government departments/ organisations from the three-tier governance structure – national, State, and city along with other stakeholders. The data submitted by the cities on the portal were evaluated by an Expert

# Climate Smart Cities Assessment Framework



## ENERGY and GREEN BUILDINGS

Total electricity consumption in the city

Energy efficient street lighting in the city

Total electrical energy in the city derived from renewable sources

Promotion of green buildings

Fossil fuel consumption in the city

Green building adoption

Disaster Resilience

Rejuvenation and Conservation of Water Bodies and Open Areas

City Climate Action Plan

Proportion of Green Cover

Urban Biodiversity

## URBAN PLANNING, GREEN COVER and BIO-DIVERSITY



## WATER MANAGEMENT

Energy-efficient waste water management system

Wastewater Recycle and Reuse

Energy-efficient water supply system

Extent of Non-Revenue Water

Flood/water stagnation risk management

Water Resources Management

Level of Air Pollution

Clean Technologies Shared Vehicles

Clean Air Action Plan (Planning and Implementation)

Availability of Public Transport

Percentage of Coverage of Non-Motorised Transport network (pedestrian and bicycle) in the city

## MOBILITY and AIR QUALITY



## WASTE MANAGEMENT

Landfill / Dumpsite Scientific Remediation

Construction and Demolition (C&D) waste management

Scientific Landfill availability and operations

Extent of dry waste recovered and recycled

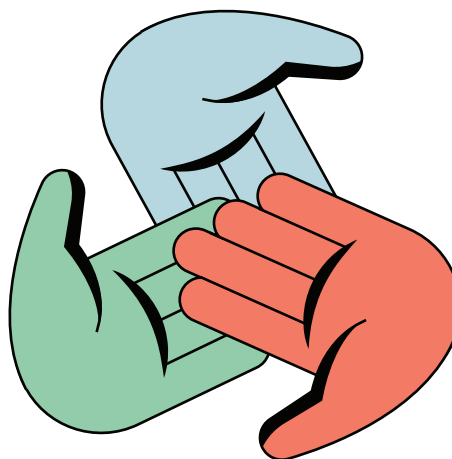
Extent of Wet Waste Processed

Waste minimisation initiatives undertaken by the city

Committee. At the conclusion of this process, the first baseline assessment for each city was announced with the objective to inform them about their climate readiness.

The learnings and experiences from the Framework's first year in operation, as well as the feedback collected from the participating cities, were evaluated and subsequently used to develop **CSCAF 2.0**. The new version was introduced in ... with improved indicators, assessment methodology, scoring criteria, and evidence that must be captured for a holistic assessment of a city's climate score.

The knowledge-sharing platforms provided evidence that the cities were learning from each other's experiences. Not only this; they were also motivated to work towards combating climate change impacts collectively. The success stories, best practices, advisories and other reference material from the first assessment hence have proved to be an impetus for taking India's fight against climate change forward.



More than  
**300**  
state and city  
officials participated  
in these workshops





# Climate Action turns into a Multi-Level Agenda

Local Climate Actions are multi-level tasks requiring the involvement of different government authorities and other stakeholders. In India, however, the responsibility for implementing various missions and schemes rests with the State Governments and the concerned local bodies or local administrations, as urban solutions need to be customized to their respective local context.

Understanding the multi-level nature of urban climate action and the imperative to bring all concerned actors on a collaborative platform to ensure implementation success, the CSC project is actively working with different governmental levels to promote cooperation among stakeholders. The national-level CSCAF was developed to guide climate action in cities but is flexible enough to allow for local customisation in cities. Practical experiences during program implementation constitute valuable feedback for the continuous improvement of the Framework. The approach is much like that invested in growing a tree. The CSC project adopts a holistic approach from the moment the plan is seeded, nurturing while also providing the supporting structure and step-

by-step guidance for its eventual success.

The project advises the Ministry of Housing and Urban Affairs (MoHUA), city administrations, and state governments in the implementation of smart and climate-friendly measures for infrastructure and area-based development, capacity building of Urban Local Bodies, and establishment of networking formats for the dissemination of practical experiences.



## Outlook for the Future

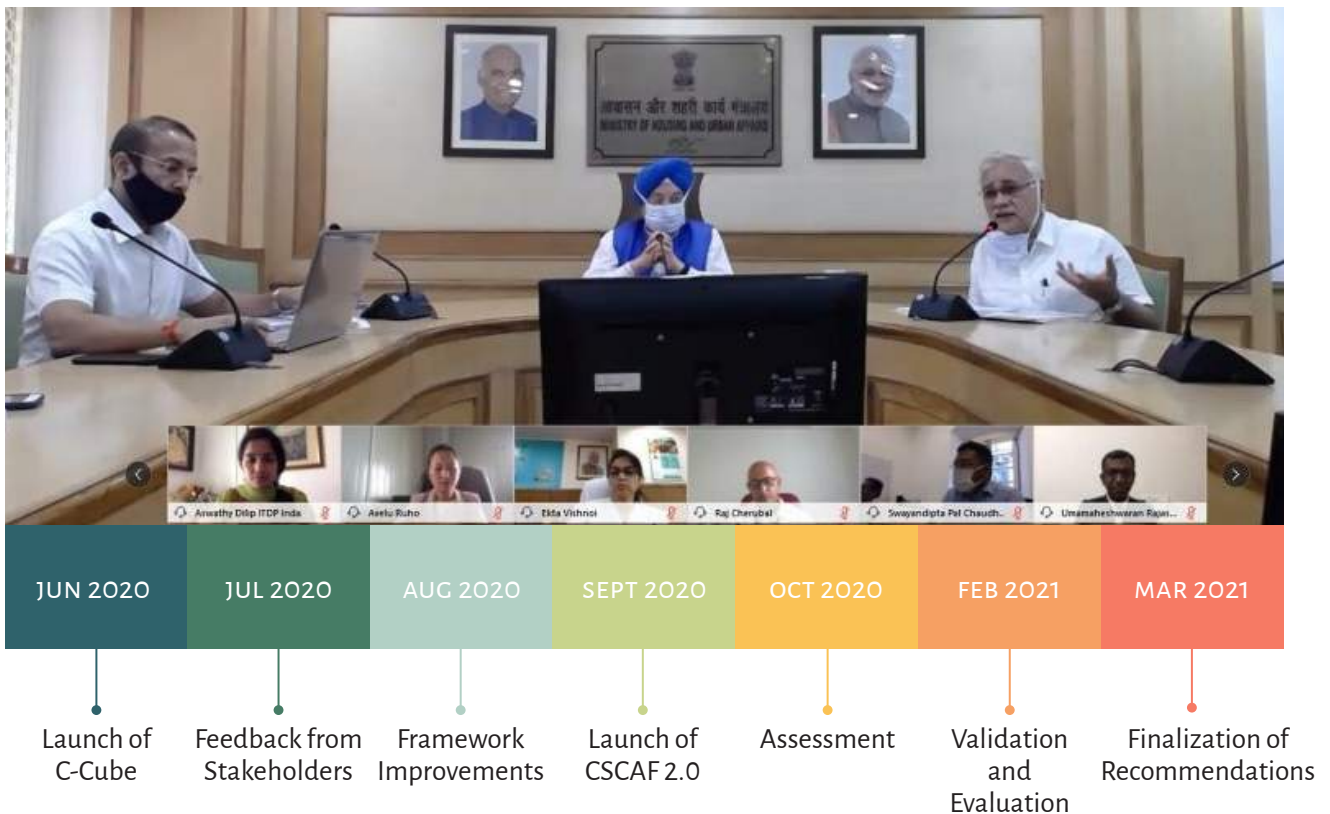
Apart from the intended outcomes of CSCAF 2.0, the Framework, when implemented in letter and spirit promises a long-term sustainable impact on climate through the promotion of stakeholder participation and collaboration. The expected additional outcomes of this assessment include:

1. Actual actions on the ground
2. Awareness generation
3. Citizen participation
4. Surfacing learning
5. Capacity building
6. Need-focussed investments
7. Promotion of circular economy

The envisaged outcomes of the Framework including and not limited to are:

1. Benchmarking
2. Peer-learning
3. Capacity building
4. Global Learning
5. KPI-driven spending
6. Awareness creation
7. Citizen engagement
8. Promotion of circular economy

The true contribution and worth of this exercise will be determined by how successfully the Framework leads to the achievement of these outcomes.



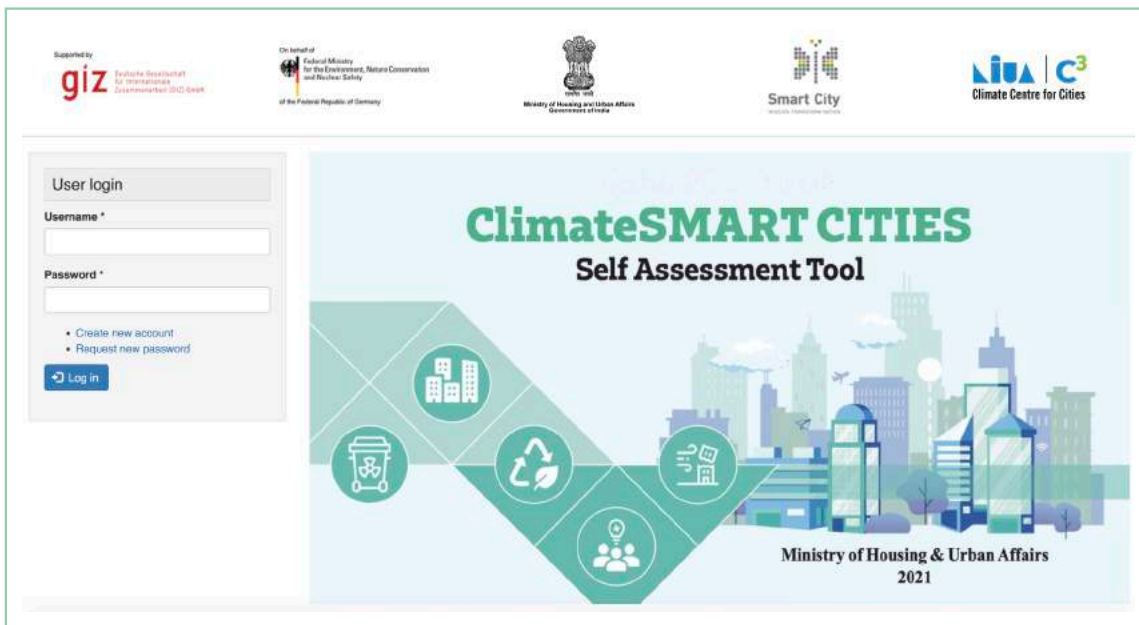
Launch of CSCAF 2.0 | Source: GIZ

# Climate Smart Cities Self-Assessment Tool

The ClimateSmart Cities – Self Assessment Tool (CSC–SA Tool) was developed under the Project to provide cities with quantifiable, emission-based evidence to prioritize climate actions. The tool also provides cities with emission reduction “potential” of its intervention using assessment data for relevant ClimateSmart Cities Assessment Framework indicators. The tool is helping cities to integrate climate action within urban processes effectively. The tool follows the ‘Global Protocol for Community-Scale Greenhouse Gas Emission Inventories’ (GPC) to calculate indicator-wise GHG emissions and mitigation potential. To contextualize and simplify calculations, the tool uses India-specific studies, reports and documents for non-revenue water, low carbon

shared vehicles and proportion of green cover indicators. Wherever possible, the tool uses India-specific emission factors, otherwise, it uses global default factors to estimate emissions.

