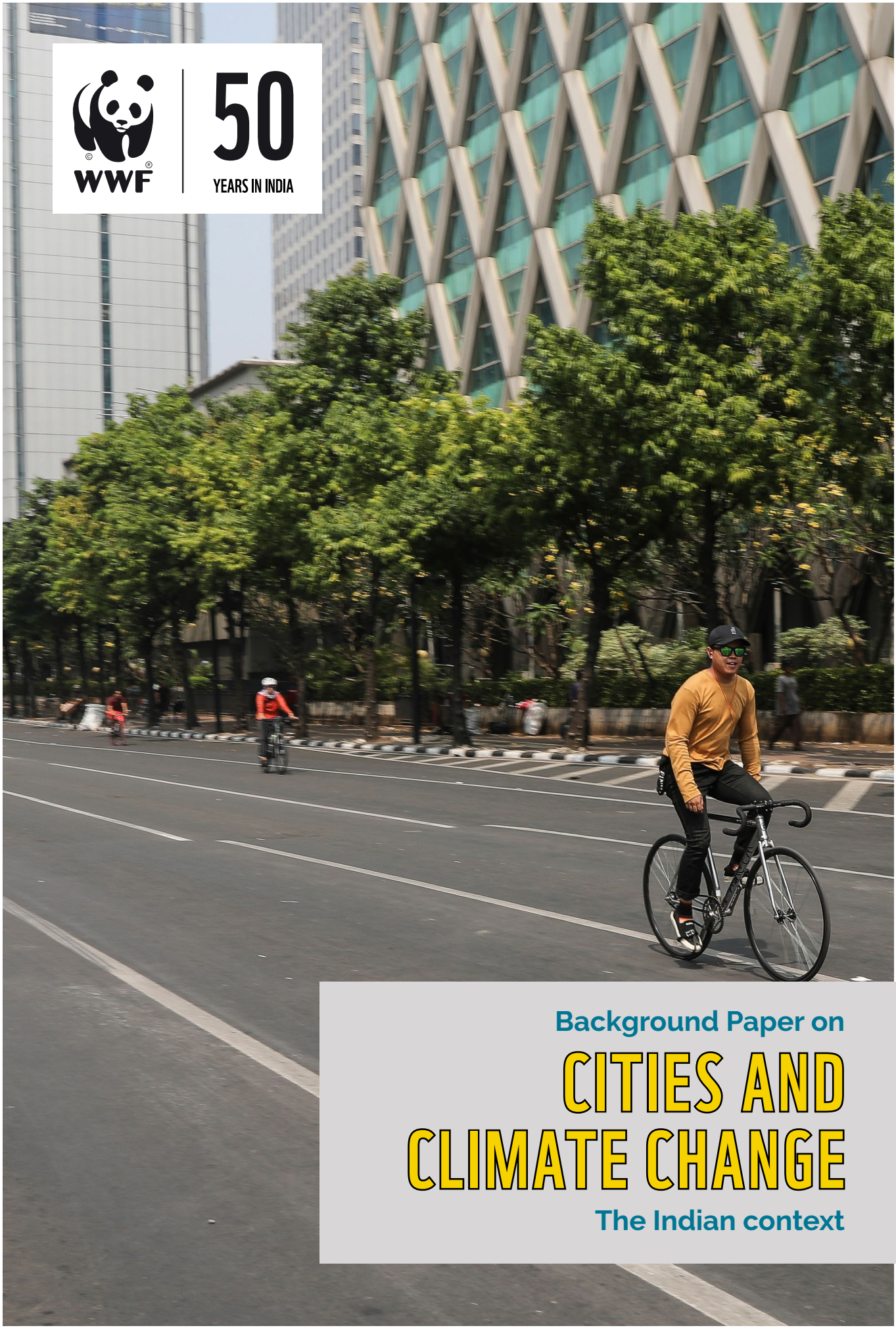


WWF

50 YEARS IN INDIA

Background Paper on

CITIES AND CLIMATE CHANGE

The Indian context

Brief Summary

Over half of world's population currently resides in cities, collectively contributing to 75 percent global greenhouse gas (GHG) emissions. The global urban population is also under the constant threat of increasing climate anomalies leading to increased risk for the vulnerable communities. This paper aims to provide an overview of the role of cities in addressing climate change, from a mitigation and adaptation perspective. More specifically, the paper delves on the developments with regard to the recognition of cities as stakeholders in the national climate agenda, in the Indian context. It tries to understand how city level climate action in India could align with various national schemes and programmes across different sectors such as energy, transport, waste, and climate resilience and adaptation.

The purpose is also to provide a snapshot of key organizations supporting Indian cities for a low-carbon climate-resilient growth. The specific engagement of diverse organisations such as multilateral and bilateral agencies, city networks, thinks tanks, research institutions, and civil society, to facilitate and handhold urban climate action is also discussed.

And finally, the paper highlights the aspects of urban climate finance in India, which enables funding of sustainable urban development projects to tackle the impacts of climate change. As cities are often limited by the lack of technical and financial know-how for climate action, it is crucial to support policy makers and practitioners to understand the landscape of climate actions and finance in the urban context. This would enable them to prioritize sustainable urban development initiatives with strong climate co-benefits for addressing the challenges and opportunities presented by cities in India.

Contents

Acronyms

AMRUT	:	Atal Mission for Rejuvenation & Urban Transformation
ACT	:	Action on Climate Today
ADB	:	Asian Development Bank
AF	:	Adaptation Fund
AfD	:	Agence francaise de Developpement
AMRUT	:	Atal Mission for Rejuvenation and Urban Transformation
BOOT	:	Build, Own, Operate and Transfer
BOT	:	Build-Operate-Transfer
BRTS	:	Bus Rapid Transit System
C3/C-Cube	:	Climate Centre for Cities
CAKN	:	Clean Air Knowledge Network
CAMPA	:	Compensatory Afforestation Fund Management & Planning Authority
CAP	:	Comprehensive Action Plan
CCIP	:	Climate Change Innovation Programme
CDIA	:	Cities Development Initiative for Asia
CDKN	:	Climate and Development Knowledge Network
CDM	:	Clean Development Mechanism
CER	:	Certified Emission Reduction
COVID-19	:	Coronavirus disease 2019
CPF	:	Carbon Partnership Facility
CSCAF	:	ClimateSMART Cities Assessment Framework
CSE	:	Centre for Science and Environment
CSO	:	Civil Society Organization
CSP	:	City Sanitation Plan
CSTEP	:	Center for Study of Science, Technology and Policy
DAE	:	Direct Access Entity
DFI	:	Development Finance Institutions
DFID	:	Department for International Development
DPCL	:	Delhi Power Company Limited

DPL	:	Development Policy Lending
EbA	:	Ecosystem-based Adaptation
EV	:	Electric Vehicle
FCDO	:	Foreign, Commonwealth and Development Office
FDFA	:	Federal Department of Foreign Affairs
GoM	:	Government of Maharashtra
GCF	:	Green Climate Fund
GCoM	:	Global Covenant of Mayors for Climate and Energy
GDP	:	Gross Domestic Product
GEF	:	Global Environment Facility
GHG	:	Greenhouse Gas
GIZ	:	Deutsche Gesellschaft fuer Internationale Zusammenarbeit GmbH
GPCC	:	Global Programme on Climate Change and Environment
GPCCAP	:	Guiding Principles for City Climate Action Planning
GT	:	Gigatonne
HRIDAY	:	National Heritage City Development and Augmentation Yojana
ICAP	:	India Cooling Action Plan
ICLEI	:	International Council for Local Environmental Initiatives
IDC	:	Infrastructure Development Corporation Limited
IDRC	:	International Development Research Centre
IFC	:	International Finance Corporation
IIHS	:	Indian Institute for Human Settlements
IPCC	:	Intergovernmental Panel on Climate Change
IRADe	:	Integrated Research and Action for Development
ISCDL	:	Indore Smart City Development Limited
JICA	:	Japan International Cooperation Agency
JNNURM	:	Jawaharlal Nehru National Urban Renewal Mission
LUPM	:	Land Use Planning and Management
MDB	:	Multilateral Development Bank
MMR	:	Mumbai Metropolitan Region
MNRE	:	Ministry of New and Renewable Energy
MoEFCC	:	Ministry of Environment, Forest and Climate Change

MoUD	:	Ministry of Urban Development
MoF	:	Ministry of Finance
MoHUA	:	Ministry of Housing and Urban Affairs
MSW	:	Municipal Solid Waste
NABARD	:	National Bank for Agriculture and Rural Development
NAMP	:	National Air Quality Monitoring Programme
NAPCC	:	National Action Plan on Climate Change
NbS	:	Nature-based Solutions
NBFI	:	Non-Banking Financial Institution
NCAP	:	National Clean Air Programme
NCT	:	National Capital Territory of Delhi
NDC	:	Nationally Determined Contributions
NDMC	:	New Delhi Municipal Corporation
NGO	:	Non-Governmental Organization
NIE	:	National Implementing Entities
NIUA	:	National Institute of Urban Affairs
NSC	:	National Steering Committee
OPCC	:	One Planet City Challenge
OPIC	:	Overseas Private Investment Corporation
PMAY(U)	:	Pradhan Mantri Awas Yojana (Urban)
PMC	:	Pune Municipal Corporation
PMR	:	Pune Metropolitan Region
PPP	:	Public Private Partnerships
PRSP	:	Partial Risk Sharing Program
PV	:	Photovoltaics
RDF	:	Refuse Derived Fuel
RE	:	Renewable Energy
SAR	:	South Asia Region
SBM-U	:	Swachh Bharat Mission Urban
SCIP	:	Sustainable Cities Impact Program
SCM	:	Smart Cities Mission
SDC	:	Swiss Agency for Development and Cooperation
SDG	:	Sustainable Development Goals
SIDA	:	Swedish International Development Cooperation Agency
SIL	:	Specific Investment Loans

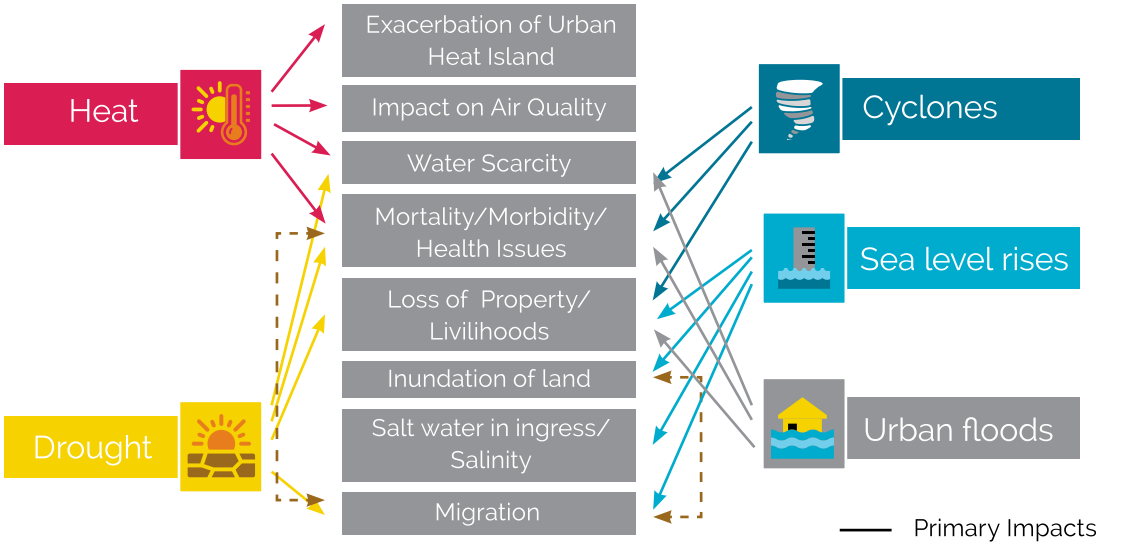
SME	:	Small and Medium enterprises
SmUDI	:	Smart Urban Development in Indian States
TERI	:	The Energy and Resources Institute
UCCR	:	Urban Climate Change Resilience
UCCRTF	:	Urban Climate Change Resilience Trust Fund
ULB	:	Urban Local Body
UN	:	United Nations
UNDP	:	United Nations Development Programme
UNEP	:	United Nations Environment Programme
UNFCCC	:	United Nations Framework Convention on Climate Change
UN-Habitat	:	United Nations Human Settlements Programme
USAID	:	United States Agency for International Development
VCS	:	Verified Carbon Standard
WASH	:	Water, Sanitation and Hygiene
WB	:	World Bank
WMO	:	World Meteorological Organization
WRI	:	World Resources Institute
WWF	:	World Wide Fund for Nature

1. Background

Over half of the world's population lives in cities, and this is likely to increase to over two thirds by 2030. Particularly in developing countries where cities are still growing, population is likely to increase further. By 2050, it is estimated that 68 percent of the global population will live in urban areas, leading to a rise in use of resources.[1] Cities are seen as major contributors to climate change, as various urban activities are sources of greenhouse gas (GHG) emissions. Estimates suggest that cities are responsible for 75 percent of global carbon emissions, with transport and buildings being among the largest contributors. In addition, cities use a large proportion of the world's energy supply.

While being contributors, cities are also among the areas most affected by climate change. 70 percent of cities globally, are already dealing with the effects of climate change. Rising global temperatures cause sea level rise, and increase the occurrence of extreme weather events such as floods, droughts and storms. These often have adverse impacts on basic services, infrastructure, housing, human livelihoods and health, in cities.

It is therefore vital for cities to play a significant role in climate change both in mitigation as well as in building resilience. Cities are hubs of innovation, and serve as a crucial link in developing solutions, especially in key sectors like energy, building, mobility, and waste management by integrating climate change in urban planning. In the current context, the short-term management solutions adopted in the face of COVID-19 can also provide key lessons for cities to adapt in the medium- and long-term to deal with the larger climate crisis. Climate smart planning in cities will determine the extent and impact of climate change, and the ability to achieve emission reductions as well as the capacity to adapt to changing circumstances. Investing in climate adaptation is therefore not only crucial but also a sound investment for cities. The Global Commission on Adaptation in a recent statement emphasizes the need for accelerated progress on urban resilience by improving the resilience of essential services in cities through a strategic shift toward crisis-proof and equitable urban development. It further states the importance of climate-smart projects including storm-proof affordable housing, nature-based solutions, such as green roofs, and inclusive and sustainable sanitation systems, which can be implemented in even the poorest communities.[2]



Impacts of climate change on cities

1 https://www.weforum.org/agenda/2019/09/climate-change-won-or-lost-in-cities-or-by-cities/

2 https://cdn.gca.org/assets/2020-07/Global_Commission_Adapation_COVID_Resilience_Statement.pdf

Mitigation

Enhanced use of renewable energy systems

- Aggressive renewable energy targets
- Solar power installations (rooftop PV, water heaters, street lights etc.), and wind-solar hybrid systems

Energy efficiency

- Energy efficient measures for lighting, buildings and housing
- Dedicated Energy Saving Cell to guide energy projects
- Sustainable housing practices

Transport

- Comprehensive mobility plans
- Improved public transport infrastructure & traffic management
- Mass Rapid Transport (Bus Rapid Transit and Metro)
- Non-motorized transport (pedestrian and cycle-friendly street designs)
- Fuel shift from diesel to CNG and/or electric

Waste management

- Efficient waste collection and management
- Composting and biomethanation.
- Waste recovery/recycling plants.
- Efficient Municipal Solid Waste management (Waste-to-Energy plants)

Adaptation and Climate Resilience

Policy/Action Plans/ Institutional measures

- Implementing Heat Action Plans and Climate Change resilience strategies.
- Establishing early warning systems for floods and heat waves.
- Establishing emergency/disaster management cells.
- Creating awareness among citizens about actions to be taken during extreme events.

