CLIMATESMART CITIES

Assessment Framework

2020

REFERENCE DOCUMENTS

ENERGY &
GREEN
BUILDINGS

URBAN
PLANNING,
GREEN COVER
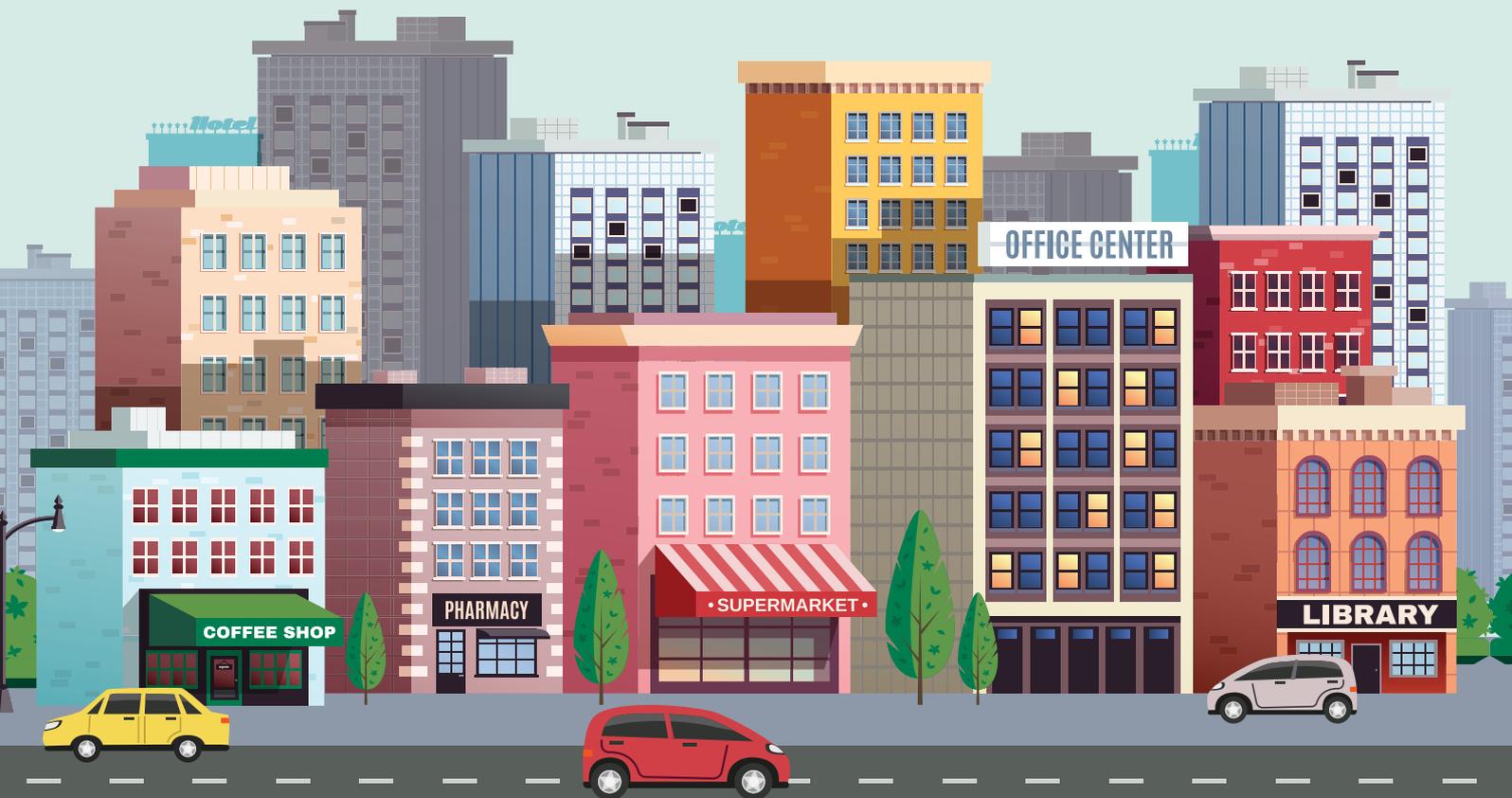& BIODIVERSITY