The tool does not provide a real-time city-level inventory but only an estimation of emissions and emission reduction potential quantified in terms of GHG emissions. The emission reduction “potential” numbers are calculated using assessment data for 11 indicators under the assessment framework. For more accurate estimations, the tool requires the city to collect additional parameters. Cities, States, Academia and Research Institutions can register on the ClimateSmart Cities Assessment Framework website hosted on Smartnet to access this tool.



Climate Smart Cities Self-Assessment Tool

# Climate Centre for Cities

To provide sustained impetus and perspective to the ongoing efforts, the Ministry of Housing and Urban Affairs set up a dedicated "Climate Centre for Cities" within the National Institute of Urban Affairs (NIUA). The objective of the centre is to conduct regular monitoring of the performance of Indian cities with respect to their climate action and provide contextual handholding support to the cities in the form of training and capacity building activities, knowledge management, alliance partnership, and development of tools/technology to support cities in their climate actions. The project provided strategic advice to MoHUA and NIUA for setting up the centre.

Designed as a secretariat for all sustainable urban development initiatives, its purpose is to streamline climate action in the cities. One of the main tasks of C-Cube is the implementation of CSCAF 2.0. While CSCAF is the tool that helps cities to develop climate actions, C-Cube helps them implement it correctly. The department also organises other climate initiatives under the CSC project, like the ClimateSmart Cities

Alliance. C-Cube is providing the following services across all initiatives:

- Communication outreach
- Capacity building
- Policy, planning, program, and project support
- Partnerships
- Research and knowledge management
- Innovation

Under the Climate Smart Cities project, C-cube capacities were strengthened through various International Exchanges with the German Institute of Urban Affairs (Difu) which has hosted the central knowledge transfer hub, the Service- and Competence Center: Local Climate Action (SK:KK) in Germany since 2008. During the exchanges and meetings with German Counterparts, introduction to the role and functions of SK:KK, similarities, and comparisons enables both transfer hubs to learn from each other. During the project period, C-Cube becomes the knowledgeable, networked administrative and guarantees sustainability and project learning dissemination after project closure.



Exchange among Indian and German Institute of Urban Affairs for sharing learnings and exploring areas of future cooperation



# Knowledge Exchange and a Development Partnership

The Indo-German Development Cooperation is a crucial pillar of the strategic partnership between India and Germany. Cooperation commenced in the 1950s and grew rapidly, with India quickly becoming the largest recipient of German development assistance. Both parties have repeatedly attested to their equal commitment to solving global developmental challenges.

"The urban portfolio of GIZ India is quite diverse, working for sustainable urban development closely with Smart Cities Mission and other urban missions. Climate Actions have gained more and more importance in the last years and are an essential part of our ongoing and upcoming endeavors. Working toward Climate Change mitigation as well as adaptation has been a priority in our joint urban initiatives."

- Mr Ernst Doering  
Director and Cluster Co-ordinator,  
Sustainable Urban and Industrial  
Development (SUID), GIZ India

In response to India's extensive urban transformation agenda and the launch of the Smart Cities Mission and the Atal Mission of Rejuvenation and Urban Transformation (AMRUT) in 2015, the Indo-German Cooperation extended its priority areas to the field of Sustainable Urban Development. In April 2015, the Indian Ministry of Urban Development

(now MoHUA) and the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU) signed a Joint Declaration of Intent (JDI) for cooperation in Sustainable Urban Development. The objective of JDI is to promote cooperation between India and Germany in urban development, extend practical guidance to seize common development opportunities and tackle challenges, and promote exchange in the areas of strategy, capacity development and implementation at the national and regional levels.



## Indo-German Working Group

To implement the Joint Declaration of Intent and to identify suitable projects and initiatives to promote sustainable urban development, a Joint Working Group (JWG) on Sustainable Urban Development was established comprising representatives from both countries. The Climate Smart Cities Project anchors the activities of the JWG.

## International Exchange

Three exposure visits were organized by the Climate Smart Cities Project. An Indian delegation with national, sub-national, and local representatives was invited to national and international urban planning events. They also undertook site visits and had meetings with various German administrative institutions in urban planning. As part of the two exposure visits, Indian and German delegations also participated in the International Conference on Climate Action 2019 in Heidelberg and Frankfurt, the 13th Federal Congress of Urban Development Policy in Stuttgart, Germany, and World Urban Forum-11 at Katowice, Poland.

"The CSC project was planned to integrate climate aspects into the Smart Cities Mission of the Government of India. The impact of the project is in bringing together various stakeholders to push the climate agenda from the stage of policy to implementation."

- Vaishali Nandan  
Project Head, Climate Smart Cities Project,  
GIZ India

## Indo-German Delegation at the World Urban Forum 11, Poland 2021



## Indo-German exposure visit to Bundesskongress, Germany 2019



## Indo-German Delegation attending Conference on Collaboration for Climate Action, Germany 2019



# 03

## Tracing CSC Footprints in Municipal Corporations





National-level frameworks and structures to facilitate climate-friendly urban development like the CSCAF and C-Cube play a critical role in establishing a nationwide climate agenda and laying the strategic foundation for planning measures. However, the actual implementation of measures is under the authority of the respective local administrative bodies. Throughout the project, CSC has closely worked with the municipalities of its project partner cities.

GIZ, under the CSC project, plays a key role in the development of measures at various levels, cooperating with national, state, and city organisations, ensuring that climate-friendly solutions are anchored in the urban development agenda across the country.

Pursuing this objective, GIZ is working with three partner smart cities – Kochi,

Bhubaneswar and Coimbatore and their respective governments to develop interventions that are in line with the CSCAF. GIZ has supported each of the three partner cities in the development of two out of five sector assignments factoring in the local scenario and challenges in each city. These sectors include solid waste management, C&D waste management, green building, green cover, and stormwater management. Additionally, the project assisted the cities in undertaking analysis of Urban Heat Islands in the three cities which helped the cities to identify their intervention areas and plan for their action accordingly. An advisory on the preparation of Urban Heat Island maps was developed and shared with the Ministry of Housing and Urban Affairs which assists other cities in preparing their Urban Heat Island maps, which is also one of the criteria in the CSCAF.

## Development of measures

A planning workshop in each of the three partner cities was organised in 2018 to initiate the development of local interventions. Multiple local stakeholders, including officials from government agencies, non-government organisations and citizen organisations attended the workshops to identify the main challenges of urban climate change. Based on the requirements and concerns of the cities, key sectors were identified and subsequently focused on, under the project. GIZ consulted its **CSC project partners TU Berlin, DIFU, and NIUA as well as selected external consultants, including CRISL Infrastructure Advisory, Buro Happold, IPE Global, and Schenk Engineering and Fichtner Consulting Engineers (India) Pvt Ltd.**, among others, for the development of project assignments.

The nature of interventions varied and depended on the underlying local challenges in each city. For every sector in each city, a Situation and Gap Analysis Report was developed, aimed at assessing the current climate situation and recommendations and a roadmap for implementation was proposed. Participatory development of urban design thinking measures to mitigate climate change, spatial thematic analysis and the creation of sector-specific frameworks were all part of this exercise. All practical experiences and technical inputs gathered through local measures have been shared with other cities through a comprehensive capacity development process, including training and working aids.

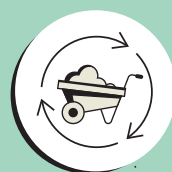
# Bhubaneswar

Bhubaneswar, the state capital and the largest city in its state is the epicentre for economic and developmental activities. The city is also known for its religious significance and attracts tourists around the year. Situated on the eastern coastal plains, Bhubaneswar has increasingly become vulnerable to climate adversities, especially heavy rainfall and cyclones. These extreme climate conditions have exerted increasing pressure on Bhubaneswar's urban infrastructure, causing regular urban floods. Rapid urbanization and inadequate infrastructure have further aggravated the vulnerability of the city. On account of the geographic, climatic, and infrastructural attributes of the city, Bhubaneswar was identified as a CSC project city.

A planning workshop, organised by GIZ, with the cooperation of the Bhubaneswar Municipal Corporation (BMC) and Bhubaneswar Smart City Limited, was instrumental in ascertaining the needs of the city. The city's vulnerability to urban floods due to extreme rainfall events, cyclones and encroachment of natural drainage systems was identified as a primary climate-related challenge. An equally significant challenge, determined by stakeholders during the workshop was the city's inadequate C&D waste management system. Bhubaneswar's infrastructural development has not been commensurate with its rapid urbanisation, leading to waste dumping in the stormwater drainage systems, and worsening an already existing problem. Therefore, the CSC project interventions for Bhubaneswar were premised on these identified concerns and implemented with the cooperation of the municipality and the BSCL, for sustained action and impact.