Built Environment and Infrastructure

- Energy efficient measures for lighting, buildings and housing
- Dedicated Energy Saving Cell to guide energy projects
- Sustainable housing practices

Water management

- Recycling treated waste water.
- Rejuvenation of water bodies.

Climate change mitigation and adaptation should be seamlessly integrated in local urban development plans which have long-term consequences on a city's contribution to GHG emissions as well as response to climate vulnerabilities and hazards. Addressing climate change would also provide local co-benefits such as reduced pollution, and better quality of life and health for citizens. Urban planning and design should incorporate long-range strategies for climate change that reach across physical scales, jurisdictions, and electoral timeframes. These activities need to deliver a higher quality of life for urban citizens as the key performance outcome.[3]

Cities can lead the way by adopting and ensuring access to renewable energy and energy efficiency measures, and recognizing the importance of sustainable, integrated urban planning to facilitate this transition. Energy and space efficient building standards and retrofitting are priorities along with design for material reuse and recycling and shifting to renewables. Cities have the opportunity to shift to sustainable urban planning and transportation thereby facilitating low-carbon, energy-efficient development and physical greening of cities. Prioritizing pedestrians and bicycles, public transportation, support for e-vehicles and car-sharing, over private vehicles has multiple benefits such as addressing air pollution and congestion, improving equity through accessibility, and enhancing biodiversity in cities. Urban biodiversity provides significant ecosystem services contributing to climate change mitigation and adaptation, such as carbon sequestration, air and water purification, mitigation of impacts of environmental pollution, noise reduction, and regulation of microclimate. High biodiversity increases the resilience of the city. Cities need to act within their own administrations, and with stakeholders and citizens.[4] Urban infrastructure system transition consistent with limiting global warming therefore requires -policy makers and associated stakeholders to be informed regarding a science based approach towards aligning climate action with the 1.5˚C goal. Further development of more rigorous understanding and characterisation of the connections between urban planning, design and infrastructure and climate change mitigation and adaptation is required. It will also be important to understand how urban micro-climates integrate into urban planning and design to simultaneously improve urban environmental outcomes, reduce risk and address the need to adapt to, and mitigate, climate change.[5]

3 Rosenzweig C., W. Solecki, P. Romero-Lankao, S. Mehrotra, S. Dhakal, T. Bowman, and S. Ali Ibrahim. 2015. ARC3.2 Summary for City Leaders. Urban Climate Change Research Network. Columbia University. NY

4 WWF Cities Policy Paper Series- Cities in the Climate Crisis: Energy & urban planning to support 1.5˚C alignment

5 World Climate Research Programme, 2019. Global Research and Action Agenda on Cities and Climate Change Science - Full Version. Prieur-Richard, A.H., B. Walsh, M. Craig, M.L. Melamed, M. Colbert, M. Pathak, S. Connors, X. Bai, A. Barau, H. Bulkeley, H. Cleugh, M. Cohen, S. Colenbrander, D. Dodman, S. Dhakal, R. Dawson, J. Espey, J. Greenwalt, P. Kurian, B. Lee, L. Leonardsen, V. Masson-Delmotte, D. Munshi, A. Okem, G.C. Delgado Ramos, R. Sanchez Rodriguez, D. Roberts, C. Rosenzweig, S. Schultz, K. Seto, W. Solecki, M. van Staden, and D. Ürge-Vorsatz (Eds.). 31 pp. WCRP Publication No. 13/2019.

1.1. Emergence of cities as stakeholders in the global climate and sustainability agenda

Globally, the significance of integrating sustainability in cities' actions and plans has been recognized. The role of cities at the forefront of climate change mitigation and adaptation was first discussed by a large group of mayors in December 2009 during the Conference of Parties (COP) 15 in Copenhagen at the Climate Summit for Mayors organised jointly by the city of Copenhagen, C40, and ICLEI.[6] Further, in recent years the need to strengthen the response to climate change in cities is discussed across major global agendas such as Sustainable Development Goals (SDGs), Paris Agreement, and the New Urban Agenda. Non-party stakeholders (cities, businesses, sub national regions, investors, and civil society) came together to lend momentum to the Paris agreement in 2015 with commitments to act on climate change. At the UN Climate Conferences in Marrakesh in 2016 and Bonn in 2017, countries restated their understanding that success on climate change will require greater ambition on the part of non-state actors. The UN's 2015 Sustainable Development Goals included an explicit urban goal for the first time - Goal 11 (Sustainable Cities and Communities). Similarly, Goal 7 (Energy) and Goal 13 (Climate Action) are also relevant to cities. Over two-thirds of the submitted Nationally Determined Contributions (NDCs) show clear urban references and content, establishing the relationship between sustainable urbanization and climate action. The New Urban Agenda, adopted at Habitat III, resolved to enable national, sub-national and local governments along with other stakeholders to achieve sustainable urban development. The Sendai Framework for Disaster Risk Reduction emphasizes the need for national and local disaster risk reduction strategies. In March 2018, Intergovernmental Panel on Climate Change (IPCC) co-sponsored an international Cities and Climate Change Science Conference and the related Cities IPCC campaign (initiated by the organisations who partnered with the IPCC in hosting the conference) in Edmonton, Canada, to engage the scientific community, practitioners and policymakers in discussing the next frontier of research focused on the science of cities and climate change. One of the most important outcomes from the Conference was the Edmonton Declaration – a city focused document that reaffirms the importance of science-based policy and decision making.

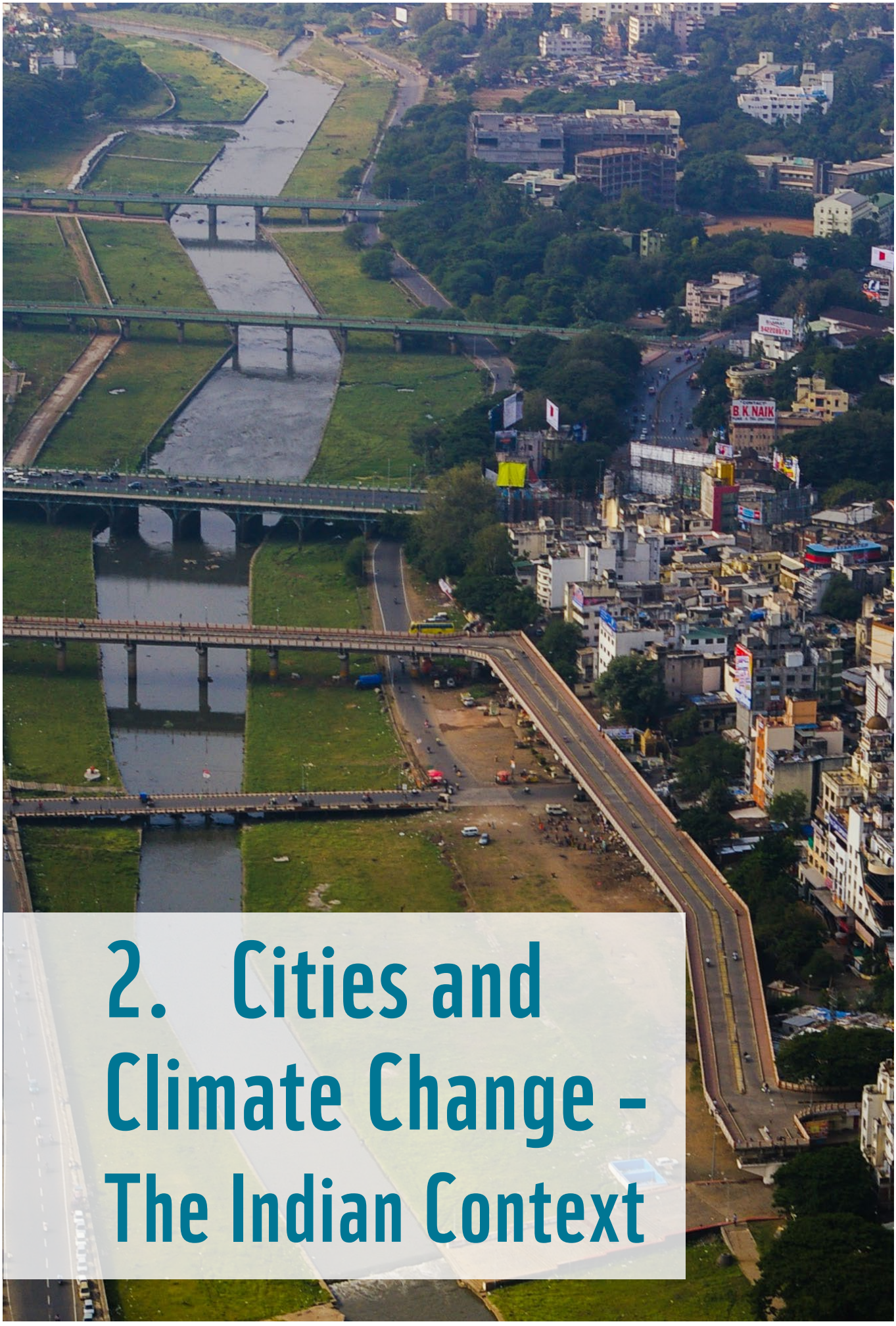
Also in 2018, IPCC published the 'Special Report on Global Warming of 1.5˚C (SR1.5) to explain the pathways to and impacts of limiting global warming to 1.5˚C compared with 2 ˚C on ecosystems, human health and well-being. It showed that to retain global warming within 1.5˚C, global emissions must peak by 2020 and reduce to net zero by 2050. The report identified cities and urban areas as one of four critical global systems that can accelerate and upscale climate action, and further recognized that this will require major transitions in how both mitigation and adaptation/resilience are undertaken. It also stated that strengthening the capacities for climate action of national and sub-national authorities, civil society, the private sector, indigenous peoples and local communities can support the implementation of ambitious actions

6 The World Bank, 2010: Cities and Climate Change: An Urban Agenda. Urban Development Series Knowledge Paper (https://openknowledge.worldbank.org/bitstream/handle/10986/17381/637040WP0Citie00Box0361524B0PUBLIC0.pdf?sequence=1&isAllowed=y)

implied by limiting global warming to 1.5˚C.[7] In September 2018, California hosted the Global Climate Action Summit in San Francisco in an effort to bring together non-state actors including elected leaders at the state and local level, to galvanize stronger commitments to address climate change.

These global efforts over the years, have gradually and successfully established that, while governments continue to play the pivotal role in strengthening climate action and subsequent mainstreaming of low carbon development pathways, non-state actors such as cities are gaining prominence as the catalysts to enhance and sustain this global momentum for change. The global policy push for mobilising cities towards progressive actions to achieve sustainable low carbon growth, is being complemented by local action in several cities across the globe. Mayors and local governments are increasingly rising up to the challenge and providing necessary impetus to the global climate change goals.

7 IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5˚C. An IPCC Special Report on the impacts of global warming of 1.5˚C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.



2. Cities and Climate Change – The Indian Context

India has witnessed rapid urbanisation with a population of more than 30 per cent living in urban areas currently, expected to be 40 per cent in 2030. Estimates indicate a tripling of India's built environment (man-made spaces, such as buildings) to accommodate 200 million more urban dwellers by 2030.[8] As Indian cities cater to growing populations, they would also be faced with the challenges related to provision of basic necessities such as housing and transport, which would further lead to increased demand for energy and water, higher emissions and waste generation, deteriorating air quality and, associated health impacts. Nearly 44 percent of India's rapidly growing carbon emissions have urban origins, emanating from transport, industry, buildings, and waste contributing towards climate change.[9] Within urban areas the megacities, metro cities and class I cities generate 59 percent of the GHG emissions in the country. This makes our cities vulnerable and imposes huge risks of increased water stress, heat island effect, and increased frequency and severity of extreme weather events such as urban floods, and droughts. Further, air quality deterioration poses serious challenges for city administrators as a total of 102 cities in India, of which 43 are Smart Cities, are already facing poor air quality.

Major cities in India have witnessed loss of life and property, disruptions to transport and power, incidences of epidemics due to floods during the monsoons, most notable amongst them being Mumbai in 2005, Surat in 2006 and Kolkata in 2007; Chennai 2017; Kerala 2018 the recent ones. The changing pattern of rainfall due to climate change and a variety of other associated factors of urbanization were key attributors to these incidents. These incidences also highlight the associated loss of life, public property and inconveniences particularly due to traffic snarls.[10] According to a report published in 2018, 1.6 billion people living in over 970 cities globally, will be regularly exposed to extreme high temperatures, including Bengaluru, Chennai, Delhi, Jaipur and Kolkata, and over 800 million people, living in 570 cities globally will be vulnerable to sea level rise and coastal flooding, including Chennai and Mumbai.[11] In 2019, many cities in India recorded all time high temperatures rising above 40˚C in most cities, and exceeding 45˚ C in some of the worst affected states.[12]

In view of the increasing climate related threats and the looming climate crisis, especially on urban areas, several efforts are now underway to develop climate resilient urban growth strategies across the spectrum. In practice, the initiation of India's urban development policies is often conducted in a top-down manner, driven by national ministries. The ministries provide guidelines and financial resources for state governments who are then expected to implement plans through their municipal bodies.[13] Besides the necessary

8 https://scroll.in/article/841788/can-indian-cities-lead-on-climate-action-as-they-go-about-their-development-goals

9 TERI, 2015. Draft Report on the "Study on quantification of the Greenhouse Gas mitigation potential of the various development initiatives undertaken by Government of India"

10 https://smartnet.niua.org/csc/assets/pdf/key-documents/Climate-Smart-Cities-booklet.pdf

11 UCCRN, 2018. The Future We Don't Want: How Climate Change Could Impact the World's Greatest Cities. Technical Report (https://c40-production-images.s3.amazonaws.com/other_uploads/images/1789_Future_We_Don't_Want_Report_1.4_hi-res_120618.original.pdf)

12 https://nidm.gov.in/pdf/guidelines/new/guidelines_heatwaveguidelines.pdf

13 Jan Beermann, Appukuttan Damodaran, Kirsten Jörgensen & Miranda A. Schreurs, 2016. Climate action in Indian cities: an emerging new research area, Journal of Integrative Environmental Sciences, 13:1, 55-66 (https://doi.org/10.1080/1943815X.2015.1130723)

policy based impetus, local government's ability to undertake urban climate action also depends on the availability of resources, technical know-how, and capacity building. This calls for support for cities from varied stakeholders including national and state governments, local governments and city departments, businesses, multilateral and bilateral organisations, think tanks and research institutions, financial institutions, and civil society.