MOBILITY
& AIR
QUALITY

WATER
MANAGEMENT

WASTE
MANAGEMENT

Climate Centre for Cities

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Ministry of Housing and Urban Affairs

Government of India

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Overview

ClimateSmart Cities Assessment Framework (CSCAF)

The ClimateSmart Cities Assessment Framework (CSCAF) was launched by the Ministry of Housing and Urban Affairs (MoHUA) under its Smart Cities Mission in 2019. This framework is first-of-its-kind city assessment framework on climate relevant parameters. This year, we are launching the ClimateSmart Cities Assessment Framework 2.0 to capture the progress made by cities since the previous year. The CSCAF 2.0 envisages to provide a roadmap for 100 smart cities and subsequently all Indian cities in combating climate change. The framework consists of 28 indicators across five thematic areas, namely: (i) Energy and Green Buildings, (ii) Urban Planning, Green Cover and Biodiversity, (iii) Mobility and Air Quality, (iv) Water Management and (v) Waste Management. The framework provides assessment of both, mitigation and adaptation measures. The indicators are progressive in nature to support cities in assessing where they stand and encourage them to adopt appropriate actions enabling them to improve their score.

Background: Reference Documents

This document is a compilation of a list of reference materials showcasing relevant policies and case studies. It provides a list of references with web links of documents and videos where it can be accessed. It is arranged indicator wise along the 5 sectors aiming to create a repository of innovative and successful initiatives related to the five sectors that have been undertaken by various cities across the nation. It also helps one to understand the current status and implications of different policies across all sectors. Through this, various cities and partners can access a range of reference materials required for successful implementation of the CSCAF 2.0.

For more information:

More information regarding the assessment framework for CSCAF 2.0 can be accessed on the ClimateSmart Cities microsite: https://smartnet.niua.org/csc/index.html

Details regarding the indicators and overall methodology can be found in the CSCAF 2.0 technical document at https://smartnet.niua.org/csc/key-documents.html

Details of other reference materials are available at: https://smartnet.niua.org/csc/knowledge-repository.html

For any other queries, please contact the National Institute of Urban Affairs helpdesk at: 011-411-86699 from Monday to Friday, 9am to 5pm. Cities can also email climate-smartcities@gov.in for support.
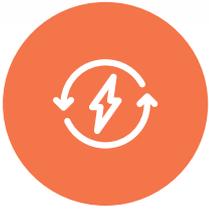
Energy & Green Building

Indicator 1: Electricity consumption in the city
Manual for the Development of Municipal Energy Efficiency Projects, India -This manual is a practical tool for the development, financing and/or implementation of a municipal energy efficiency project using a performance contract. The manual is intended for the public sector and lay audiences, as well as for those who need a reference regarding the project development process.

Indicator 2: Total electrical energy in the city derived from renewable sources
Energy Statistics 2020 - Energy Statistics is an integrated and updated database of reserves, installed capacity, production, consumption, import, export, and wholesale prices of different energy sources such as coal, crude oil, natural gas and electricity.
India 2020 Energy policy review, International Energy Agency - The review of India's energy policies explores India's achievements in developing its energy sector, as well as the challenges it faces in ensuring a sustainable energy future. India offers an inspiring example for many countries around the world with a track record of expanding access to electricity and clean cooking for its citizens and swiftly deploying renewable energy technologies.

Indicator 3: Fossil fuel consumption in the city
Draft National Energy Policy (2017) - The National Energy Policy (NEP) aims to chart the way forward to meet the government's bold announcements in the energy domain.

Indicator 4: Energy efficient street lighting in the city
Akola Municipal Corporation, India - Performance Contracting for Street Lighting Energy Efficiency The project used an energy savings performance contracting approach under which the contractor. The project resulted in annual energy savings by 56%. It reduced electric bills for the city by INR (Indian Rupee) 6.4 million per year.
BEE's Energy Efficient Street Lighting Guidelines - The purpose of these guidelines is to increase the awareness about the Bureau of Indian Standards (BIS) Code of Practice for lighting of public thoroughfares and to provide practical guidance on energy-efficient street lighting best practices.