Stormwater  
Management



C&D Waste  
Management



Study on Integrated Urban water management of Bhubaneswar—Conducted and submitted

**September 2019**

Prototypes prepared using Urban Design Thinking for cities

**March 2020**

Gap Analysis and Recommendation Report for C&D waste submitted to Bhubneswar

**June 2020**

RFP for C&D facility

**January 2021**

Review of C&D Byelaws

**February 2021**

C&D quantification and characterisation exercise

**April 2022**

1st Urban Design Thinking workshop

**August 2019**

Support in filing up the assessment framework

**December 2019**

Gap Analysis and Recommendation Report for storm water submitted to Bhubneswar

**June 2020**

PPP options and Review of RFP for 50 TPD C&D waste recycling plant

**October 2020**

Review of storm water master plan

**February 2021**

MRV concept and training

**November 2021**

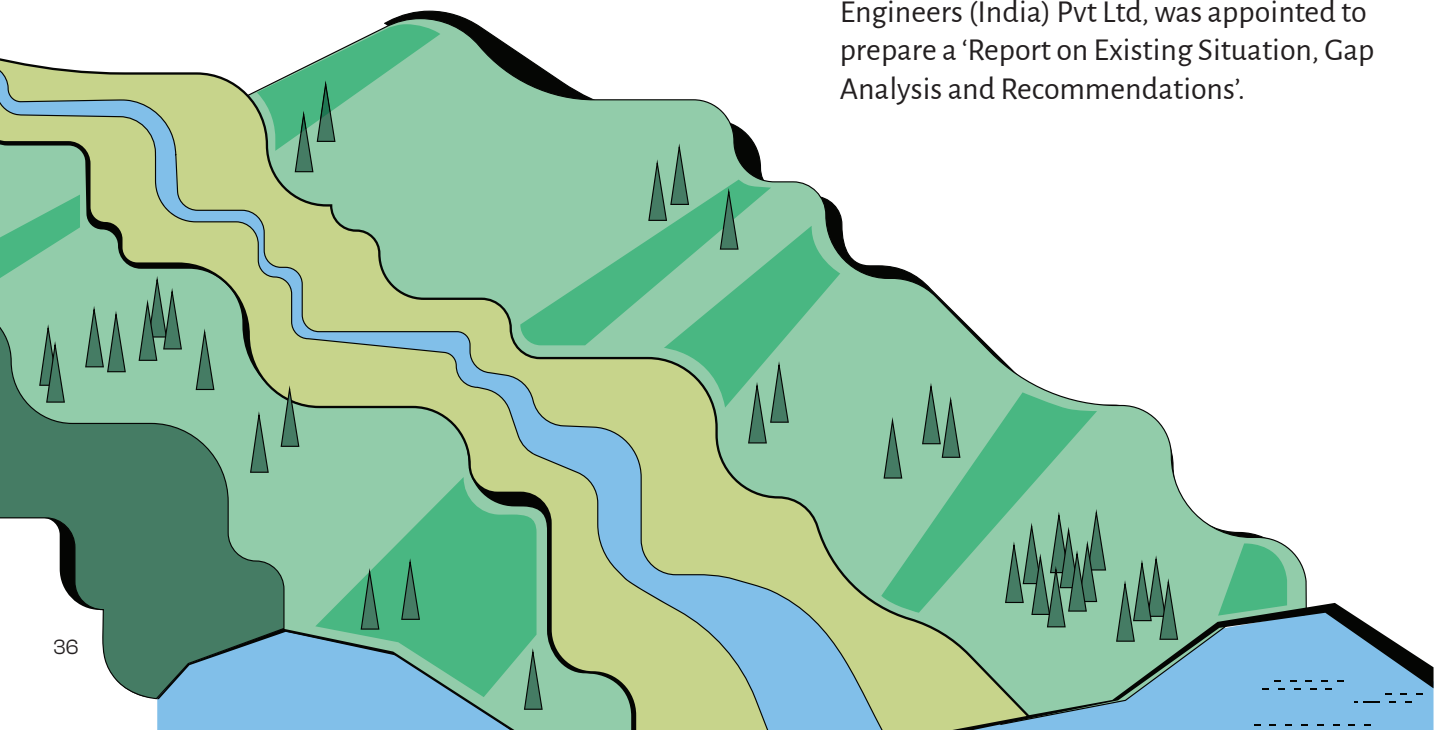
Handover of Stormwater Master Plan for Ward 4—Bhubaneswar

**August 2022**



Urban flooding is a well-documented problem in Bhubaneswar. Several projects on storm water management have been developed in the past. From 2017-2020, GIZ under the ICT-A project assisted Bhubaneswar in the development of a digital solution designed to facilitate data between citizens and the municipal administration in the **maintenance and clearing of the city's drainage systems**. It was also addressed in Bhubaneswar's Smart

City projects, specifically the Lake Neutral Project, which aimed to develop a green area in the downstream part of one of the city's major drains (Drain No. 10), by constructing, amongst others, an artificially created water retention pond. Despite the sporadic development of individual measures, a comprehensive city plan for storm water management had been missing. Two measures were developed under the CSC project to address this inadequacy—an urban design thinking measure on the sponge city concept by TU Berlin, and Fichtner Consulting Engineers (India) Pvt Ltd, was appointed to prepare a 'Report on Existing Situation, Gap Analysis and Recommendations'.



## **Design Thinking for Better Planning**

An Urban Design Thinking Series was conducted by the implementation partner TU Berlin to develop a **climate-sensitive urban design from a user perspective**.

Two workshops and one online survey were conducted culminating in the development of a pre-feasibility study on stormwater management in Bhubaneswar.

An online survey of residents within a 500m stretch north and east of Drain No. 10 conducted by TU Berlin in 2019 concluded that residents were significantly affected by the changes in the local climate. To relieve the downstream zones from the increasing pressure of stormwater drainage, it was jointly decided by BMC, BSCL and GIZ to focus on water retention in its catchment area in the neighbourhoods of Nayapalli.

This plan of retaining water in the Nayapalli catchment area would help tackle the

challenges of stormwater being faced by the city by reducing the runoff of water and getting collected in the low-lying area leading to a flood-like situation.

A second Urban Design Thinking workshop was conducted in March 2020 to develop a model for a Sponge City concept for the Nayapalli catchment area. The general idea of a 'Sponge City' is to hold water at the source and discharge it slowly. This enables effective use of the water by the city and its inhabitants. To implement this, three layers of intervention were identified in the second workshop these were further elaborated in the finalised pre-feasibility report.

The three layers comprise:

1. Activation of open spaces
2. Linking of open spaces
3. Awareness of the values of a blue-green city infrastructure





## Stormwater Management

Based on the Urban Design thinking workshop an open space analysis in the Nayapalli district was undertaken. Seven open spaces were selected to serve as case studies for the conceptual development of the identified layers, as presented in the pre-feasibility report. The developed solutions are to serve as planning principles that can then be adopted and transferred to cover the entire city of Bhubaneswar.

Complementing the urban design thinking series, a **Report on the Existing Situation, Gap Analysis and Recommendations** were prepared. The report provided a detailed analysis of the current state of stormwater management in Bhubaneswar and made recommendations on the steps required to tackle potential weak points. The report was based on the observations made during multiple site visits in March 2020, meetings with BMC officials, input documents provided by GIZ, as well as relevant policies related to stormwater drainage at the national, state, and city levels.

Taking the Sponge City concept further, the Nayapalli plan was designed to add to the

reduction of surface runoff and enabled the development of rainwater harvesting structures to prevent flooding. A comprehensive report was submitted including a detailed design and Bill of Quantities (BOQs).

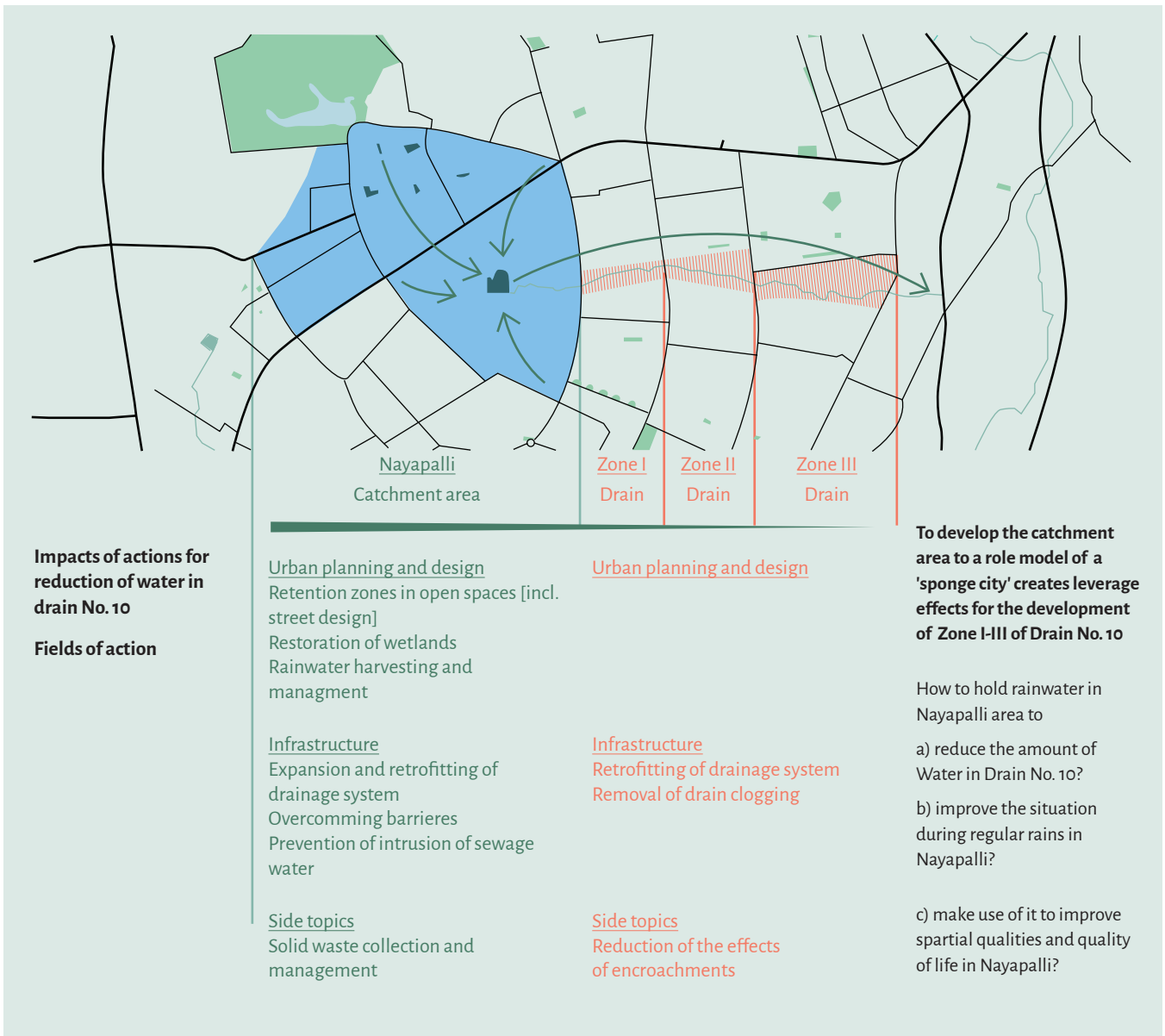
To tackle the critical issue, ward 4 area which is notoriously prone to flooding throughout the year, developed a stormwater Master Plan for the ward 4 areas. It made recommendations for corrective actions for the management of stormwater water, supported by a topographic survey of the area. The plan created a comprehensive strategy for the region to manage its stormwater while also aligning with the City Development Plan (CDP) and future growth goals. Interestingly the financial analysis of the budget based on the CSCAF, undertaken by the project showed that stormwater drainage was one of the biggest areas of spending for the city of Bhubaneswar.

The BMC has since pledged to invest significantly into the development of the stormwater management infrastructure in Bhubaneswar in a structured manner.