With much of India's development dependent on cities, and in line with the objectives of the Paris Agreement, cities urgently need to plan and implement climate actions in an integrated and inclusive manner through mitigation of greenhouse gas emissions and climate adaptation to foster wider social, cultural, economic and environmental benefits.[14]

This section provides an overview of the diverse initiatives being undertaken at different levels of governance to mainstream climate action in Indian cities. The nature of support provided to cities by key organisations representing bilateral and multilateral agencies, city networks, think tanks/research institutions, and civil society are also highlighted. The aim is to provide an overview of the current scenario in India with regard to the urban climate action.

2.1. National and State Level Policies/Programmes and Schemes

In 2016, India ratified the Paris Agreement and under its Nationally Determined Contributions (NDC) committed to reduce the emission intensity of its Gross Domestic Product (GDP) by 33-35 percent from 2005 level by 2030, increase the share of non-fossil fuels-based electricity, and enhance the forest cover. The NDC revolves around India's policies and programmes to promote clean and renewable energy, development of less carbon-intensive and resilient urban centres etc. [15] India is focussing on the transformation and rejuvenation of cities through various schemes and programmes, which have a thrust on promoting smart solutions that can make cities climate resilient. The endeavour is to draw the linkages between various sectoral schemes and programmes with urban climate action, and the achievement of the national climate goals. Listed here are some of the key programmes and schemes of the government of India that could encourage and mobilise associated climate action in cities.

The National Mission on Sustainable Habitat under the National Action Plan on Climate Change (NAPCC), 2008, aimed at encouraging sustainable urban planning in India with the help of policy, infrastructural and research interventions in sectors such as buildings, waste management, water resources and transportation. By focussing on key urban sector issues, this mission was one of the early attempts to perceive urban development from a climate change lens. **The Jawaharlal Nehru National Urban Renewal Mission (JNNURM)** was a massive urban rejuvenation scheme launched by the Government of India in 2005 for a seven-year period up to 2012, and was further extended for another two years before the existing urban development missions were introduced. Although not directly aimed at integrating climate action in urban planning, however the key areas of focus

14 MoHUA, 2019. Climate Smart Cities Assessment Framework
15 https://smartnet.niua.org/csc/assessment-overview.html

including improved water supply and sanitation, solid waste management, road network, urban transport and redevelopment of old city areas, along with integrated development of slums[16] had significant environmental and climate co-benefits. Further, the **"Solar Cities" Mission** was designed to support Urban Local Bodies (ULBs) to prepare a road map to guide 'renewable energy cities' or 'solar cities', indicating the involvement of cities in the achievement of the country's renewable energy and energy efficiency goals. The target of installing 40GW of grid connected rooftop solar PV capacity by 2022 was further reinforcement of the central role that cities would have in the achievement of the ambitious solar energy expansion plans.

National Urban Transport Policy encouraged interventions in urban transport such as Bus Rapid Transit System (BRTS), urban transit infrastructure or financing of metro rail projects etc. This stemmed from the recognition that efficient, inclusive urban transport systems can connect people with jobs, health care, and education, and in turn reduce congestion, and limit carbon emissions that are contributing to climate change. Taking the sustainable urban mobility efforts forward is the **National Electric Mobility Mission 2020** that aims at promoting electric mobility in Indian cities. Waste management is addressed through the **Swachh Bharat Mission Urban (SBM-U)** which aims at making urban India free from open defecation and achieving 100 percent scientific management of municipal solid waste in 4,041 statutory towns in the country.[17] **Pradhan Mantri Awas Yojana (Urban)** launched in 2015, aims to ensure housing for all in urban areas for providing 'pucca' houses to all eligible families / beneficiaries by 2022.[18] Further, many alternative and innovative technologies are being implemented in six states across the country through a Global Housing Technology Challenge - India. Light House Projects will act as live laboratories demonstrating innovative, proven construction technologies for speedier and cost-effective construction of houses which are sustainable green, eco-friendly and disaster resilient.[19] **India Cooling Action Plan (ICAP)** provides a 20-year perspective (2017-18 to 2037-38) and recommendations, to address the cooling requirements across sectors, and ways and means to provide access to sustainable cooling. Development and implementation of ICAP has been an inter-ministerial undertaking. Some actions emerging out of the ICAP also require involvement of State Governments and ULBs for their implementation. **Nagar Van Scheme,** announced by Ministry of Environment, Forest and Climate Change (MoEFCC), aims to develop 200 Urban Forests across the country in next five years with a renewed focus on people's participation and collaboration between Forest Department, Municipal bodies, NGOs, Corporates and local citizens. With Warje Urban Forest in Pune (Maharashtra) serving as the role model for the Scheme, it envisions the creation of additional forests on the existing forest land in the cities or any other vacant land offered by the ULBs.[20] To address the pertinent issue of air pollution in Indian cities, the **National Clean Air Programme (NCAP)** was launched initially as a mid-term five-year plan with 2019 as a

16 https://web.archive.org/web/20120517045523/http://jnnurm.nic.in/wp-content/uploads/2011/01/Prime-Ministers-Office.htm

17 http://mohua.gov.in/cms/swachh-bharat-mission.php

18 https://pmay-urban.gov.in/FAQ#:~:text=Pradhan%20Mantri%20Awas%20Yojana%20(Urban)%20for%20ensuring%20housing%20for%20all,all%20eligible%20beneficiaries%20by%202022.&text=PMAY(U)%20has%20made%20a,the%20house%20under%20this%20Mission.

19 https://pib.gov.in/PressReleseDetailm.aspx?PRID=1634268

20 https://pib.gov.in/PressReleasePage.aspx?PRID=1629563

base year, and further extendable up to 20-25 years in the long-term after review of mid-term outcomes.[21] The main objectives of NCAP are to ensure stringent implementation of mitigation measures for prevention, control and abatement of air pollution, augment and strengthen air quality monitoring network across the country, and increase public awareness and capacity building measures. The aim is 20-30 percent reduction of fine (particulate matter of diameter 2.5 micrometre or less, or PM2.5) and coarse particles (particulate matter of diameter 10 micrometre or less, or PM10) concentration by 2024. 102 non-attainment cities have been chosen from 23 states & UTs on the basis of WHO's fourth Ambient Air Quality Database and National Air Quality Monitoring Programme's (NAMP) ambient air quality data obtained for 2011–2015. Most of the chosen cities are Tier-2 cities with the exception of Delhi, Mumbai, Kolkata and Bengaluru.

National Heritage City Development and Augmentation Yojana (HRIDAY) aims to bring together urban planning, economic growth and heritage conservation in an inclusive manner, and with the objective of preserving the heritage character of the city. The Scheme has supported development of core heritage linked civic infrastructure projects which includes revitalization of urban infrastructure for areas around heritage, religious, cultural and tourism assets of the cities. These initiatives include development of water supply, sanitation, drainage, waste management, approach roads, footpaths, street lights, tourist conveniences, electricity wiring, landscaping and such citizen services.[22] **Ease of Living Index** has been developed by the Ministry of Housing and Urban Affairs (MoHUA) to assess the quality of life of citizens in the target cities. Presently it serves as a common minimum framework for cities to evaluate themselves and will evolve in future rounds to better represent the needs and aspirations of the citizens. The Index aims to quantify the ease of living of citizens across three pillars including quality of life, economic ability, and sustainability.[23] In 2015, the **Smart Cities Mission (SCM)** and **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)** were launched to address the issue of infrastructure gap in urban areas, besides enhancing the business and investment climate for the benefit of the poor. The aim was to develop 100 smart cities that are ahead of the curve in decision making, problem solving, as well as ease of living of citizens, and improve infrastructure in another 500 cities, under the AMRUT scheme. The Smart Cities Mission was further aligned with the national climate agenda through the **ClimateSMART Cities Assessment Framework (CSCAF)** initiated in 2019 for the 100 Smart Cities. CSCAF is a first-of-its-kind cities assessment framework on climate relevant parameters such as energy and green buildings, urban planning, green cover & biodiversity, mobility and air quality, water resource management, and waste management. The objective was to provide a clear roadmap for the cities and in effect, urban India as a whole, towards combating climate change while planning and implementing their actions including investments. CSCAF serves as a tool for cities to assess their present situation and facilitate cities to adopt, implement and disseminate the best practices and further to set standards in comparison to the international efforts towards the green, sustainable and urban resilient habitats. Further, in July 2020, the Climate Centre for Cities (C-Cube) was launched with a vision to build climate action in cities. Instituted by the MoHUA under its Smart Cities Mission, and based at the National Institute of Urban Affairs (NIUA), C-Cube

21 Ministry of Environment, Forest & Climate Change Government of India, 2019, NCAP NATIONAL CLEAN AIR PROGRAMME

22 http://mohua.gov.in/cms/hariday.php

23 MoHUA (2019), Ease of Living Index 2019 - Assessment Framework

serves as a one-stop shop for climate informed actions to ensure a sustainable urban future for India. This is one of the most relevant initiatives by the national government to strengthen the integration of climate actions in urban development plans. Cities will now be better equipped to contribute to the achievement of the Indian NDCs, especially to reduce the emission intensity of GDP by 33-35 percent from 2005 level by 2030.

Climate Centre for Cities (C-Cube / C3)

Under the Smart Cities Mission, the Climate Centre for Cities (C-Cube) has been set up within NIUA with the vision to build climate action in cities. C-Cube has been established to act as the one-stop solution for climate informed urban development action, which would involve risk reduction, skill enhancement, energy savings, loss minimization and emissions reduction in urban areas. C-Cube is assisting the ministry in implementing the ClimateSMART City Assessment Framework, which comprises of 30 diverse indicators across five categories namely; (i) Energy and Green Buildings, (ii) Urban Planning, Green Cover & Biodiversity, (iii) Mobility and Air Quality, (iv) Water Resource Management and (v) Waste Management. The framework is designed to serve as a tool for cities to assess their present climate scenario and assist them to adopt, implement and disseminate the sectoral best practices adopted by other successful cities to create sustainable and resilient habitats. C-Cube would also focus on providing services related to a) Policy, Planning, Program and Project Support, b) Research and Knowledge Management, c) Innovation, d) Capacity Building, e) Communication Outreach and f) Partnership. The centre will leverage its network to connect ULBs with technical partners, bilateral organizations, funding agencies, solution providers, research institutions & community organizations to implement climate action at scale. C-Cube would further facilitate high impact and transformative initiatives that would enable ease of living and good health for all.[24]

And finally, the **National Urban Policy Framework 2018** recognizes environmental sustainability as a key element towards sustainable urbanization. It further states that making cities environmentally sustainable requires long-term integrated solutions for the urban planning system. The policy framework factors in the key issues of air quality, sustainable mobility, energy, waste management, water resources, and disaster risk reduction and resilience.[25]

Climate action in Indian States

NAPCC also recognized the role of state and local governments in implementation of the action plan. 29 States prepared Climate Action Plans called the State Action Plan on Climate Change (SAPCC). Sub-national authorities at state level are expected to play a key role in actively incorporating climate change considerations into day-to-day governance, adopting climate-friendly policies and programmes, regulations, and investment decisions. In general, states and UTs have tried to stay as close to the eight missions identified under NAPCC as possible, with only a few going

24 Smartnet - Launch of Climate Centre for Cities (C-Cube) (https://smartnet.niua.org/content/384301cb-b537-4561-8495-5dacd5ffd133)

25 https://smartnet.niua.org/sites/default/files/resources/nupf_final.pdf

beyond to achieve the required focus on health, urban development etc. There has also been an effort to adopt the co-benefit approach— promoting development objectives while yielding additional benefits for climate change. Since SAPCCs are adaptation-centric and try to focus on good development, most interventions have been proposed to be implemented through ongoing sectoral programmes and schemes.[26] Gujarat was the first State in India, the first in Asia and fourth in the world to form an independent Department for Climate Change, with a vision to act as a bridge within the Government, and between the Government and society to address climate change.[27] In 2019, the 29 states started revising their five-year SAPCC, which are intended to integrate climate change concerns into mainstream government planning processes.

Cities pioneering climate action in India

Several Indian cities are also a part of this momentum for change and have exemplified their role in addressing climate change. Key examples include, BRTS and Metro in many cities – most notably in Ahmedabad and Delhi respectively, solar powered airport in Kochi, implementation of bicycle sharing scheme and street redesign project in Pune, waste management in Indore, green building design in the affordable housing scheme in Rajkot, low carbon commute transition project in Kolkata with plans to transition city fleet to 5,000 electric buses, and to fully electrify the ferries that run across the Ganges River by 2030 [28], among several others. Some cities have shown strong intent by committing to emissions reduction targets. For instance, Rajkot has committed to reduce 14 percent of the total annual GHG emission by the year 2022-23 from the baseline annual GHG emissions in the year 2015-16, 22 percent of which will be from measures promoting renewable energy. Cities have gradually started incorporating adaptation and climate resilience initiatives. The Heat Action Plan (HAP) for Ahmedabad developed in 2013 was the first heat action plan and early warning system in South Asia. The Ahmedabad Municipal Corporation partnered with Indian Institute of Public Health- Gandhinagar, the India Meteorological Department (IMD), and the Natural Resources Defence Council (NRDC) for this initiative. Based on the success of the 2013 Ahmedabad Heat Action Plan (HAP), city, state, and national level authorities are ramping up to implement extreme heat warning systems and preparedness plans.[29] IMD and National Disaster Management Authority (NDMA) are working with 23 states that generally record high temperatures leading to heat-wave conditions to develop heat action plans. Currently 20 cities have implemented HAP and implementations in next 100 cities are under process for which IMD has provided required data to NDMA.[30] In 2019, NDMA released the National Guidelines for Preparation of Action Plan – Prevention and Management of Heatwave. The guidelines aim to provide a framework for developing HAPs for implementation, interagency coordination and impact evaluation of heatwave response activities in cities/towns.[31] Surat was a pioneer city that prepared an urban resilience strategy under the 100Resilient Cities

26 Vineet Kumar 2018, Coping with Climate Change: An Analysis of India's State Action Plans on Climate Change, Centre for Science and Environment, New Delhi (http://cdn.cseindia.org/attachments/0.40897700_1519110602_coping-climate-change-volII.pdf)

27 http://gujenvis.nic.in/PDF/Gujarat-SAPCC.pdf

28 https://www.c40.org/press_releases/c40-awards-2019

29 NRDC, 2020. Expanding heat resilience across India: Heat Action Plan Highlights (https://www.nrdc.org/sites/default/files/india-heat-resilient-cities-ib.pdf)

30 IMD, 2019. Forecast Demonstration Project (FDP) for Improving Heat Wave Warning over India. Implementation Report, 2019 (https://internal.imd.gov.in/section/nhac/dynamic/fdpheatreport2019.pdf)

31 https://nidm.gov.in/pdf/guidelines/new/guidelines_heatwaveguidelines.pdf

initiative supported by Rockefeller Foundation. The programme provided funds for a chief resilience officer in each member city to lead the resilience efforts, resources for drafting a resilience strategy, access to private sector, public sector, academic, and NGO resilience tools, and membership in a global network of peer cities to share best practices. After Surat, two other cities Pune and Chennai developed climate resilience strategies.