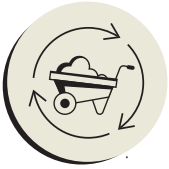
### CSC Project Interventions

- Review of existing Bhubaneswar Stormwater Master plan
- Stormwater Master Plan for Ward 4—Bhubaneswar
- Drainage plan for the Nayapalli area-Bhubaneswar



Development of blue-green measure in catchment areas Source: TU Berlin, Marcus Jeuther





## C&D Waste Management

In recent decades, Bhubaneswar, like many other Indian cities, has experienced an accelerated pace of urbanisation. This, and the changing patterns of lifestyle are the reasons behind the exponential growth of construction of new buildings, the demolition of large numbers of old buildings and the increased renovation of existing structures. All are contributing to the generation of large quantities of C&D waste every year. Construction and demolition (C&D) waste comprises any waste that is generated from the construction, renovation, repair, and demolition of houses and other large building structures within cities. With the construction sector being highly resource and energy-intensive, it contributes substantially to GHG emissions and consequently climate change, which is why enhanced recycling is a foremost need. Furthermore, inadequate waste disposal and waste dumping into urban water bodies and water channels have impaired the city's ability to cope with extreme flooding events, making C&D waste management in Bhubaneswar a priority task. Effective C&D waste management, therefore, directly contributes to the success of stormwater management in Bhubaneswar.

The currently operational C&D waste management system in the city is being managed by BMC. Its waste management system is mainly based on the state-wide

sanitation policy that was rolled out in 2017. Despite the policy comprising a comprehensive list of strategic components for waste management and sanitation, the climate change component of waste management, and the C&D component were not specifically highlighted. To address these shortcomings and include solid waste management in the conversation of urban climate mitigation and resilience, GIZ under the CSC project consulted Schenk Engineering and IPE Global for the development of **Gap Analysis, Recommendations & Roadmap Report on C&D Waste Management in Bhubaneswar.**

For a comprehensive assessment of the existing situation, an off-site analysis, including a literature review of relevant documents, a review of existing systems on C&D waste management, stakeholder mapping, and a review of ongoing and proposed projects, as well as an on-site analysis, including a field assessment were done. The consultants identified the absence of any baseline concerning the quantity and characteristics of C&D waste, as one of the main problems in Bhubaneswar. This greatly impedes the development of any future interventions. It was stated that the establishment of a robust, informative, and trustworthy C&D waste baseline generation inventory system would act as a catalysing tool for BMC to achieve its





objectives regarding C&D waste management

Other objectives include the mapping of C&D waste flow, the optimization of the fleet size for C&D waste collection and transportation, the provision of proper site planning for temporary C&D waste storage, and the development of a material circularity concept.

GIZ supported the city in reviewing the RFP for C&D waste management, developing bylaws for C&D waste management, and conducting characterization and quantification studies to establish baselines and help the city make decisions.

In terms of the amount of fuel consumed for transportation from the source to the disposal, the waste industry is one of the biggest sources of GHG emissions. The trend of these emissions needed to be understood, as well as the effects of the various GHG emission reduction initiatives being implemented. GIZ proposed a concept for a GHG Monitoring, Reporting and Verification (MRV) system for C&D waste within the existing structure of the Corporation and training were conducted for ULBs staffs on the same.

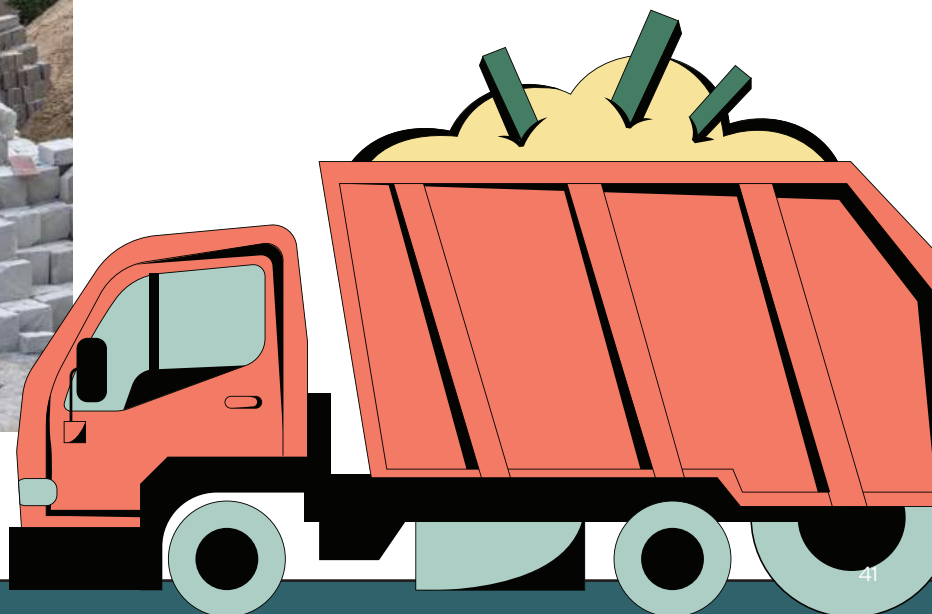


"The major reasons for urban flooding are erratic rainfall and the lack of infrastructure. Through our intervention, we are not only arresting the runoff but storing the water in reservoirs that can be utilised for various purposes like watering local parks or for flushing toilets. The idea is to release the water in stormwater drains when there is no rain, thus reducing pressure on them."

-Mr Shabaz Khan  
Technical Expert- Bhubaneswar  
GIZ, India

### **CSC Project Interventions**

- Review of C&D Byelaws
- C&D Quantification and Characterisation exercise
- PPP options and review of RFP for 50 TPD for C&D Waste Recycling Plant
- MRV Concept and Training

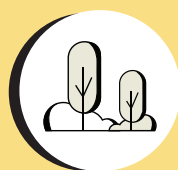


# Coimbatore

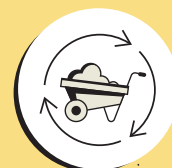


Coimbatore, one of the fastest-growing tier-II cities in India, has transformed itself from a small agricultural village to a big industrial and administrative city. Rapid urban growth has led to the increased sealing of public and private areas, causing the disappearance of green spaces in and around Coimbatore. Amongst others, this loss of green cover is leading to a rise in temperature and a loss in biodiversity, thus negatively impacting the local climate at large. Owing to the topographical attributes of the city, water security has persisted as a concern. Urbanization, construction and waste disposal around the periphery of water bodies, historically built to capture water where it flows, have inhibited its ability to regulate climate. Attempting to revive and rehabilitate these water bodies, and increase urban green cover has been identified as an immediate need of the city, the CSC project provided technical support to CCCM in this endeavour.

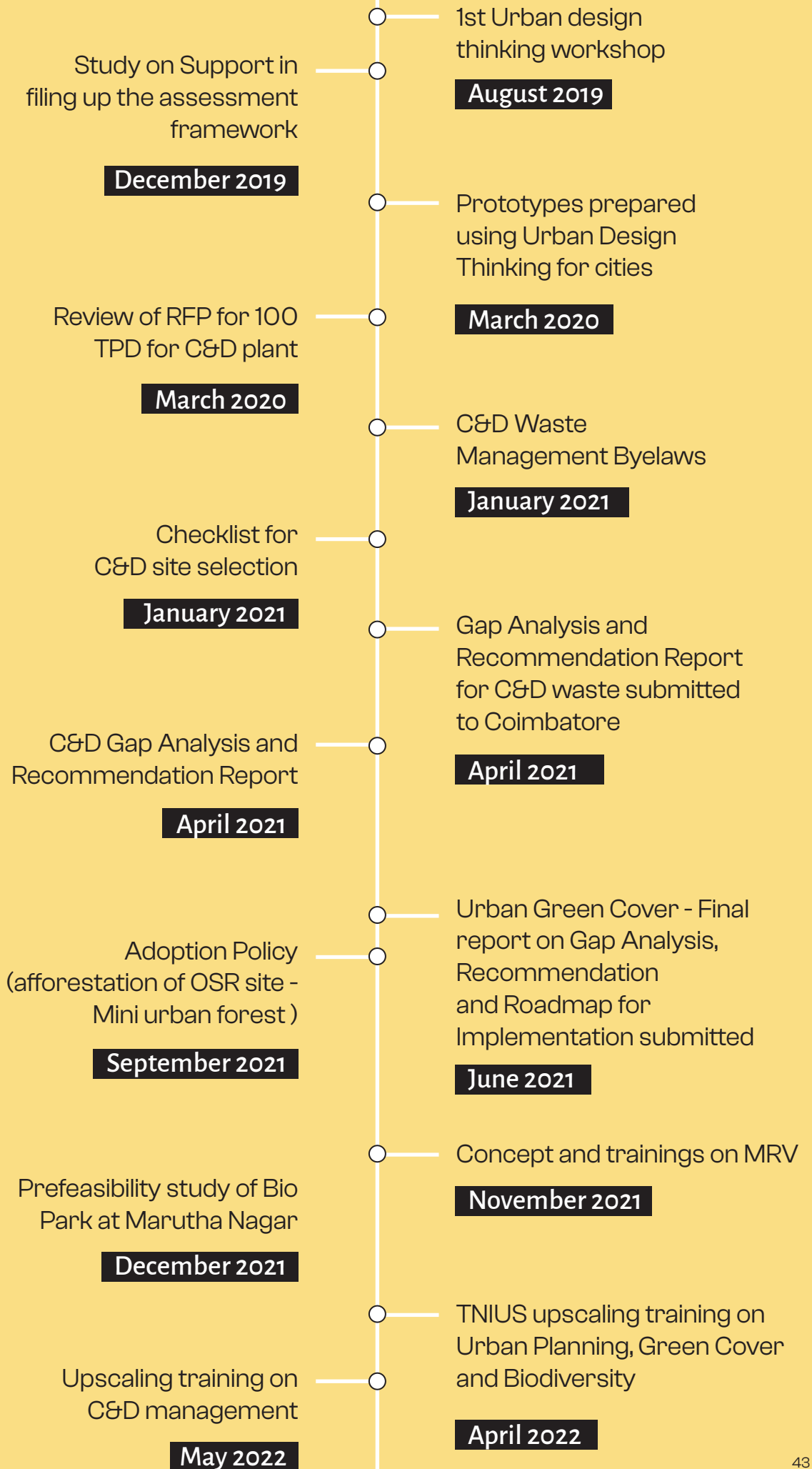
In order to gain a comprehensive understanding of the situation, GIZ in cooperation with the Coimbatore City Municipal Corporation (CCMC) and Coimbatore Smart City Limited (CSCL) organised a planning workshop based on urban design thinking in December 2018, which was attended by various public and civil stakeholders from Coimbatore. An increase in urban green cover, restoration of water bodies, and improved C&D waste management system were identified as key intervention areas for the CSC project. The CSC project intervention's focus was not just on restorative measures but also preventive.



Urban Green Cover

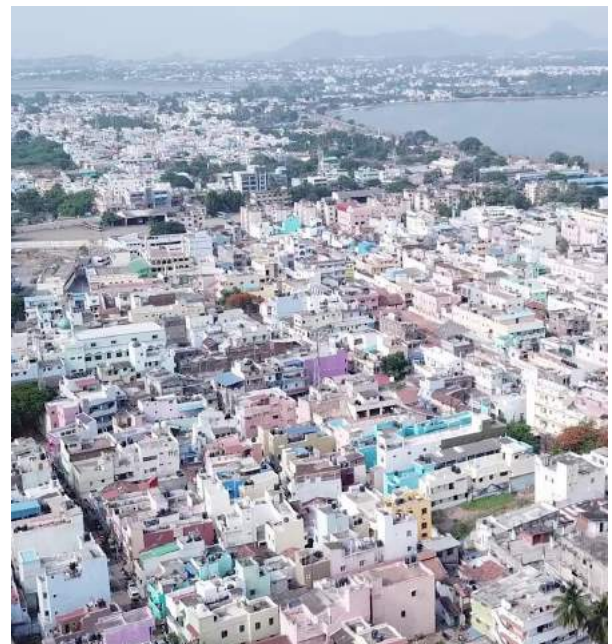


C&D Waste Management





In the CSC project, GIZ and its implementing partners have developed two measures on the subject of Urban Green Cover, which combined, are meant to provide a strong foundation for future implementations. CSC projects implementing partner, TU Berlin through an Urban Design Thinking Series, developed a citizen-centric approach for the development of urban solutions. It was then developed into a pre-feasibility study on green spaces in Coimbatore. Additionally, to assess the distribution of green cover in Coimbatore and for the planning of interventions, GIZ collaborated with CRISIL India to develop an Urban Green Cover Framework Study including recommendations and a roadmap for Coimbatore.



## Urban Design Thinking

As part of the **urban design thinking measure**, TU Berlin conducted two workshops and one online survey on the public's perception of green cover in Coimbatore. During the first urban design workshop in August 2019, participants from public and private groups reflected on the green cover, acknowledging the value of parks as the green lungs of the city. The participants also realised that the extensive tree planting activities in the past years have not been accompanied by appropriate maintenance measures.

The online survey was conducted in the summer of 2019 with about 1,000 participants from the area of CCMC on the perceived climate change effects in the city. Many respondents stated to have witnessed changes in local climate, mainly in form of high temperatures, erratic monsoons and droughts. These climate changes have impacted their lives leading to water scarcity and higher cost of living.

In the second urban design thinking workshop, participants worked on developing a strategic approach to retrofit the existing green infrastructure following the sponge city concept. The two guiding questions that structured the dialogue were:

1. How to increase the retention and cooling capacities of open spaces

2. How to increase biodiversity in the city

An underdeveloped park in Marutha Nagar's neighbourhood, Koundampalayam of Ward No. 6, was selected as a pilot area for the strategic development of open space conservation. The Marutha Nagar Bio Park is a pioneering example of a green community space. It exhibits the multidisciplinary capacity of parks by planning solutions in multiple layers of interventions, namely activation of open spaces, strengthening of ecological values, rainwater harvesting and management, and creation of awareness about the value of blue-green infrastructure. Proposed solutions include a bio-fence, a green eco-park design, a rainwater harvesting and management concept, a neighbourhood circuit, and an awareness campaign.





## Urban Green Cover

The importance and benefits of urban green spaces according to their size, type, accessibility, and distance have been verified in multiple studies in environmental disciplines. A good understanding of a city's distribution of existing green spaces including their types is essential for the identification of gaps in green cover and for the development of future greening strategies for the city. For this reason, GIZ under the CSC project appointed CRISL Infrastructure Advisory to develop the green cover assessment study in October 2019. The objective of the study is to provide CCMC with a detailed understanding and mapping of the various types of flora and fauna naturally available in Coimbatore city, as well as the surrounding legal and political frameworks that influence them. The study and included map act as a crucial decision-making tool, enabling the local government to develop targeted planning strategies for developing green in the city.

Both measures under the CSC project, by TU Berlin and **CRISIL Infrastructure Advisory**, have significantly shifted the governmental and public discourse on the **urban green cover in Coimbatore**. They illustrate the importance of green cover for the city and its residents



while providing a toolkit of measures to guide and assist the city administration in the development of future intervention plans.

Following the two CSC measures, GIZ continued to support the city in the development of an adoption policy that has now been implemented by the CCMC. In 34 identified Open Space Reserve (OSR) areas and urban forests are being developed with the support of local NGOs and private agencies. The plan is for 100 parks. Detailed plans for the Maruthanagar park have been prepared for implementation by CCMC. Further support to develop green areas around likes is proposed. Heat island mapping was also carried out for



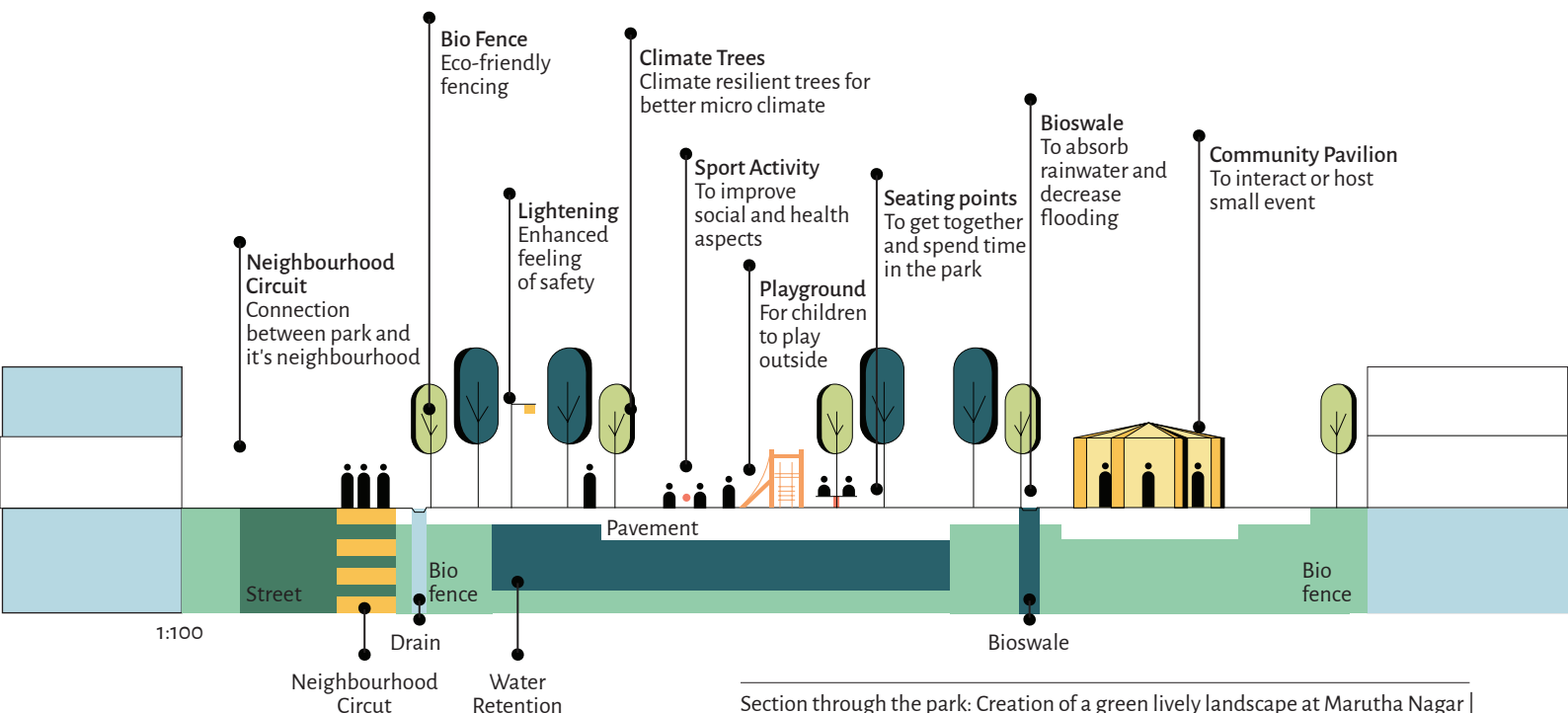
the city and will help identify other areas of immediate attention. financial analysis of the budget using the CSCAF framework as a lens helped identify funds within the CCMC budget for further action.

"We prepared an urban green cover city-wide programme and based on that we gave some recommendations, including policy-level intervention."

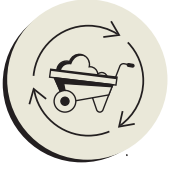
### CSC Project Interventions

- Adoption Policy (afforestation of OSR site - Mini urban forest)
- Draft DPR Bio Park at Marutha Nagar

- Mr Ravi Kumar  
 Technical Expert- Coimbatore  
 GIZ India



Section through the park: Creation of a green lively landscape at Marutha Nagar | Source: TU Berlin, Efa Faschina



## C&D Waste Management

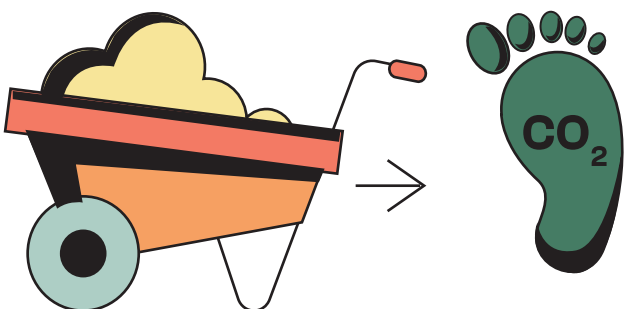


Coimbatore city, like other Indian cities, has been experiencing exponential growth in the production of Construction & Demolition waste, due to an abundance of construction, renovation and demolition activities in recent decades. The inappropriate and inadequate management and recycling of C&D waste contribute significantly to the overall carbon footprint of the city. With respect to waste management, the State of Tamil Nadu has rolled out several policies, which guide Coimbatore's approach within this sector. These include the Tamil Nadu Sanitation Policy, 2012, State Action Plan on Climate Change, 2020, and the Tamil Nadu SWM Policy and Strategy but the climate change component

was not very well addressed in any of the policies and they also lacked incorporation of C&D waste management as one of the components.

To address these deficiencies, two consultancy firms, Schenk Engineering, Germany and IPE Global, India were commissioned to develop a **Gap Analysis, Recommendations & Roadmap Report on C&D Waste Management in Coimbatore**. The assessment of the existing scenario comprised an off-site analysis, including a literature review of relevant documents, a review of existing systems on C&D waste management, stakeholder mapping, and a review of ongoing and proposed projects, as well as an on-site analysis, including a field assessment. The study also reviews various policies at the national, state and city level levels with regard to C&D waste management and recommendations were shared.