In order to sustain this momentum there is a need to recognize cities that are leading the transition towards a climate-resilient future, stimulate the development and wider dissemination of best practices, and provide opportunities for networking and partnerships among stakeholders.

2.2. Supporting climate action in Indian cities

Cities are one of the key drivers of economic growth and contribute to a large share of a nation/state's GDP. This has also positioned them as both contributors and solutions of climate change. In order to sustain the growth in cities, its governance structure acts as an underlying framework towards delivering basic services/amenities along with planning for the future growth. However, due to the existing bottlenecks like increasing population, degrading infrastructure, poor health etc., cities often struggle to address climate change at a local level. Several global/national organizations have been assisting cities in terms of scientific knowledge, policy advocacy, implementation and technical advice, and financial support. The section provides a snapshot of the key organisations that are actively engaging with cities in India to support the transition to a climate smart future.

Multilateral agencies (UN)

Several UN agencies have been leading diverse initiatives to promote, facilitate and support greater climate action. Sustainable urban development in line with the global climate goals is one of the areas of intervention for these agencies. Together with partners, UN agencies have been engaging with the urban sector to enhance local climate action in cities. United Nations Human Settlements Programme (UN-Habitat) is the nodal UN agency for human settlements, and sustainable urban development. UNHABITAT's work in India emphasizes on safe, inclusive, resilient and sustainable cities and regions. The Guiding Principles for City Climate Action Planning (GPCCAP) developed to guide city-level climate action planning is a useful resource for cities world over, including India. Other UN agencies such as the United Nations Environment Programme (UNEP) and United Nations Development Programme (UNDP) are also engaged at various levels of governance, at both national and sub-national levels in sectors such as housing, transport, urbanization, heritage, public spaces, environment, climate change, and vulnerability. Further details provided in Annexure 1.

Bilateral Agencies

Bilateral agencies in India have recognised sustainable urban development as an important area of intervention, and introduced opportunities within their programmes to support these initiatives. These agencies work with different stakeholders such as policymakers, researchers, think tanks, and civil society to support sustainable development in cities. The nature of support provided by bilateral organisations include specific and focused technical assistance to selected cities, city-to-city cooperation between Indian cities and those

in other countries, handholding support for development and implementation of government schemes and programmes such as Smart Cities, development of climate smart resilient cities, funding sustainable infrastructure projects in cities such as Metro Rail, Intelligent Transport Systems, Water Supply & Sewage Treatment Facilities, Renewable Energy, Energy Efficiency etc. In recent years and with the evolving climate and cities related discussions globally, the focus has been on capacity building of cities for low carbon and climate resilient city development in India. Some of the key bilateral organisations supporting the mainstreaming of climate action in Indian cities are International Development Research Centre (IDRC | CRDI); European Union (EU): International Urban Cooperation (IUC); Agence francaise de developpement (AfD); Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH; Japan International Cooperation Agency (JICA); Swedish International Development Cooperation Agency (SIDA); Swiss Agency for Development and Cooperation (SDC); Foreign, Commonwealth and Development Office (FCDO); United States Agency for International Development (USAID). Details about the key initiatives of each of these organisations are available in Annexure 2.

Think tanks, research institutions and civil society

Think tanks, research institutions and civil society have a critical role in supporting cities in the transition towards a climate smart future, and strengthening capacities and partnerships of cities for improved and informed decision-making in alignment with global and national urban sustainability goals. Policy analysis, technical guidance and capacity building, research and advocacy, knowledge sharing and creating awareness, and networking are the key functions of these organisations. They often partner and collaborate with multilateral and bilateral organisations, corporates, and international networks to facilitate access to finance for the cities to undertake and implement sustainable urban development projects. Some of the key organisations are mentioned in Annexure 3.

City Networks

Several international and national networks that mobilise and support local climate action in cities. These urban networks provide cities with required support and stimulate action through the sharing of ideas and experiences. These networks help in connecting city officials around the world along with influencing national and international policy agendas. They also showcase ideas and solutions from the leading cities, and establish a knowledge bank for member cities. The networks focus on sectors such as adaptation and resilience, air quality, energy & buildings, food, waste & water, and transportation & urban planning. For instance, ICLEI – Local Governments for Sustainability is a network of more than 1,750 regional & local governments. ICLEI-South Asia works closely with the local governments in multiple Indian cities. The global C40 city network has six member cities in India (Bengaluru, Chennai, Delhi NCT, Kolkata, Jaipur and Mumbai), among several others globally. Similarly, the Global Covenant of Mayors for Climate and Energy (GCoM) is an international alliance of cities and local governments with a shared long-term vision of promoting and supporting voluntary action to combat climate change. The GCoM partner cities in India include Ahmedabad, Bhavnagar, Junagadh, Gandhinagar, Gangtok, Gwalior, Jamnagar, Kochi, Nagpur, Panaji, Patna, Rajkot, Shimla, Surat, Vadodara. Further details provided in Annexure 4.

WWF's One Planet City Challenge (OPCC)

WWF's global initiative for cities, One Planet City Challenge (OPCC) is a global biennial challenge that is designed to highlight, reward and inspire cities that are willing and prepared to make substantial long-term efforts towards sustainability and resilience. Created in 2011, the platform aims to highlight the power of cities to advance international climate and sustainability agendas, demonstrating cities' potential to help close the climate ambition gap. The OPCC assesses and guides cities towards a 1.5˚C compliant pathway – contributing to the Paris Agreement, the UN Sustainable Development Goals and the conservation agenda. Since its inception in 2011, more than 500 cities have joined the OPCC, reporting over 5,700 actions that have the potential to reduce total GHG emissions by 3.9 GT by 2050. During the OPCC 2019-2020 cycle, 255 cities from 50+ countries were assessed on 1.5 ˚C alignment and their plans reviewed on the basis of their evidence in climate action.[32]

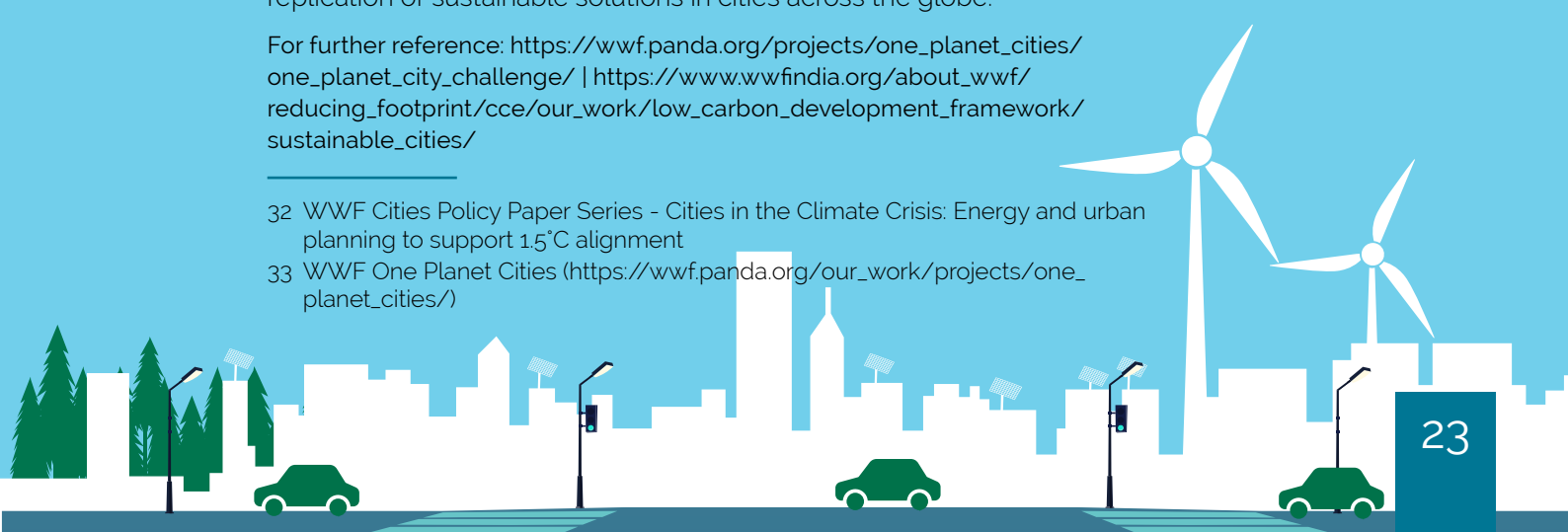
Since 2012, the India chapter of OPCC has been providing increased support and capacity building to cities in scaling up their climate actions by addressing the barriers for integration of a climate focus into the cities' policies, action plans and urban planning. So far, 26 cities across 16 states have been part of the city challenge in India. WWF-India engages with multiple stakeholders including the policy makers, city corporations as well as citizens to sensitize on climate change issues and mobilize climate actions. The programme aims to strengthen networking, both at the local and national level, to foster knowledge sharing, highlight best practices, and facilitate partnerships to mainstream climate action in city level development planning.

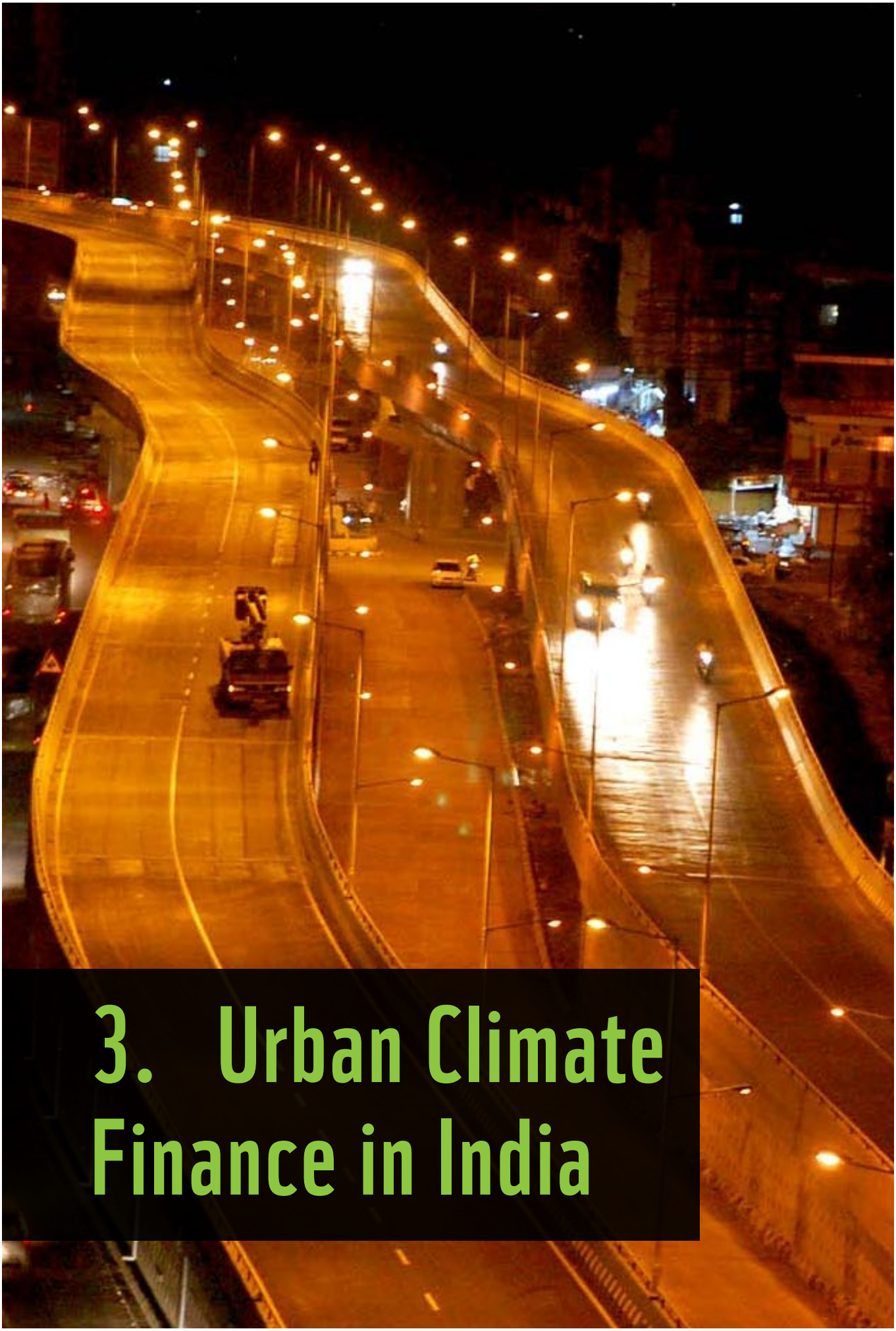
WWF is committed to increasing political leadership, public engagement and entrepreneurship to transform cities. The aim of WWF's City Programme is to support the creation and development of One Planet Cities around the globe – cities that enable all people to thrive and prosper while respecting the ecological limits of our one and only planet.[33] WWF created the One Planet City Challenge and Urban Solutions to highlight some of the most inspiring cities, and their innovative solutions. These projects aim to facilitate the sharing and replication of sustainable solutions in cities across the globe.