Recommendations were given regarding the development of a C&D waste generation inventory system, mapping of C&D waste flow, optimization of fleet size for C&D waste collection and transportation, and formation





of city-specific bylaws and legal enactments. Methods for quantification of C&D Waste were also shared with the city. GIZ also supported the city in the review of their RFP document and bids for setting up a 100 TPD C&D waste management plant in Coimbatore through the PPP model. Monitoring GHG emissions is an extremely important aspect for cities to plan their action toward reducing the emission. GIZ developed a concept for GHG Monitoring, Reporting and Verification (MRV) system for C&D waste management within the existing system of municipal operations. This system will help the city of Coimbatore in reducing their emission in the sector through focused interventions.

GIZ under the CSC project developed **Bylaws for C&D waste management in Coimbatore**. The bylaws directly drew from the information collected in the gap analysis and recommendations report, allowing for the development of a political framework around the C&D waste system in Coimbatore that factors in the existing scenario and

stakeholders. It includes strategies to effectively reuse C&D waste as well as for GHG emission monitoring, making CCMC the very first corporation in the country to set sector-specific mechanisms to reduce carbon emissions. GIZ also supported the development of a checklist to identify locations of C&D waste and dumpsites. Subsequently, 17 locations were notified.

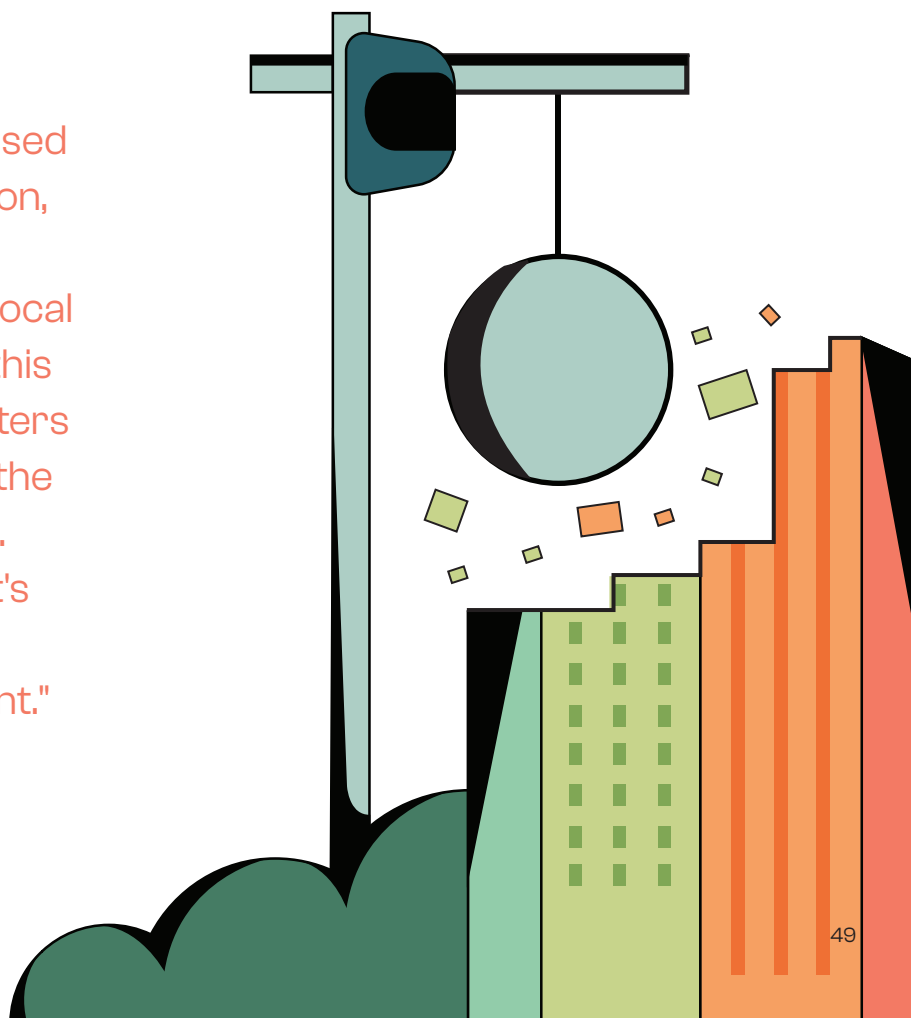
Together these measures are expected to help the city reduce its carbon footprint, improve sanitation, protect natural urban areas from waste pollution, and improve the local economy through the trade in recycled waste.

### CSC Project Interventions

- C&D Waste Management Byelaws
- Checklist for C&D site selection
- MRV Concept and Training

"The amount of construction and demolition (C&D) waste generated in cities has increased as a result of rapid urbanisation, and managing this waste has become a new challenge for local government. Mishandling of this C&D materials triggers disasters like urban floods by clogging the drain and obstructing its flow. As a result, one of the project's intervention-focus areas has been C&D waste management."

- Mr Liju Mathew  
Technical Expert  
GIZ India





# Kochi

Kochi, a coastal city and the commercial capital of Kerala, is vulnerable to the ill effects of climate change due to its geography and economic growth. Natural disasters like floods, coastal erosion and landslides along with rapid urbanization, and natural resource depletion have led to several environmental and health hazards. Around 20% of the city's land mass is underwater, transforming Kochi into various islands and mainland parts that are connected by canals and their backwaters. This city has risen from an ancient port town to a well-established trading centre, and today forms the commercial capital of the state. Due to its unique geography, Kochi is highly vulnerable to natural disasters such as floods, coastal erosion, and landslides. With these vulnerabilities in the background, the city needed climate-sensitive solutions, for which GIZ collaborated with KMC.



**Green Building  
and Flood Resilient  
Buildings**



**Solid Waste  
Management**



Support in filing up the assessment framework

**December 2019**

1st Urban design thinking workshop

**August 2019**

Green building checklist

**December 2019**

Climate Action Plan - Kochi

**February 2020**

Gap Analysis for green building framework

**October 2020**

Gap Analysis for Kochi Municipal Solid Waste Management

**January 2021**

Upscaling training on green building - KILA

**July 2021**

Greenbuilding checklist

**October 2021**

Concept and training for MRV

**Jan 2022**

Prefeasability study for Ernakulum market

**March 2022**

Route planning study for ward

**March 2021**

KILA training of C&D waste

**April 2022**

KILA training on Urban Green Planning

**May 2022**



Considering the increasing urbanisation of Kochi in the past decades, the need to better guarantee the sustainability of future urban development was identified as a top concern. Preparation of a Climate Action Plan (CAP) was identified as the first area of intervention. Findings from the Climate Action Plan were then taken up for further planning and implementation. As per the records, the city took up actions like reduction of energy consumption by converting the streetlights into LEDs; planning for improved collection and transportation of municipal solid waste and greening the building sector.



With the intention of finding climate solutions for the city GIZ along with Kochi Municipal Corporation (KMC) and Cochin Smart Mission Ltd. (CSML) organised a planning workshop in December 2018 by GIZ, during which participants representing various public and private organisations sought to identify the most pressing urban climate challenges in Kochi.

As a first step to developing a clear understanding of the relevance of green and flood resilient buildings in Kochi, and to get an insight into citizens' perspectives. A planning workshop accompanied by an online survey was conducted. The proceedings from these showed that most citizens clearly linked changes in local annual temperatures and rainfalls to global climate change. A second workshop on the green building was later organised by GIZ and held in Kochi in November 2019. The workshop brought together stakeholders and experts engaged in the green building sector to brainstorm and provide inputs for the development of the

draft framework for green buildings in Kochi.

In parallel, and in preparation for the development of the green building framework, GIZ prepared a situation & gap analysis report on green buildings in Kochi. The report sought to understand and document the current state of green construction in Kochi and analyse the existing policy framework, barriers and gaps. The report not only highlights the various points of urgencies that demand a green building framework but furthermore reveals the topics it must cover.





## Green and Flood Resilient Buildings

Kochi city's diverse architectural style has traditionally been shaped by its role as a historic port city whose culture has been enriched by successive waves of migration over several millennia. While the architectural style originally was strictly governed by locally available resources and built-in accordance with the local climate, factory-produced materials such as cement and steel quickly took over in the 1970s during Kerala's rapid urbanisation. This marked the end of environment-friendly Kerala infrastructure. Several attempts by the government of Kerala to promote sustainable building techniques and innovative materials have been implemented since, such as the development of alternative technology institutions like Nirmithi Kendra. However, widespread implementation of green buildings in Kerala could not be achieved.

The CSC project aims to address this issue through the introduction of a **Green Building Framework**.

The **Kochi Green Building Framework** is meant to provide an easy-to-use political instrument to evaluate the greenness of buildings without depending on official certifications such as LEEDS and others. Several GIZ project partners and consultancy firms contributed to the

development of the Framework, including TU Berlin, and Buro Happold.

The new **KMC building** was selected to be developed as a lighthouse project for the Green Building Framework implemented by the Kochi Municipal Corporation (KMC). TU Berlin and Buro Happold under the CSC project provided technical support for the green certification and transformation of the KMC building and helped to incorporate recommendations into the design. The heat island mapping for Kochi helped the city identify the areas of the city where green building interventions are most needed. The Kannur stadium is one such area that required immediate action.

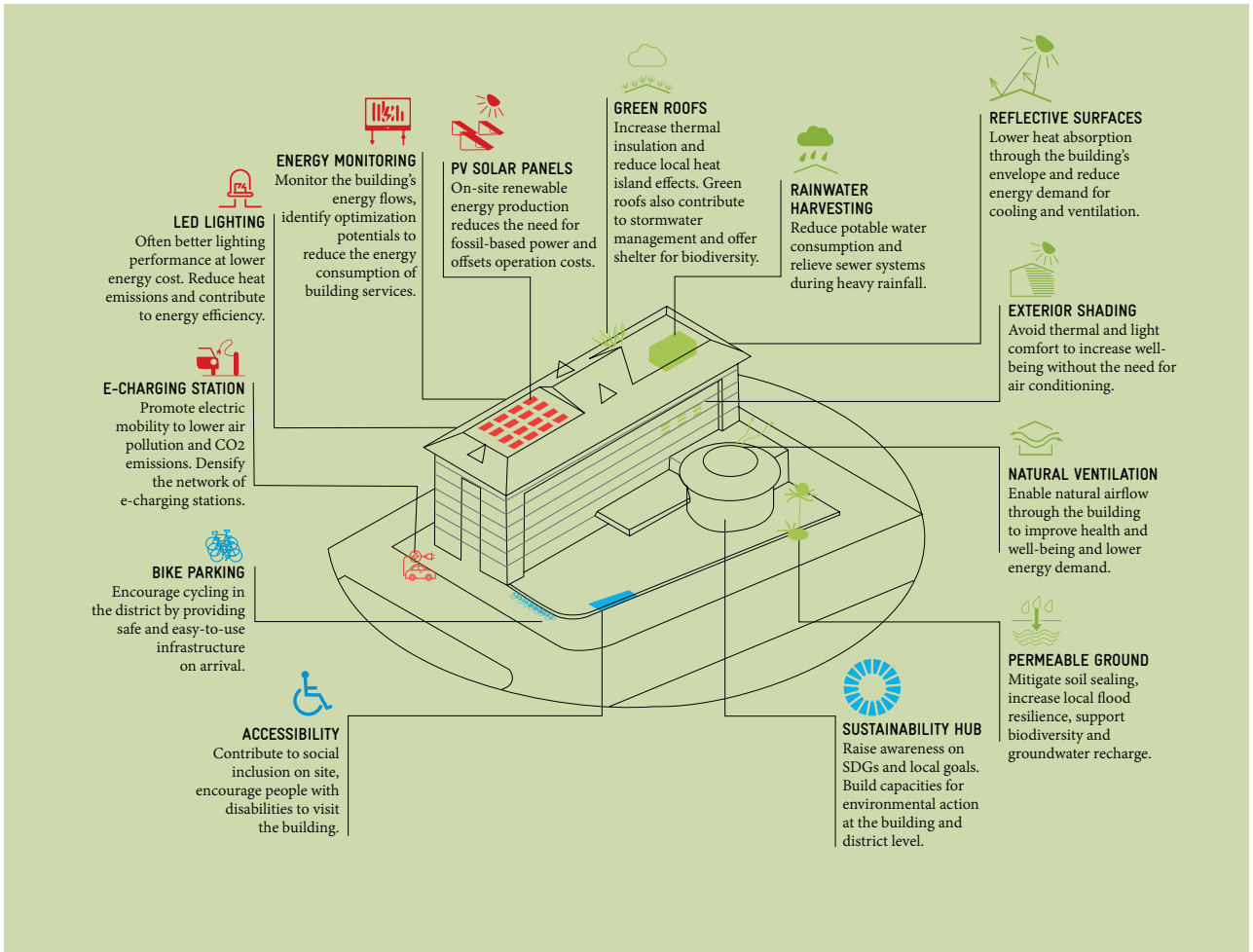
All assignments helped create a well-rounded and praxis-oriented green building framework. It is expected to enable administrations, companies, and civilians to easily assess the level of sustainability of their buildings and provide a guideline for the construction of green buildings, which can be used for most new urban developments. This will ultimately lead to a significant reduction in the carbon footprint of the construction industry in Kochi and help create more climate-resilient buildings.

"There is general awareness about green buildings but the number of green buildings in Kochi and in fact in the entire state is very low."

- Ms Sunita Menon  
Technical Expert- Kochi, GIZ India

### **CSC Project Interventions**

- Green building checklist- Preparation of RFPs for New Buildings in Kochi
- Green Building Advisory Report submitted to Kochi Municipal Corporation





## Solid Waste Management

Solid waste management was identified as the second thematic sector of climate relevance in Kochi. Kochi city possesses a well-organised SWM system. Compared to most other Indian cities, the Kochi SWM system is unique in that it includes waste segregation into dry and wet waste at the source, as well as a complex collection system spanning several actors—starting with the primary collection of waste by Kudumbashree workers with manual push handcarts, to aggregation at designated storage points, and transportation via compactor vehicles and larger vehicles to the final processing location at Brahmapuram facility.

However, SWM in Kochi had some shortcomings. The system with its high reliance on individual workers was vulnerable to extreme weather events such as cyclones. SMW waste disposal caused clogging of natural and artificial drains, contributing to Kochi's vulnerability to urban flooding in extreme rainfall events.

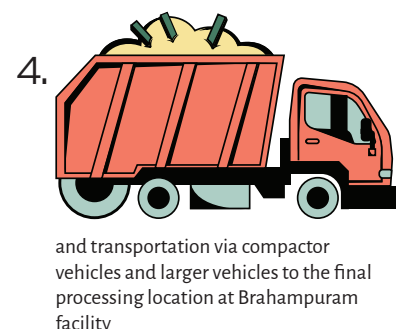
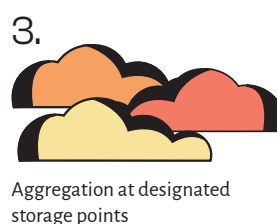
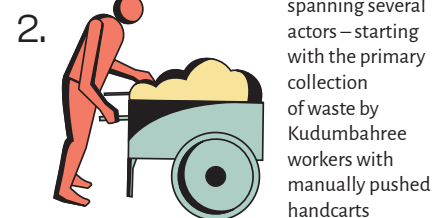
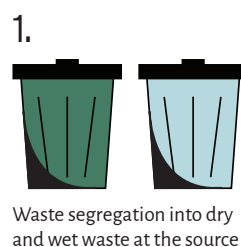
To identify the current weak spots of the SWM system in Kochi and develop sensitive planning solutions, the GIZ project developed **a gap analysis and recommendations report for SWM in Kochi**. The main deficiencies identified included the absence of a route plan which compromised coordination between the primary and secondary collection, inadequate vehicle structures, and the lack of proper storage points, that, during rains, commonly led to the contamination and blockage of water systems. Additionally, Kochi's SWM system lacked the inclusion of a climate change resilient approach. GIZ also analyzed the city's compliance with various waste management rules including C&D waste, Biomedical waste and Plastic waste.

The Broadway market in Kochi is one of the main vegetable markets in the city and the management of waste in this area is one of the major challenges for the city. GIZ, under the project, developed a concept for in-situ

management of organic waste in the market, thus reducing the amount of transportation of waste to Brahmapuram and associated emissions. The market is also one of the wholesale markets for bananas, thus generating a massive amount of associated waste. The project also developed a concept for the management of banana waste in the market.

In response to these drawbacks, GIZ and KMC initiated the development of a **Collection and Transportation Plan for Kochi**. The plan includes a well-researched quantification of solid waste at the city level, as well as at the area level. The study was conducted as a pilot for a ward which can then be upscaled to other wards and thus helping KMC to utilize their resource for SWM Collection and transportation in the most efficient manner. This estimation constitutes the foundation for any future technical, financial, and resource planning regarding the SWM system in Kochi. A Monitoring, Reporting and Verification (MRV) system for monitoring the SWM system of the city was also prepared and the KMC staff were trained for the same. The plan incorporates climate mitigation and resilience aspects, such as the employment of battery-operated vehicles

The unique Kochi SWM system includes:

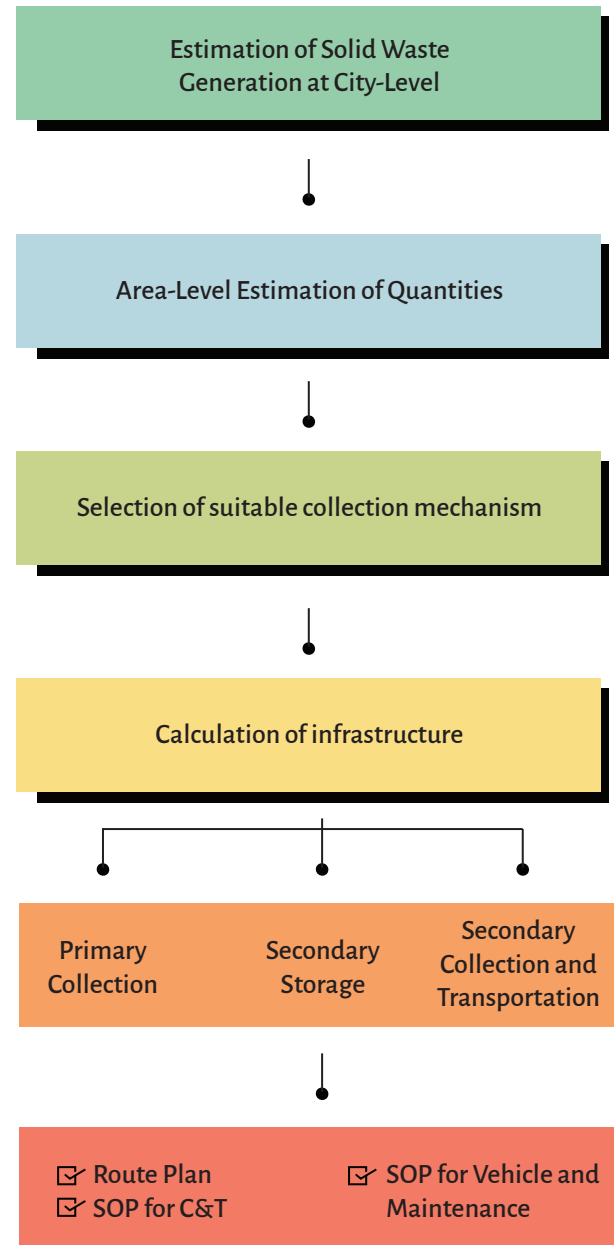




for primary collection, as was already proposed in the Smart City Project. The plans provide concrete instructions that will help Kochi city to update its SWM system to be more effective and climate-friendly. This also set the groundwork for establishing a more resilient SWM system that can operate in emergencies.

"We are supporting the corporation to do waste segregation under the segregation awareness program. Segregation will help the corporation reduce the financial burden of transporting waste."

- Dr Ramesh Nair  
Technical Expert- Kochi, GIZ India



Collection and Transportation Plan Framework  
Source: IPE Global

### **CSC Project Interventions**

- Micro Planning Municipal Solid Waste- Collection and Transportation Root Rationalisation
- Pilot Study for Ward-4
- MRV Concept and Training
- Municipal Waste Characterisation and Quantification Study

# 04

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## Capacity Development

Capacity Building is a core part of the CSC project and is embedded in its methodology of planning, implementation, and upscaling. The various measures implemented in the three project cities, Bhubaneswar, Coimbatore, and Kochi, constitute pilot projects aimed at providing examples for the development of praxis-oriented solutions in line with the CSCAF Assessment Framework. MoHUA and GIZ wanted to upscale these solutions to as many other cities and states within the country as feasible.

This dissemination process for the CSCAF at the national level and the work in cities was achieved through the development of multiple measures for capacity development at the national and state levels. These included training implemented by Indian training institutes as well as the preparation of work aids for cities. At the national level, the CSCAF was disseminated through a series of online and face-to-face trainings. Subsequently,

**133** trainings conducted

**2800+** participants trained across 10 states

**17** training institutes capaciated

**6** MoU's signed

**5** working aids prepared

**9** CSCAF indicators converted to trainings

**4** Self paced learning programme anchored at NULP

this was done through a Helpdesk at NIUA, an implementing partner via C-cube. Five multi-day training series, corresponding with the five thematic sectors covered by the local measures, were held between 2021-2022 and jointly organised by MoHUA and GIZ with the implementing partners NIUA and the German Institute of Urban Affairs (Difu) and one of three Indian training Institutes, namely Engineering Staff College of India (ESCI), Tamil Nadu Institute of Urban Studies (TNIUS), and Kerala Institute of Local Administration (KILA).