For further reference: https://wwf.panda.org/projects/one_planet_cities/one_planet_city_challenge/ | https://www.wwfindia.org/about_wwf/reducing_footprint/cce/our_work/low_carbon_development_framework/sustainable_cities/

32 WWF Cities Policy Paper Series - Cities in the Climate Crisis: Energy and urban planning to support 1.5˚C alignment

33 WWF One Planet Cities (https://wwf.panda.org/our_work/projects/one_planet_cities/)





3. Urban Climate Finance in India

The urban population in South Asia Region is expected to grow by 250 million by the year 2030. While the region is extremely vulnerable to the impacts of climate change like flood risk, sea-level, changing monsoon pattern, drought-like conditions, potable water shortages etc., it is also expected to witness a spike in economic and population growth. Indian cities alone are expected to host 200 million more people by 2030 and are yet to construct almost two-thirds of their buildings that will exist in 2030. Climate adaptation and resilience-building measures are needed at the city level to address risks to vital infrastructure such as, energy, transportation, water management and sanitation and food systems. Cities are also central to the mitigation efforts in a country. SDG 11, challenges world leaders to "Make cities and human settlements inclusive, safe, resilient and sustainable". As urban areas address each SDG, these can become models for forward-looking, durable development. The development of low-emission, climate-resilient projects needs to be synchronized with city planning at large, with climate goals and priorities syndicated with and incorporated into multiple agencies and functions. Emissions are not only embedded in infrastructure but are driven by infrastructure use. A classic example is the influence of spatial and transportation planning on mobility and its associated emissions.[34] Climate finance for cities could help accelerate ongoing climate actions and risk proof existing infrastructure, and facilitate the mainstreaming of climate risk and actions into policy and governance.[35]

The International Finance Corporation (IFC) has estimated that the total climate investment potential of South Asian cities is around $2.5 trillion for the period of 2018-2030 across six key sectors including, climate-smart water, electric vehicles, public transport, renewable energy, and waste. Among these the green buildings sub-sector has the largest climate investment potential (72 percent), followed by EVs & Public Transport and RE.[36]

Scaling-up climate investment for low-carbon, climate-resilient infrastructure in cities involves a number of opportunities and challenges specific to the Indian urban scenario. ULBs hold the decision making power over the selection of infrastructure projects made at the city-level and over the land-use changes, which in turn determines the requirement of future infrastructure and associated investments. This provides the ULBs with a wide range of policy tools available to achieve sustainability and scale-up investment for low-carbon, climate-resilient infrastructure. However, ULBs are often constrained by a lack of capacities and funding opportunities towards financing climate-resilient infrastructure at the city-level.[37] While the increased collaboration of cities with national and international agencies has led to a better understanding of climate issues at the local level, securing funds for financing climate action is still a challenge for urban local bodies in India. To tackle these issues, policy-level support is required from the national and sub-national governments to improve the financial viability of cities and generate additional funding sources. Since public sector funding will not be sufficient, cities need to mobilize private capital to fill funding gaps for blue-green urban infrastructure projects, which can be enabled through national-level policies.[36] The access to a mixed pool of finance including international financial institutions, private partners and public funds is crucial in facilitating resilient growth in cities and ensuring a low-carbon trajectory.

34 CCFLA, 2015. The State of City Climate Finance 2015

35 Barnard, Sam, 2016.Climate finance for cities - How can international climate funds best support low-carbon and climate resilient urban development?: ORF

36 IFC, 2018. Climate Investment Opportunities in Cities - An IFC Analysis

37 OECD, 2012. Cities and Climate Change, OECD Publishing, Paris.

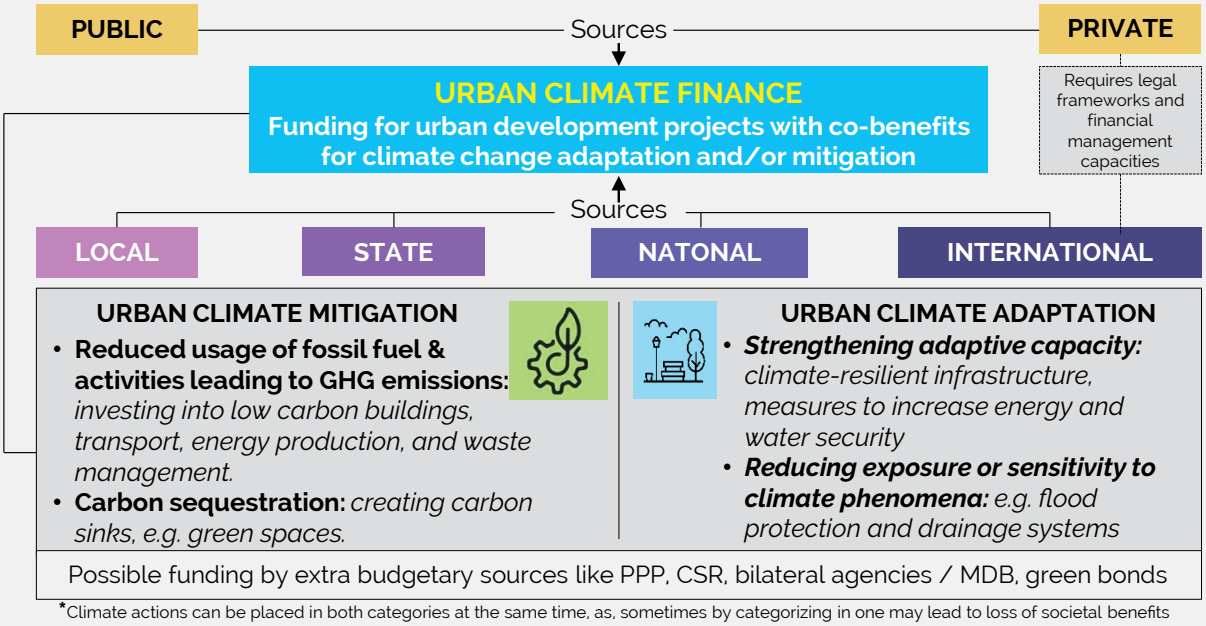
Financing adaptation in urban areas

- Solutions for urban flooding in the low-lying areas
- Sustainable urban drainage systems
- Re-use of water and better resource efficiency of water supply (municipal & industrial)
- Coastline protection from increasing frequency of cyclonic events
- Maintenance of existing infrastructure and prevention of adverse land-use changes, which may lead to future disaster risks
- Nature-based solutions (NbS) which would facilitate ecosystem-based adaptation (EbA)
- Heat Action Plans to address extreme heat events

Financing mitigation in urban areas

- Energy-efficient lighting and appliances
- Renewable energy at the local level
- Circular economy, and improved solid waste management facilities
- Improved mobility through affordable mass transit, encompassing low-carbon and non-motorized transportation infrastructure, and electric mobility.

ULBs can explore funding for sustainable urban development in partnership with Central Government Ministries, Multilateral/Bilateral agencies and national/ international civil society organizations. While the CSOs/NGOs generally do not play a key role in direct financing, they can provide consultations related to technical support, capacity building and leverage existing collaborations with central and state governments, multilateral /bilateral agencies, Development Finance Institution (DFIs) for further exploring the climate finance landscape in the urban context.



*Climate actions can be placed in both categories at the same time, as, sometimes by categorizing in one may lead to loss of societal benefits

INTERNAL ← CHALLENGES → EXTERNAL

Direct barriers faced by cities: *Lack of awareness, political priority, capacity, institutional structures and tools*

Outside of ULB's direct sphere of influence: *National policies, unattractive risk-return profiles of climate projects, lack of financial mechanisms*

OPPORTUNITIES

Cities can attract additional revenues and investment capital through "new" financing instruments, such as land value capture and bonds

Financial intermediation through specialized fin. institutions, in turn, can serve to pool risks and channel international funds directly to sustainable urban development

INTERNATIONAL

Multilateral (Climate) Funds
- Adaptation Fund ***(AF)***
- Clean Technology Fund ***(CTF)***
- Global Environment Facility ***(GEF)***
- Green Climate Fund ***(GCF)***
- Pilot Program for Climate Resilience ***(PPCR)***
- Special Climate Change Fund ***(SCCF)***

Multi & Bilateral Development Banks
- African Development Bank ***(AfDB)***
- Asian Development Bank ***(ADB)***
- Corporacion Andina de Fomento ***(CAF)***
- European Investment Bank ***(EIB)***
- Inter-American Development Bank **(IADB)**
- World Bank and its subsidiaries
- National development banks (like ***AFD, KfW, JBIC***, etc.)

Other multi and bilateral public finance
- Climate Change Resilience Trust (UK, Rockefeller Fdn, ADB)
- Global Climate Change Alliance+ (EU), Market mechanisms (CDM, Gold Standard and VCS)
- International Climate Initiative (Germany)
- International Climate Fund (UK)
- NAMA Facility (UK, Germany)
- Global Climate Partnership Fund (Germany, UK, Denmark)
- Global Climate Change Initiative (USA)

Other sources
- Municipal Bonds (Green/Climate Bonds etc.)

NATONAL

Energy & Green Buildings
- Solar Cities Programme & AJAY (MNRE)
- MuDSM (BEE)
- MEEP, SLNP & UJALA scheme (EESL)
- AMRUT, PMAY (U) & SCM (MoHUA)

Urban Planning Green Cover & urban Biodiversity
- GIM (MoEFCC)
- NMSKCC (DST)
- NCRMP (NDMA)
- AMRUT, HRIDAY & SCM (MoHUA)

Mobility & Air Quality
- FAME programme (MHIPE)
- AMRUT & Urban Mobility Schemes (MoHUA)
- NCAP (MoEFCC)

Water Resource Management
- AMRUT (MoHUA)
- NWM (MoJS)

Waste Management
- SBM-U (MoHUA)

* As per MoHUA's ClimateSMART City Assessment Framework (CSCAF)

STATE

- National and the State Level Disaster Response Fund.
- State-wise fiscal instruments to address environment and climate change: E.g. Sikkim Ecological Fund (SEF), Green Tax on motor vehicles by Tamil Nadu, Maharashtra and Andhra Pradesh are few notable examples.
- Finance of viable project by institutions like NABARD.
- Project funding under the State Finance Commission

- Most of the funding is channeled through accredited implementing entities (mostly intl. organizations like UN agencies, MDB etc.)
- Cities have also accessed climate funding through developing joint proposals with implementing entities.

AJAY: Atal Jyoti Yojana; **AMRUT**: Atal Mission for Rejuvenation and Urban Transformation; **BEE**: Bureau of Energy Efficiency; **CDM**: Clean Development Mechanism; **DST**: Department of Science and Technology; **EESL**: Energy Efficiency Services Limited; **FAME**: Faster Adoption and Manufacturing of Hybrid and EV; **GIM**: Green India Mission; **HRIDAY**: National Heritage City Development and Augmentation Yojana; **MEEP**: Municipal Energy Efficient Programme; **MHIPE**: Ministry of Heavy Industries & Public Enterprises; **MNRE**: Ministry of New & Renewable Energy; **MoEFCC**: Ministry of Environment, Forest & Climate Change; **MoJS**: Ministry of Jal Shakti; **MoHUA**: Ministry of Housing and Urban Affairs; **MuDSM**: Municipal Demand Side Management; NABARD: National Bank for Agriculture and Rural Development; **NAMA**: Nationally Appropriate Mitigation Action; **NCAP**: National Clean Air Programme; **NCRMP**: National Cyclone Risk Mitigation Project; **NDMA**: National Disaster Management Authority; **NMSKCC**: National Mission on Strategic Knowledge for Climate Change; **NWM**: National Water Mission; **PMAY(U)**: Pradhan Mantri Awas Yojana (Urban); **SBM-U**: Swachh Bharat Mission Urban; **SCM**: Smart Cities Mission; **SLNP**: Street Lighting National Program; **UJALA**: Unnat Jyoti by Affordable LEDs for All; **ULB**: Urban Local Body; **VCS**: Verified Carbon Standard

Source: NIUA (https://smartnet.niua.org/csc/assessment-to-action.html)

3.1. Types of Financing Options

3.1.1. Funding at International level

Multilateral and Bilateral Banks / Financial Institutions

Most of the international funding sources are channelled through accredited implementing entities, including international organizations such as UN agencies, development banks, among others.

World Bank provides Specific Investment Loans (SILs) for funding the construction of physical and social infrastructure. It also supports subnational Development Policy Lending (DPL), which is an instrument to support sector reforms through policy development and implementation as well as institutional capacity building. In order to access SILs, ULBs can apply through their national government agencies; and in case of subnational DPL, ULBs with "legislative autonomy and independent budgetary authority immediately below the national level" are among the eligible entities to apply. Such funds are more favourable for capital or metropolitan cities which aims to explore various avenues to receive climate funds.[38] Meanwhile, the **International Finance Corporation (IFC)** at the World Bank aims to mobilize commercial financing for priority projects and in turn connects cities with capital markets, which leads to diversification of investor base. They support cities on sectors like climate resilience, urban transport, smart city development, water and waste management, energy efficiency and street lighting; in the form of availing support for public-private partnerships (PPPs), community outreach and capacity building.[39]

The IFC, in collaboration with the EU has established **Eco-Cities India**, a multi-year technical advisory programme, designed to assist government and civil society in meeting efficiency targets (such as NDCs), reductions in emissions levels and increased focus on climate-resilient development pledged under the Paris Climate Agreement. The program is structured around five cities—Bengaluru, Bhubaneswar, Chennai, Mumbai (MMR) and Pune (PMR). The primary goals for the program include development of solutions to infrastructural problems relating to urban transportation, water and waste management, street lighting, green affordable housing, energy efficiency, and climate resilience. In that regard, the program is developing and financing replicable, scalable projects in the areas of climate-smart infrastructure, market for green buildings and promoting competitive Small and Medium Enterprises (SMEs).

Asian Development Bank (ADB) provides support for addressing environmental and climate change challenges in urban areas, among other initiatives. The ADB has established **Urban Climate Change Resilience Trust Fund (UCCRTF)**, in collaboration with USAID, DFID and the Rockefeller Foundation, which aims to support cities in Asia (including India) towards reducing risks related to floods, storms or droughts faced by vulnerable communities. The fund aims to scale up investments in urban climate change resilience (UCCR) and supports cities by improving urban planning, designing climate resilient infrastructure, and investing in projects and people. The Trust Fund provides technical assistance and investment grant financing to projects, through the ADB Operation

38 L. Junghans, L. Dorsch, A. Brandschwede, R. Sakofski,2015. Finding the Finance - Financing Climate Compatible Development in Cities. Germanwatch.

39 International Finance Corporation Cities Initiative - IFC: A Solutions Provider for Cities and Mayors

Departments to support climate change integration into city planning, implementation of infrastructure and policy / institutional interventions, along with knowledge management. ADB has also supported Smart Cities Mission projects for strengthening climate change resilience in urban India. ADB also manages the **Cities Development Initiative for Asia (CDIA)**, a multi-donor trust fund implemented in partnership with AFD, that works closely with secondary cities in Asia and the Pacific to address gaps in infrastructure development and financing. It uses a demand-driven approach to support infrastructure projects that emphasize poverty reduction, environmental improvement, climate change mitigation or adaptation, and good governance. To facilitate these initiatives at the city level, CDIA provides a range of international and domestic expertise that can include, among others, support for project preparation studies for high priority infrastructure investment projects. Some of the selected cities in India include Rajkot, Pimpri, Kochi, Coimbatore, Tiruppur, Erode, Mysore, Visakhapatman.