Besides planners and technical officers from the governments of the three partner cities and implementing agencies, officials from 14 other smart cities also participated in the training series.

Each training series concluded with a one-day Training of Trainers (ToT), with the training institutes expected to build on the knowledge of city and state administrations. The training series aims to support the project and partner

"The idea is not to just build capacities. What we are trying to build with GIZ is a capacity ecosystem. So it is not just about training people but taking it to many more throughout ToT programs, capacity grids, peer to peer learning, documentation of best practices and knowledge exchanges at international, national and regional levels."

Mr Hitesh Vaidya  
Director, National Institute  
of Urban Affairs

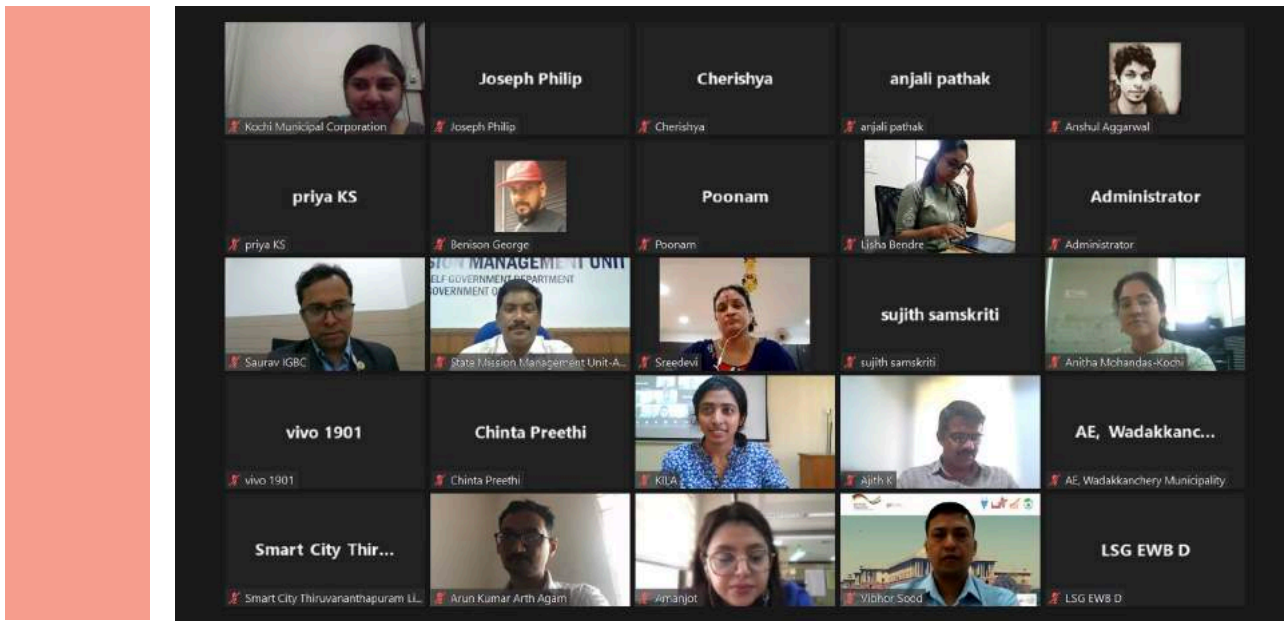


cities to improve their performance in the ClimateSmart Cities Assessment Framework. Training institutes participated in these trainings. Foremost were TNIUS, KILA and ESCI who went on to conduct 10 plus trainings for participants from other smart cities. Two MoUs were signed with the support of GIZ. Implementing partner, NIUA continued the training dissemination with regional institutes and signed 6 MoUs for further training and localizing the trainings. The expected impact of the capacity development measures includes the expansion of knowledge from practical experience and technical inputs to additional administrative entities and the strengthening of key target groups' capacities, especially through peer-to-peer learning formats. All trainings are available on the National Urban Learning Platform (NULP) of MoHUA for mass dissemination.

"The project focused to build the capacities of municipal functionaries, national and regional level training institutes to mainstream local climate actions. The developed training courses aligned to ClimateSmart Cities Assessment Framework (CSCAF) were scaled up across the country in partnerships with capacitated institutions."

- Mr Vibhor Sood  
Technical Expert  
GIZ India





# 05

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## Way Forward

After the successful journey of the CSC project, it has come to a point when its modus-operandi will change. The project has successfully brought together all stakeholders to discuss and exchange knowledge on climate change. The project takes pride in bringing the discussion on climate change to the agenda of Smart City Mission.

The experience of the project at the national level and at the city level has reiterated the belief that for making cities climate resilient and for the overall growth of a city it is important to look at climate change holistically.

The GIZ ClimateSmart Cities project was conceived as a plan to include climate aspects in the Smart Cities Mission, thus plugging the sustainability gap. Climate is now an integral part of the Mission with an eye on future upscaling and improving the program for application of improvement of the planet.

The ClimateSmart Cities Assessment Framework with its focus on the sectors of climate including water, water resource management, water supply, stormwater management, mobility, air quality, green buildings, urban planning, biodiversity and others have made the project universal, and the project work scalable.

There will be a follow-on project for the

ClimateSmart Cities project, which is called the 'Urban Act: Integrated Urban Climate Action for Low Carbon and Resilient Cities, and has a stronger focus on including climate in regular planning. Climate is made of blocks that fit together, so now the focus is on viewing it as a composite piece, not in silos. In a few years, it is expected that the interconnections between different aspects of climate will become clearer and climate will be seen from a larger perspective in urban areas.

The planet cannot be a standalone aspect, and it's important to look at it holistically. The environment is a subset of climate or vice versa. Any talk on the environment must include sustainability, inclusion, safety, child-friendly, etc., and all of these are subsumed in the paraphernalia of climate. To make a healthy happy city means making it friendly and safe. Despite the challenges of urbanization, the effort must be to look at the whole picture, then only will it be possible to solve the problems.

In this context, the Smart Cities Mission has definitely been ahead of its time, and it has provided the flexibility to remodel the definition in the current context with an eye on the future of urbanization. This means developing sustainable frameworks for growth that ensure that resource consumption



does not deplete the planet, but rather leaves plenty for future generations. This entails building affordable yet excellent infrastructure spanning transport, water, housing, sanitation, waste management, et al. Technology becomes the enabler in such urbanisation plans.

Sustainable growth needs to be climate sensitive, with climate adaptation and mitigation woven into the plans. This makes sustainability an important pillar of any country's growth agenda, the other two being the quality of life and economic ability.

Under the current CSC project, a lot of work has been done whereby citizens are now reclaiming city spaces. All this was made possible when

the program connected the dots between sustainability and Smart City.

The global multi-dimensional partnership involving multiple stakeholders has enabled the development of frameworks that can be a repository of city-specific best practices that have wider applications beyond the city and can be replicated across the country. Further, collaborative learning, knowledge exchange, and capacity building will sustain the climate agenda going forward.

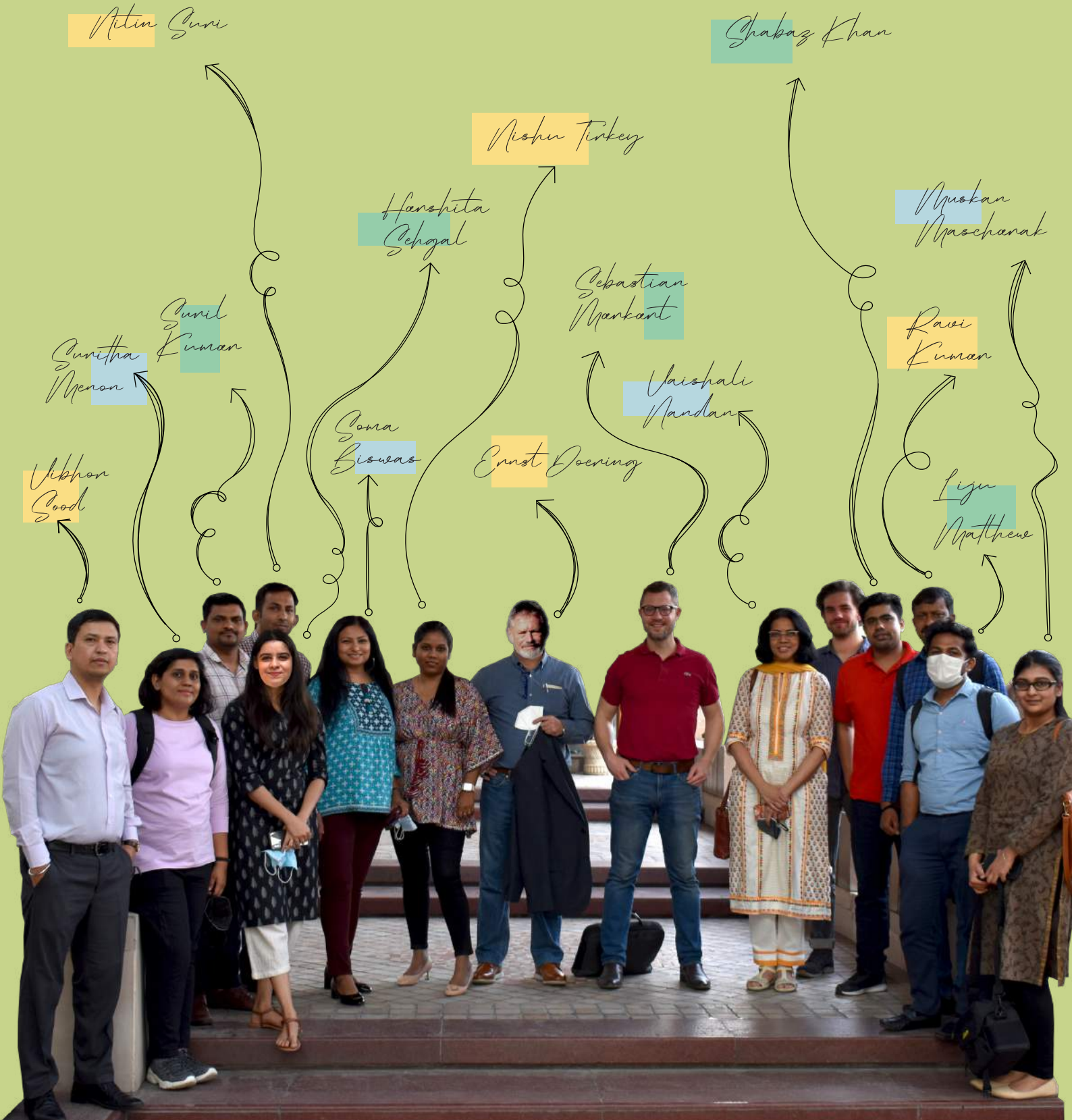
The projects work to initiate the climate alliance that is global in its breadth, applicability and impact. Sustainable ClimateSmart Cities are just the beginning of a sustainable future.

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