Green Climate Fund (GCF) has been designated as an operating entity of the financial mechanism of the UNFCCC and aims to support developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change. In India, National Bank for Agriculture and Rural Development (NABARD) has been accredited as Direct Access Entity (DAE) of GCF for channelizing resources under this fund. The GCF resources are utilised for projects and programmes related to climate resilient development and low emission pathways in India. **Global Environment Facility (GEF)** is a multilateral climate fund that has been contributing to climate action in India for some time. It is aimed at multiple focal areas including climate change, forests, land use, and sustainable cities. **GEF's Sustainable Cities Impact Program (SCIP)** harnesses the power of networks and experience from the cities in the pilot phase and plans to support 24 new cities in 9 countries (including India). The program aims to advance the integrated approach of urban planning and bring together global, national, and local stakeholders to work towards a common vision of sustainable, inclusive, gender sensitive, and resilient development. While GEF-6 SCIP included the Indian cities of Vijayawada, Guntur, Mysore, Jaipur, Bhopal; GEF-7 SCIP includes Chennai, Guwahati, Pune, Surat. **Adaptation Fund (AF),** associated with the UNFCCC is the only international climate fund besides the GCF that is independent of development finance institutions. It is financed through a levy on international carbon market transactions. The AF pioneered direct access to climate finance by the developing countries through National Implementing Entities (NIEs) based in the respective countries instead of working solely through multilateral agencies and banks. NABARD is the NIE for India.

Carbon Finance

Cities that deal with waste management, energy efficiency, and access to energy can be beneficiaries of the carbon market. Many cities are exploring ways to use carbon finance to leverage private and public funding. For example:

- Indore is planning to reinvest the revenue generated from its Verified Carbon Standard (VCS) Program into renewable energy and energy efficiency projects.
- The South Africa City Network is developing a program of energy projects in different South African cities based on establishing a framework for carbon finance.

- Amman, Jordan has partnered with the World Bank's Carbon Partnership Facility (CPF) for the city's low-carbon development strategy and is now a pilot for the Citywide Approach to Carbon Finance.
- In Sao Paulo, the revenues from carbon finance have been used to support community.

Guarantees

Guarantees are used to improve investor confidence in cases of risk (for example, the lack of a track record of bond issuance). Credit enhancements provided by multilateral development banks (MDBs) can help cities access credit at more affordable terms. Through a partial credit guarantee, the guarantor shares the risk of debt service default with lenders on some predetermined basis. This tool can be used to protect private lenders and investors against the risk of a government failing to perform its contractual obligations.

3.1.2. Funding at National level

Climate funds support climate actions in urban areas under few national climate missions and allied initiatives. One notable case is the recently launched Nagar Van or Urban Forests scheme, which will be funded by the Compensatory Afforestation Fund Management and Planning Authority (CAMPA), which functions under the MoEFCC for monitoring, providing technical assistance and evaluating the compensatory afforestation activities. Also the MoHUA, under its flagship Smart Cities Mission, has supported various initiatives with direct or strong climate co-benefits. Among the various initiatives under NAPCC, the missions which are most relevant for cities are Jawaharlal Nehru National Solar Mission (JNNSM), National Mission for Enhanced Energy Efficiency (NMEEE), National Mission on Sustainable Habitat (NMSH) and National Water Mission (NWM).[40]

Also at the sub-national level, budgetary support has been recommended for few of the states for their SAPCCs by the National Steering Committee on 26 SAPCCs (NSC-SAPCC) in the MoEFCC. These SAPCCs also include actions related to urban areas. While in case of most of the states, proper sources of funding to implement the SAPCCs are yet to be identified, states with budgetary support for SAPCC may also support climate action in cities.

3.1.3. Funding at Local level

Market-based financing offers significant opportunities for investments in cities. The private sector will be an important source of adaptation funding for both private assets and public infrastructure. City engagement with the private sector on adaptation could involve the following:

- Privately-held infrastructure that provides public services (for example, transportation, electric power networks, water systems, and solid waste)
- Private properties that can be leveraged to improve adaptive capacity (for example, buildings that could be renovated with green roofs to minimize the urban heat island effect)
- Leverage private finance to fund a range of dedicated adaptation investments, whether or not a private company has a direct interest in the project

40 Divya Singh, 2017. Climate Finance Architecture in India, CBGA

Insurance and other risk management instruments serve important functions for cities and countries when disasters strike, covering the risks of high severity, low-frequency events for individuals, public institutions, and private entities. However, private sector insurance is not always robust in developing countries and may not be accessible to the poorest communities. Dedicated insurance can help to ensure access to immediate liquidity to finance emergency relief and reconstruction operations. Further, many governments are exploring **Public Private Partnerships (PPPs)** to design, build, finance, and operate public infrastructure facilities, while receiving a financial return through fees charged to users or payment from the public sector. PPP contracts can vary broadly from a concession to a service contract, but the public sector retains ultimate accountability to the user for providing the service. The main benefit of a PPP is to mobilize private capital, while also improving service quality and the management of the facility. PPPs are now broadly used for public services, such as public transport or water supply, as well as for infrastructure management, such as highways.

3.1.4. Private Climate Finance

Most private climate finance in India have been leveraged by MDBs and bilateral financial institutions, which then mobilize commercial finance to the Indian financial institutions (public and private sector banks, non-banking financial (NBF) institutions; and private investors mostly through CDM) to further lend it for climate action in India. Some of the key sources of private climate finance in the Indian landscape are as follows:[41]

Debt Finance: These are usually in form of local and foreign currency loans. The former is given by domestic (public and private banks) and NBF institutions. Public banks, which lend to the renewable energy sector in India are State Bank of India, Canara Bank, and Central Bank of India. Private Banks lending to the sector include ICICI Bank, HDFC Bank and Axis Bank. Foreign currency loans, on the other hand, are provided by development banks, export import banks and foreign banks. In India, these loans are being provided by JICA, Exim Bank of China and USA, Overseas Private Investment Corporation (OPIC) and Asian Development Bank (ADB).[42] **Green Bond** is fast emerging as another mechanism to finance green initiatives. The key difference between a 'green' bond and a regular bond is that the issuer publicly states it is raising capital to fund 'green' projects, assets or business activities with environmental benefits. Potential sectors where Green Municipal Bonds can finance sustainable projects are Energy, Waste Management, Green Infrastructure, Clean Water and Utilities, Storm Water Management, Transportation and Industrial Efficiency. While the municipal bond market in India is still at a nascent stage, there are several advantages for municipal corporations in issuing green bonds. Green bonds expand the quantum of clean energy finance and broaden investor base, provide access to low cost, long-term capital, increase liquidity and drive green investment by enabling refinancing, and create investment pipelines to meet climate commitments.[43] **Private Partial Risk Guarantee Facilities** are also a source of climate finance in India, though it has a limited presence. ADB's India Solar Generation Capacity is one such example. The World Bank Group's Partial Risk Sharing Program (PRSP)

41 Divya Singh, 2017. Climate Finance Architecture in India, CBGA
42 Vyoma Jha, 2014. The Coordination of Climate Finance in India, ODI
43 GIZ, 2017. Green Municipal Bonds in India: Potential, Barriers and Advantages

also provides partial risk and credit guarantee products to support projects taken up by governments and private investors in developing countries.[44] **Private Equity and Venture Capital** has also become one of the biggest sources of funds for renewable energy projects, especially the wind and solar power projects. The private equity firms, which have invested in India include GIC Singapore, Abu Dhabi Investment Authority, Asian Development Bank (ADB) and Goldman Sachs.

3.2. Case studies

3.2.1. Energy Efficient Street Lighting in Bhubaneshwar

The Urban Renewal Plan for Bhubaneswar requires $700 million, of which almost $400 million is expected to be sourced through PPPs. The Bhubaneswar Municipal Corporation in collaboration with the IFC designed a PPP that would reduce energy consumption, improve visibility, and make the city safer for its residents. With support from DevCo, a multi-donor facility affiliated with the Private Infrastructure Development Group, IFC linked the private partner's revenue directly to the amount of energy it saved the city. The more energy the company saved the city, the more it would earn. Almost 20,000 street-lights in Bhubaneswar have been retrofitted with energy-efficient lighting. IFC has helped the cities of Berhampur, Cuttack, Jaipur, Rourkela, and Sambalpur improve their street lights through PPPs. Together, these projects will reduce GHG emissions by nearly 50,000 metric tons per year, bring in over $20 million in private sector investment, and make city streets safer for citizens.[45]

3.2.2. Financing Rajkot's Urban Climate Actions

Rajkot has identified a Low Emission Development Strategy, which specifies city's goals, including water supply, wastewater treatment, non-motorized and public transport initiatives, and integrating climate priorities with urban planning. Rajkot's Development Plan 2031 aims to implement these strategic priorities through initiatives with possible emissions reduction potential like Transit Oriented Development (TOD), sustainable mobility, green networks, and water and sewerage management. While the Development Plan 2031 specifies a variety of approaches to finance the city's development projects, the ULB plans to explore land value capture and the sale of public land to raise municipal funds. In addition to public funding from the national and subnational governments, Rajkot intends to leverage private sector funds through PPPs. The Rajkot Municipal Corporation has been innovative and successful with PPPs in the past, with initiatives like high-purity sewage treatment plant contract under BOT model. Also under the AMRUT Scheme, the city has issued multiple tenders to the private sector for PPPs in sectors like water, wastewater, green open spaces, riverfront development and sustainable transport (mass transit systems, metro rail etc.). Rajkot has also proposed issuing municipal bond to raise funds for the urban development initiatives, which would initially help in financing the upgrade of smart water meters to ensure 24-hour water supply across the city.[46]

44 Divya Singh, 2017. Climate Finance Architecture in India, CBGA
45 IFC, 2018. Climate Investment Opportunities in Cities - An IFC Analysis
46 CISION, 2019. Indore's Municipal Corporation Becomes the First Asian Municipal Body to get its Sustainable City Projects Registered for Carbon Credits from VCS (Verified Carbon Standard, USA) Program

3.2.3. Indore's Verified Carbon Standard (VCS) Program

Indore has become the First Asian Municipal Body to get its sustainable city projects registered for carbon credits from VCS (Verified Carbon Standard, USA) Program. Indore Smart City Development Limited (ISCDL) has registered three projects — a bio-methanation plant, a compost plant and a 1.5 MW solar plant, under the VCS program of the UNFCCC. This has led to the mitigation of 1.7 lakh tonnes of carbon dioxide equivalent. The project is registered for 30 years and it will get issuance of approximately 3,50,000 credits per annum having international carbon market value of avg. USD 2,00,000 - 4,00,000 per annum. ISCDL further plans to reinvest the revenue generated into other smart city projects with better sustainability and climate co-benefits, focusing on renewable energy and energy efficiency e.g. proposed solar power plant.[46]

3.2.4. Pune's Municipal Bonds

Pune Municipal Corporation (PMC) with support from Government of Maharashtra (GoM), Ministry of Finance (MoF), Ministry of Urban Development (MoUD) (presently MoHUA) and other partners raised INR 200 crores through Municipal Bonds during the first tranche of its five-year bond programme (approx. INR 2264 crores). The bond was additionally supported by the Government of India through a compensation of 2 percent interest subsidy on the total size of the bond issue. PMC have approved a consumption-based telescopic water tariff structure for the next 30 years and this policy will progressively increase the revenues generated from the '24x7 Water Project'. Additionally, as a part of the structured escrow payment mechanism, a portion of PMC's property tax has also been pledged for the debt servicing of the bond program. The bonds may also be partly/fully paid from PMC's several revenue sources. This '24x7 Water Project' would enable the city of Pune to lead further towards self-sustenance.

3.2.5. Treating Wastewater for Reuse in Thermal Power Generation, Nagpur

The Maharashtra Generation Company Ltd. (MahaGenCo) used to consume a large amount of fresh water to generate electricity in its thermal power plants located near the city of Nagpur. In order to meet the increasing electricity demand, MahaGenCo planned further expansion which also required an additional supply of water, thus putting additional load on this already water-scarce region. To address this issue, the MahaGenCo and Nagpur Municipal Corporation (NMC) signed a build-operate-transfer (BOT) end-user contract. Under the contract, NMC supplied raw wastewater, while MahaGenCo agreed to be in charge of transportation and treatment of the wastewater in its plant with secondary and tertiary treatment facilities. The contract ensured a regular supply of raw wastewater to the power plant, while providing NMC with a constant source of revenue, which also had additional environmental, social and health co-benefits.[47]

47 World Bank Group, 2010. Wastewater: From Waste to Resource. The Case of Nagpur, India (https://openknowledge.worldbank.org/bitstream/handle/10986/33111/Wastewater-From-Waste-to-Resource-The-Case-of-Nagpur-India.pdf?sequence=1&isAllowed=y)

3.2.6. Delhi's Timarpur Okhla Integrated MSW Management Project

The Timarpur Okhla Integrated Municipal Solid Waste Management (MSW) Project, located in Delhi, was a climate mitigation PPP project that aimed to reduce the amount of MSW being disposed in the landfill sites and utilizing the waste for productive purposes such as generation of power from waste. The key activities/actions under this project included converting MSW to Refuse Derived Fuel (RDF), bio-methanation plant, water recovery plant, power plant, transportation of RDF to power plants. The project was registered with the UNFCCC for CDM to earn 2.6 million Certified Emission Reductions (CERs) over ten years. The project was undertaken on Built, Own, Operate and Transfer (BOOT) mode of PPP, which involved IL&FS Infrastructure Development Corporation Limited (IL&FS – IDC), New Delhi Municipal Corporation (NDMC), Delhi Power Company Limited (DPCL), Andhra Pradesh Technology Development & Promotion Board and many other government & private agencies.[48]

3.2.7. Coastal Towns Environmental Infrastructure Project, Bangladesh

An estimated 8.6 million people in Bangladesh's coastal regions are highly vulnerable to rising sea levels along with raging cyclones in the Bay of Bengal. These urban areas further suffer from natural resource constraints and large infrastructure deficits that worsen their sensitivity to climate change. ADB supported climate resilience and disaster preparedness in eight such coastal towns (each with populations ranging between 15,000 to 60,000 people). The project grant included the funding for construction of climate resilient infrastructure (roads, drains, and cyclone shelters). It would also support the development of an integrated drainage plan and a solid waste and faecal sludge management plan incorporating a PPP business model.[49]

48 Department of Economic Affairs, 2010. Public Private Partnership Projects in India - Compendium of Case Studies

49 IFC, 2018. Climate Investment Opportunities in Cities - An IFC Analysis

Annexures

Annexure 1 - UN Organizations

United Nation Framework Convention on Climate Change (UNFCCC)

The UNFCCC is tasked with supporting the global response to the threat of climate change. The Convention has near universal membership (197 Parties) and is the parent treaty of the 2015 Paris Agreement. The main aim of the Paris Agreement is to keep the global average temperature rise this century as close as possible to 1.5 degrees Celsius above pre-industrial levels. The ultimate objective of various agreements under the UNFCCC is to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a time frame which allows ecosystems to adapt naturally and enables sustainable development. The UNFCCC also maintains the registry for Nationally Determined Contributions (NDC) established under the Paris Agreement. Cities play a crucial role in the implementation of the global climate change agenda at a local level, for those nations, which have ratified to the Paris Agreement and Kyoto protocol. While the NDCs primarily cover the national climate commitments of countries, cities aide the apportionment of those commitments at the local level by adhering to the 1.5 degree Celsius goal.[50] Cities can also undertake emission reduction projects to generate Certified Emission Reduction (CER) units that can be traded as a part of Clean Development Mechanism (CDM). Certain cities in developing nations have already begun the process of adopting an integrated systems approach to emissions reduction and resource conservation. The UNFCCC has also approved a methodology for large-scale emissions reduction initiated through various sectors within a city. The 'city-wide CDM' allows a city to reduce emissions through sectors like energy use, buildings, waste management, mobility, water use etc.[51]

For further reference: https://unfccc.int/climate-action/race-to-zero-campaign

United Nations Human Settlements Programme (UN-Habitat)

UN-Habitat is a programme for human settlements and sustainable urban development. UN-Habitat works with international climate organizations and city networks for promoting the role of cities and human settlements in achieving climate adaptation and mitigation actions. UN-Habitat is actively involved in bring together plans, policies, strategies and implementation actions for addressing various climate change related challenges, including reduction in GHG emissions and urban resilience. UN-Habitat has also been working with urban planning and development professionals for developing frameworks and tools to address the impacts of climate change at urban level along with improving the planning practices of cities in accordance with the climate anomalies.[52] UN-Habitat has prepared the Guiding Principles for City Climate Action Planning (GPCCAP), to guide city-level climate action

50 IPCC Special Report on Global Warming of 1.5 °C (https://unfccc.int/topics/science/workstreams/cooperation-with-the-ipcc/ipcc-special-report-on-global-warming-of-15-degc)

51 City-wide Clean Development Mechanism: A Framework for Empowering Cities (https://blogs.worldbank.org/sustainablecities/city-wide-clean-development-mechanism-a-framework-for-empowering-cities)

52 UN-Habitat India (https://unhabitat.org/india)

planning.[53] These principles have been incorporated in the planning of multiple cities across North America and Europe. Presently, UN-Habitat is revising the GPCCAP to further incorporate the principles of SDGs & New Urban Agenda in city level climate action plans.

UN-Habitat India is working closely with donors and key partners for assisting cities in achieving sustainable urbanization. In India, some of the prime interventions by UN-Habitat include:[54]

- Safe, Inclusive, Resilient and Sustainable Cities and Regions: Improved policy frameworks focused on inclusive planning and sustainable development through effective and participatory planning instruments at the city and regional scale.
- Affordable, Green, and Resilient Housing Environment: Design tools and mechanisms to promote social housing with a focus on energy efficiency and effective waste management strategies.
- Promote Safe, Well Planned and Serviced Neighbourhoods: Promote secure and safe livelihoods to enable sustained economic and social mobility. Integrate smart technology and participatory models to improve service delivery for all at the neighbourhood scale.
- Accountable and Efficient Urban Governance: Strengthen planning, financing, service delivery and monitoring mechanisms to ensure sustained universal access to basic services and resilient livelihoods.
- Knowledge Systematization and Learning: Develop capacities and share technical expertise to empower local city authorities to effectively and efficiently mainstream SDG-11 and its linkages in the national and local urban agenda the needs and expectations of citizens.

For further reference: https://unhabitat.org/india

United Nations Development Programme (UNDP)

UNDP is a global development network which is active in 177 nations across the world. Besides being involved with local governments to develop capacity and address development needs, UNDP is also involved in the implementation of the Sustainable Development Goals (SDGs) In India, UNDP has been engaged at various levels of governance, at both national and sub-national levels in sectors such as housing, transport, urbanization, heritage, public spaces, environment, climate change, and vulnerability.

UNDP has also been engaged in expanding the usage of solar energy in India along with promotion of Energy Efficiency initiatives at both rural and urban levels. UNDP initiated the Sustainable Urban Transport Programme at the local level, to strengthen the capacity of national/sub-national and local government agencies involved in transportation-related planning for reducing the emissions from urban transport sector.

For further reference: https://www.in.undp.org/content/india/en/home.html

53 Guiding Principles for City Climate Action Planning (https://unhabitat.org/guiding-principles-for-climate-city-planning-action)

54 UN-Habitat India (https://unhabitat.org/india)

United Nations Environment Programme (UNEP)

The United Nations Environment Programme (UNEP) is the leading international environmental authority. The work of UNEP focuses on areas such as integrated environmental planning, resource efficiency & green economy, cities and climate change, sustainable buildings, sustainable transport and air pollution, solid waste management, water and sanitation, risk reduction and disaster preparedness, and biodiversity and ecosystems.[55]

In India, UNEP had a major mobility initiative named 'Promoting Low Carbon Transport in India'. This project helped in the development of a network of expertise in transportation planning, climate change, air pollution, safety and social inclusivity. The project integrated the climate agenda with sustainable transport development in India.[56] The initiative strategically linked the transportation aspects of India's NAPCC with the development of smart cities and renewal of urban transport in India. This led to further development of cities' capacity to improve their existing transportation infrastructure along with lowering carbon emissions. The District Energy in Cities Initiative of UN Environment is promoting a city-led approach to space cooling that complements ongoing strategies and policies but unlocks the power of local governments to tackle space cooling demand by using district cooling systems and trigeneration. In India, the initiative is working with different government levels, industry, power utilities, real estate developers and financiers to design and deliver the necessary policy frameworks, stakeholder coordination structures, financing instruments and urban planning approaches conducive to bringing projects to successful investment. Thane is India's first district energy pilot city and Rajkot is first Indian city to incorporate district cooling into its Smart City Plan.[57]

For further reference: https://www.unenvironment.org/explore-topics/transport/what-we-do/share-road/india

World Meteorological Organization (WMO)

WMO is an intergovernmental organization under the guidance of United Nations, working with a membership of 193 Member States and Territories. It is the specialised agency of the UN for meteorology (weather and climate), operational hydrology and related geophysical sciences. While WMO primary function is to provide weather and meteorological services across national borders, it has also prioritized the importance of providing meteorological and related services that can assist the urban decision-makers in order to face disaster and weather related challenges. These services are crucial for departments like transport, health, energy, drainage etc. WMO is promoting healthy, safe and resilience cities through the 'Guidance on Integrated Urban Hydro-Meteorological, Climate and Environmental Services (IUS)' initiative. This initiative is aimed to build urban services through a combination of observation networks, forecasting mechanism, multi-hazard early warning systems, disaster managements plans etc. in order to equip cities to tackle future

55 UNEP - Cities and climate change (https://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/cities/cities-and-climate-change)

56 Promoting Low Carbon Transport in India (https://wedocs.unep.org/bitstream/handle/20.500.11822/16989/LCT_ProjectBooklet.pdf?sequence=1)

57 https://www.districtenergyinitiative.org/india

threat from weather and climate anomalies.[58] WMO views India as a leading country in terms of providing weather and climate services across sectors like agriculture, forests, fisheries, disaster management etc. India is currently working on setting up the national framework for which identification of priority areas is underway. The establishment of the national framework has catalysed the support through investments in improving climate and weather services from various state governments, which would allow India to make progress in providing better weather services in the future.[59]

For further reference: https://public.wmo.int/en/members/india

58 Guidance on Integrated Urban Hydrometeorological, Climate and Environment Services Volume II: Demonstration Cities (https://elioscloud.wmo.int/share/s/Rf3EW264RZWGJuLrCuzo9w)

59 From the interview of Mr. Filipe Lucio, Director, Global Framework for Climate Services (GFCS) at World Meteorological Organisation (WMO) (https://indianexpress.com/article/cities/pune/filipe-lucio-director-global-framework-for-climate-services-user-based-climate-products-global-weather-observation-networks-6271540/)

Annexure 2 - Bilateral Agencies

Canada: International Development Research Centre (IDRC | CRDI)

IDRC is a Canadian government corporation, established by the Parliament of Canada in 1970. IDRC supports research in developing countries to promote growth and development. IDRC also encourages sharing this knowledge with policymakers, other researchers, and communities around the world. With a growing presence in India, IDRC's work on climate change revolves around investment in mapping and measuring vulnerability, finding public policies to ensure resilience in the face of climate change, and supporting the shift to cleaner energy. IDRC has supported Indian cities under the Integrated Rural-Urban Water Management for Climate Based Adaptation in Indian Cities (iAdapt) program, which aims to enable cities (Solapur, Maharashtra & Vijayawada, Andhra Pradesh) to transition toward an integrated climate-proof approach to water management, providing greater water security to residents.

For further reference: https://www.idrc.ca/en/what-we-do/asia/india

European Union (EU): International Urban Cooperation (IUC)

International Urban Cooperation (IUC), funded by the EU, is a programme that supports the achievement of bilateral policy objectives as well as major international agreements on urban development and climate change, such as the Urban Agenda, the SDGs, and the Paris Agreement. The IUC programme engages with major international financial institutions and partners to link city decision-makers with potential funders. EU businesses will be an important partner for activities under the components on sustainable urban development and innovation cooperation for local and regional development. The target countries include India along with various countries in Asia Pacific, Latin America and the Caribbean (LAC) region. The major components of the IUC programme are: 1. City-to-city cooperation on sustainable urban development, 2. Sub-national action under the Global Covenant of Mayors initiative and 3. Inter-regional cooperation on innovation for local and regional development.[60]

Through the IUC programme, cities and regions across Europe have entered into partnerships on sustainable development with counterparts from around the globe. In order to share knowledge on sustainable urban development and exchanging approaches with European local governments on the topic of Smart Cities, in particular improving water and waste management services through smart methods, 12 Indian cities were selected, which incude: Gangtok, Gwalior, Kochi, Leh, Nagpur, Panaji, Shimla, Solapur, Surat, Udaipur, Vijayawada.

For further reference: https://iuc.eu/na/home/

France: Agence francaise de developpement (AfD)

AfD is the public agency that implements France's international development and solidarity policy. Some of its key objectives include promotion of biodiversity, social and environmental responsibility, and reducing the negative

60 https://iuc.eu/na/city-pairings/

impacts of climate change. AFD has been supporting sustainable urban development, energy transitions and ecological preservation in India since 2008. In India, AFD primarily works in the sector of sustainable mobility (including the financing construction of metro rail), sustainable use of water resources (towards meeting water demand and to improve the quality of resources) and supporting the development and implementation of Smart City projects (particularly in the areas of transportation, governance, energy and environment). Besides these, AFD is also financing initiatives related to India's renewable energy transition, promoting energy efficiency, protecting biodiversity along with raising awareness towards climate change. Some of the key sustainable urban development initiatives financed by AFD in India are construction of metro rail in Bengaluru, Kochi, Nagpur, Pune, Surat and, drinking water distribution network in Jodhpur and Pondicherry. Nagpur, Chandigarh and Pondicherry are being supported in the development and implementation of their "Smart City" projects.

For further reference: https://www.afd.fr/en/page-region-pays/india

Germany: Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH

GIZ is the German development agency that provides services in the field of international development cooperation. GIZ mainly implements technical cooperation projects of the Federal Ministry for Economic Cooperation and Development (BMZ), although it also works with the private sector and other national and supranational government organizations on a public benefit basis. The thematic areas of GIZ in India are Energy; Environment, Climate Change & Biodiversity; Sustainable Urban & Industrial Development and Sustainable Economic Development. Some of the key missions, which GIZ has supported in India, include Smart Cities, Clean India and Skill India. GIZ has also undertaken multiple initiatives in the Indian cities related to Energy Efficiency, Renewable Energy, Sustainable Transport, Sustainable Urban Development (Smart Cities), Climate Smart Cities, Land Use Planning and Management (LUPM), Urban Sanitation and Waste management. Besides supporting the MoHUA for the CSCAF 1.0, GIZ has also supported the Indian cities, including Bhubaneshwar, Chennai Coimbatore & Kochi for mainstreaming climate change into urban development.

For further reference: https://www.giz.de/en/worldwide/368.html

Japan: Japan International Cooperation Agency (JICA)

JICA is the Japanese governmental agency that aims to contribute to the promotion of international cooperation as well as the sound development of Japanese and global economy by supporting the socio-economic development, recovery or economic stability of developing regions. JICA has extended support in terms of concessional loans, technical cooperation and grant-aid in an integrated manner to support socio-economic development efforts of India. In addition to the conventional aid modalities, JICA has also extended cooperation on private partnership, science and technology and people to people exchange program. The key sectors supported by JICA in India include Transport, Water & Sanitation, Energy, Forestry, Agriculture, Human Resource Development, Health, and Knowledge co-creation. Co-Creation. While the focus of JICA in the Indian cities are on projects related to Metro rail, Intelligent Transport Systems, Water Supply & Sewage Treatment Facilities, Renewable Energy, Energy Efficiency etc. JICA has supported the cities of Delhi, Pune, Bangalore, Agra for water supply

and environment related projects, Varanasi and Delhi for river rejuvenation initiatives; and Pune, Bhopal and Hyderabad for pollution abatement initiatives.

For further reference: https://www.jica.go.jp/india/english/

Sweden: Swedish International Development Cooperation Agency (SIDA)

Swedish International Development Cooperation Agency (SIDA) is the Sweden's government agency for development cooperation. SIDA strives to reduce world poverty by allocating resources and knowledge with the goal of making a difference for people in Africa, Asia, Europe and South America. To achieve this, SIDA collaborates with actors from civil society, universities as well as the public and private sector. SIDA has selected environment and climate as priority areas for cooperation with India. The focus has been on energy and sustainable urban development. Some of the recent collaborations for Indian cities include initiatives related to energy efficiency, training of environmental regulators, sustainable water management, waste to energy/ biogas. SIDA has tested the Symbio City concept, methods and tools for integrated and sustainable urban development, in Visakhapatnam and has supported sanitation projects designed to benefit over 200,000 families living in slums in Mumbai and Pune.

For further reference: https://www.sida.se/English/publications/113303/india/

Switzerland: Swiss Agency for Development and Cooperation (SDC)

SDC is Switzerland's international cooperation agency within the Federal Department of Foreign Affairs (FDFA). The Agency undertakes direct actions, supports programmes of multilateral organizations, and helps to finance programmes run by Swiss and international aid organizations focusing on the themes like agriculture and food security, climate change and environment, water, disaster risk reduction, emergency relief, reconstruction and protection; along with health, education, migration, governance, human rights, gender and finance. SDC supported climate action in India under the umbrella of the Global Programme Climate Change and Environment (GPCC). While the adaptation portfolio includes Water Security, Food Security and Hazard & Risk Management; the mitigation portfolio focuses primarily on built environment, promoting energy efficiency in buildings and SMEs. Some of the notable initiatives of SDC are Clean Air Project in India (CAP India), Capacity Building for Low Carbon and Climate Resilient City Development in India (CapaCITIES). SDC has supported the cities of Coimbatore, Rajkot, Siliguri and Udaipur under the CapaCITIES initiative.

For further reference: https://www.eda.admin.ch/countries/india/en/home/international-cooperation/themes/climate-change/programe-climate-change.html

United Kingdom: Foreign, Commonwealth and Development Office (FCDO)

FCDO leads the UK's global efforts to end extreme poverty, deliver the global goals for SDGs, and tackle a wide range of global development challenges. The FCDO (erstwhile DFID) works on the thematic areas of Skills and start-ups,

Urban development (improving urban infrastructure) and, Energy and green growth (removing barriers to investment in Indian energy markets, providing clean energy and helping cope with the increased climate risks of drought, flood and extreme heat). Some of the key projects of FCDO in India include infrastructure for climate resilient growth, technical assistance for smart cities, supporting structural reforms in the power sector, smart urban development in Indian States, disaster proofing Indian cities, and Climate Change Innovation Programme (CCIP) / Action on Climate Today (ACT). Under the Smart Urban Development in Indian States (SmUDI) initiative FCDO will provide specific and focused technical assistance to selected cities including Indore, Amaravati and Pune and up to five additional UK-India partnership cities in close consultation with the MoHUA on city specific priorities to make them smart, inclusive, green and resilient.

For further reference: https://devtracker.fcdo.gov.uk/countries/IN

United States: United States Agency for International Development (USAID)

USAID is an independent U.S. Government agency that leads international development and humanitarian efforts to save lives, reduce poverty, strengthen democratic governance and help people progress beyond assistance. USAID assists India by engaging a range of stakeholders to end extreme poverty and increase citizens' access to quality health care, potable water, education and clean energy. Through its clean energy and sustainable forestry programs, USAID collaborates with the Indian Government to advance the country's transition to a green, energy-secure economy. USAID is working with India's three largest states to deploy rooftop solar systems, promote energy-efficient technologies and improve the management of India's forests to address climate change and strengthen forest -dependent communities. Under the Urban Climate Change Resilience Trust Fund (UCCRTF) supported by the USAID, the city of Kolkata has been supported by the Environmental Improvement Investment Program, along with providing support for multiple cities towards climate change-resilient SCM projects.

For further reference: https://www.usaid.gov/india

Annexure 3 – Think tanks/Research Institutes

Centre for Science and Environment (CSE)

CSE is a public interest research and advocacy organisation. CSE researches into, lobbies for and communicates the urgency of development that is both sustainable and equitable. CSE uses knowledge-based activism to create awareness about problems and propose sustainable solutions.

The sectors of focus include Energy (Renewable & Thermal), Climate Change, Clean Air and Sustainable Mobility, Sustainable Water Management and Sanitation, Sustainable Buildings and Habitat, Solid Waste Management, Mining and Governance, Food Safety & Toxins, Environmental Governance and Environmental Education. CSE's work in cities includes preparation of Clean Air Action Plans, emissions and energy consumption from urban transport, Comprehensive Action Plan (CAP) on mobility and public transport, city sanitation plans (CSPs), among others.

For further reference: https://www.cseindia.org/page/city-action

Center for Study of Science, Technology and Policy (CSTEP)

Center for Study of Science, Technology and Policy (CSTEP) is a technology-policy think tanks, with a mission to enrich policymaking with innovative approaches using science and technology for a sustainable, secure and inclusive society. Its research sectors include Climate, Environment and Sustainability; and Energy and Power along with few other sectors. The Climate, Environment and Sustainability sector aims to inform long-term developmental and policy decisions using in-depth analysis of technology options and identify pragmatic solutions for India's climate crisis. Research in this sector is divided into five sub-groups: Technology & Financing, Adaptation & Risk Analysis, Pathways and Forecasting, Centre for Air Pollution Studies, and Environment and Ecosystem. The Energy and Power sub-sector envisions to shape renewable energy and energy-efficiency policies in India using technology options to inform policy and solve energy issues. Transmission & Grid Planning, Renewable Energy & Energy Efficiency, and Regulatory Policy are the groups within the sector.[61]

For further reference: https://www.cstep.in/about.php

Indian Institute for Human Settlements (IIHS)

The Indian Institute for Human Settlements (IIHS) is a national education institution committed to the equitable, sustainable and efficient transformation of Indian settlements, which focuses on India's ongoing urban and development transformation. IIHS provides services related to Strategic Advice/ Advisory, Capacity Building, Knowledge Partnership, Implementation Support in Partnership, Knowledge Sharing & Dissemination, Monitoring, Learning & Evaluation, and Original & Cutting Edge Practice for various themes related to urban settlements. These services are spread across a wide range of practice areas / domains like Climate Change Adaptation and

61 http://www.cstep.in/about.php

Mitigation; Urban Risk and Resilience; Water, Sanitation and Environmental Services; Energy; Planning; Housing; Architecture, Spatial Design and Heritage; Land Governance and Management; Regional and Economic Development and Sustainable Urban Development.[62]

For further reference: https://iihs.co.in/

Integrated Research and Action for Development (IRADe)

Integrated Research and Action for Development (IRADe) is an independent advanced research institute, which aims to conduct research and policy analysis to engage stakeholders such as government, non-governmental organizations, corporations, academic and financial institutions. Sustainable urban development is one of the main thematic areas of focus for IRADe. The organisation collaborates with national institutions, state urban departments, urban local bodies, development aid agencies for capacity building, promoting awareness, research and training in the area of climate resilient urban development, disaster risk reduction, health resilience and urban infrastructure. IRADe has carried out rapid vulnerability assessment of 20 cities, devised roadmap for mainstreaming climate and disaster resilience components in the smart city development plans. Hazard vulnerability and critical infrastructure maps have been developed for cities to help urban planners and decision makers in devising city disaster management strategies and resilience action plans. For building health resilience within the cities, IRADE has been actively working on developing climate adaptive heat stress action plans, and early warning system for Dengue and air pollution action plans.[63]

For further reference: https://www.irade.org/

National Institute of Urban Affairs (NIUA)

NIUA is India's leading national think tank on urban planning and development. Established in 1976, NIUA was appointed as an apex body to support and guide the Government of India in its urban development plans. Since then, it has worked closely with the Ministry of Housing and Urban Affairs (MoHUA), alongside other government and civil sectors, with core competencies in research, knowledge management, policy advocacy and capacity building to address urban challenges and continuously striving to develop sustainable, inclusive, and productive urban ecosystems in the country. Whilst helping bolster India's urban narrative at the global level, NIUA is also committed to aligning its efforts in accords with the UN Sustainable Development Goals, ensuring that global targets are achieved through locally adapted and integrated urban frameworks. NIUA's work addresses 5 major thematic areas namely Urbanisation & Economic Growth; Urban Governance and Finance; Urban Infrastructure & Built Environment; Environment, Climate Change & Resilience; and Social Development.[64]

For further reference: http://niua.org/

62 https://iihs.co.in/about/
63 IRADe Annual Report
64 https://smartnet.niua.org/

The Energy and Resources Institute (TERI)

TERI is an independent, multi-dimensional organization, with capabilities in research, policy, consultancy and implementation, specializing in areas like energy, environment, climate change and sustainability space. TERI has a flagship programme on urban planning and governance with a dedicated research centre focusing on urban issues. TERI provides technical assistance to ULBs in developing sustainable, smart, and resilient cities, and places a special focus on strategic planning, sustainable urban infrastructure, and policy and governance frameworks. It delves into urban research and policy analysis for strengthening capacities and partnerships of cities for improved and informed decision-making in alignment with global urban sustainability goals. TERI further aims to strengthen and reinforce the mainstreaming of climate action at the local level by working in collaboration with various stakeholders through the medium of events & capacity building platforms. [65]

For further reference: https://www.teriin.org/cities

WRI India

WRI India is a research organization working for sustainable development in India. WRI India is part of a global network, with offices in United States, Mexico, Brazil, Indonesia and China, and regional hubs in Europe and Africa. WRI's work in the urban sector is coordinated by the WRI Ross Center for Sustainable Cities, which seeks to shape a future where cities work better for everyone. Currently they are collaborating with city administrations, urban stakeholders and partners to address pressing urban challenges and help Indian cities to become resilient, low carbon and livable while balancing their socio-economic goals. The practice areas of WRI India Ross Center include integrated transport, electric mobility, sustainable housing, data-led urban planning, livable neighbourhoods, climate smart cities, clean air, and water resilient cities.[66]

For further reference: https://wri-india.org/

65 TERI Annual Report 2018-19

66 WRI India – Press Release (https://wri-india.org/sites/default/files/Press%20Release-English.pdf)

Annexure 4 – Global City Networks / Partnerships

C40 Cities Climate Leadership Group

C40 is global network of megacities that are committed to address climate change at a local level. C40 drives cities towards collaboration, knowledge sharing and initiate quantifiable sustainable action related to climate change issues. Presently C40 is a network of 96 cities at global level, which represent around 700+ millions of global population and one quarter of global economy.[67]

The cities of Bengaluru, Chennai, Delhi NCT, Kolkata, Jaipur and Mumbai are members of C40 in India. As C40 is working across multiple sectors and issues around the world, they have convened networks among these cities in order to help replicate, improve and accelerate climate actions. The networks include Adaptation Implementation, Air Quality, Energy & Buildings, Food, Waste & Water, and Transportation & Urban Planning. These networks help in connecting city officials around the world along with influencing national and international policy agendas. They also display ideas and solutions from the leading cities, and help in establishing a knowledge bank for member cities.[68]

For further reference: https://www.c40.org/cities

Clean Air Asia

Clean Air Asia is an international non-governmental organization, established by the ADB, World Bank, and USAID, as the premier network in Asia for leading the regional mission for better air quality and healthier, more livable cities. It aims to reduce air pollution and greenhouse gas emissions in 1000+ cities in Asia through policies and programs that cover air quality, transport and industrial emissions and energy use. Clean Air Asia works with various stakeholders in the in the following areas: Air Quality and Climate Change, Low Emissions Urban Development, Clean Fuels and Vehicles and Green Freight and Logistics. Clean Air Asia has been working in India since 2008, and focuses on areas like transport, green freight and sustainable mobility work, bringing projects such as the walkability study in Indian cities, the Walkability App, National bus fuel efficiency framework, Green trucks toolkit for India etc. They are working with more than 30 cities in India to assess management capacity in preparation for the development of clean air action plans. Clean Air Asia is also supporting capacity-building activities for air quality management. They have also facilitated the Clean Air Knowledge Network (CAKN), a forum that connects air quality experts and practitioners from across India and city officials, which is aimed at promoting knowledge sharing across cities and issues and sharing best practices. Clean Air Asia has also developed the VAYU (Value Air You Use) app that tracks air quality in 38 cities throughout India and allows users to take a pledge and set milestones.

For further reference: https://www.cleanairinitiative.org/

67 About C40 (https://www.c40.org/about)

68 C40 Networks - the power of global collaboration (https://www.c40.org/networks)

Climate and Development Knowledge Network

Climate and Development Knowledge Network (CDKN) is an international network which aims to help decision-makers in developing countries design and deliver climate compatible development. CDKN works to enhance the quality of life for the poorest and most vulnerable to climate change in the partner nations. CDKN does this by combining research, advisory services and knowledge management in support of locally owned and managed policy processes. It works in partnership with decision-makers in the public, private and non-governmental sectors nationally, regionally and globally. Under its Future Proofing Indian Cities project, CDKN has assessed 59 Indian cities with the support of its partner organizations on the basis of environmental risks to their economic and social prosperity. Some of the cities under this initiative include Mysore, Madurai, Bengaluru and Aluva, which were supported in order to formulate future proofed urban development strategies and investment plans that lead to environmental, social, and economic co-benefits.[69]

For further reference: https://cdkn.org/climaterisk/india/?loclang=en_gb

ICLEI-Local Governments for Sustainability

ICLEI – Local Governments for Sustainability is a network of more than 1,750 regional and local governments, which are supported by a team of sustainable urban development experts. While ICLEI is globally functional in 100+ countries they have also built a strong regional network of local governments in South Asia under ICLEI-SA in order to achieve tangible improvements in global & regional sustainability through local initiatives in over 75 cities.[70]

ICLEI-SA working closely with the local governments in multiple Indian cities support cities towards become more sustainable resilient, low-carbon, biodiverse, resource-efficient communities. They are also involved with the Indian cities in terms of providing funding support from various national & international partners, mostly for opportunities like participation in programmes and projects, information services, technical inputs, trainings, conferences and workshops. ICLEI-SA in also engaged with cities in terms of facilitating peer learning, city-to-city networking and supporting development & implementation of pilot projects.

For further reference: http://southasia.iclei.org/who-we-are/iclei-south-asia.html

Global Covenant of Mayors for Climate & Energy (GCoM)

The Global Covenant of Mayors for Climate and Energy (GCoM) is an international alliance of cities and local governments with a shared long-term vision of promoting and supporting voluntary action to combat climate change and move to an inclusive, just, low emission, resilient society. It is a global coalition of city leaders addressing climate change by pledging to cut greenhouse gas emissions and prepare for the future impacts of climate change, where GCoM enables mobilization and support of ambitious,

69 https://cdkn.org/project/future-proofing-indian-cities/?loclang=en_gb#:~:text=As%20part%20of%20an%20ongoing,related%20risks%20facing%20the%20cities.

70 About ICLEI-SA (http://southasia.iclei.org/who-we-are/iclei-south-asia.html)

measurable, planned climate and energy action in their communities to achieve a collective vision. GCoM's three core initiatives focus on generating the next generation of knowledge, data, tools, and technical support for local policymakers to tackle sustainability challenges and contribute to a global climate solution. The three key initiatives of GCoM are Data4Cities, Innovate4Cities, and Invest4Cities, which aim to better enable cities, local governments, and the networks that support them in bridging the gap between climate ambition to action delivery. The GCoM partner cities in India include Ahmedabad, Bhavnagar, Junagadh, Gandhinagar, Gangtok, Gwalior, Jamnagar, Kochi, Nagpur, Panaji, Patna, Rajkot, Shimla, Surat, Vadodara.

For further reference: https://www.globalcovenantofmayors.org/region/south-asia/

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