Indicator 5: Promotion of green buildings
Energy Conservation Building Code Rules 2018: (Hindi/English) - The broad objectives of the gazette are energy efficiency, safety and in coordination with state-level energy conservation rules and building norms.

Indicator 6: Green building adoption
IGBC Green New Buildings rating system, Version 3.0 - The Green Building Movement in India has been spearheaded by Indian Green Building Council (IGBC) since 2001, by creating awareness amongst the stakeholders. Thus far, the Council has been instrumental in enabling 3.84 Billion sq.ft of green buildings in the country. The Council's activities have enabled a market transformation with regard to green building materials and technologies.
CERC & ENVIS Certifying a Green Building (2014) - Green housing or eco-friendly homes are an integrated approach towards minimising the adverse effects of construction on the environment and promoting healthier living for people. This document covers the national as well as international certification systems adopted by different countries

Urban Planning, Green Cover & Biodiversity

Indicator 1: Rejuvenation & Conservation of Water Bodies & Open Areas
Lake Restoration: Two successful models of lake restoration in Rajasthan (Mansagar) and Karnataka(Kaikondrahalli)- The Mansagar Lake in Jaipur, Rajasthan, and the Kaikondrahalli Lake in Bengaluru, Karnataka, both lakes have been successfully restored using two very different approaches. The report shows how to integrate a public-private partnership (PPP) model while and multi-stakeholder socially inclusive model for the restoration of water bodies such as a lake. Both approaches have successfully revived the lakes and the ecologies dependent on them. They have also provided local communities with aesthetic and recreational spaces that are also sources of revenue.
Sabarmati Riverfront Masterplan: Ahmedabad- The links lead to guiding documents to feasibility study, development plan, and landscaping reference for the riverfront development project within a city.
Manual for Data Collection for Census of Water bodies- The document defines 'water bodies' for census purposes which is also used for this indicator.
Wetland Management Conservation Rules 2017: The document is the official notification of Government of India regarding rules governing wetlands across the country. It is relevant for this indicator which considers wetlands for conservation.
Guidelines for National Lake Conservation Plan: The document prescribes guidelines regarding the selection of sites for implementation of the National Lake Conservation Plan. In this indicator, the definition of water bodies includes the lakes undertaken in this programme.
CPCB guidelines for water quality monitoring 2017: The guidelines for water quality monitoring will be useful to assess the quality of water bodies.
Advisory on Conservation and Restoration of Water Bodies in Urban Areas: The advisory sums up MoHUA's mandate to to conserve / restore urban lakes / water bodies, re-use and re-cycle waste water, etc. for the use / guidance of state governments / ULBs so that they can improve their water bodies and manage water effectively.
Water Conservation Measures Guidelines of MoHUA under Jal Shakti Abhiyan: The document highlights guidelines for water conservation consisting of interventions, awareness campaigns, monitoring and documentation.

Indicator 2: Proportion of Green Cover

Action Plan For Increasing Green Cover, Agra Municipal Corporation- The report showcases the vision, aim, objectives and the approach of Agra Municipal Corporation to increase the green cover by 15%. The approach considers the current situation of potential green areas, challenges related to revitalization, and long term strategy to address them.

Mapping Methodology of Public Urban Green Spaces Using GIS: Nagpur- The study is a mapping exercise to make a spatial inventory for the city officials for better decision making for the restoration of green and open spaces, with detailed UGS typologies and to update the status of overall availability and distribution of hierarchical recreational green spaces in the city. The paper shows the methodology to develop a holistic dataset, with high accuracy of the thematic maps.

Tree diversity, distribution, history and change in urban parks: studies in Bangalore, India- The study introduces us to Shannon index of diversity which is commonly used to measure biodiversity. The study focuses on the city biodiversity hotspots which are parks in the Bangalore city. The study results surprisingly shows that the native trees are dominated by the exotic species within the city area in the case of Bangalore.

Water Conservation Measures Guidelines of MoHUA under Jal Shakti Abhiyan: The document highlights guidelines for water conservation consisting of interventions, awareness campaigns, monitoring and documentation.

Urban Green Guidelines 2014, Town and Country Planning Organisation, MoHUA: The document highlights guidelines for conserving and rejuvenating the open spaces in urban areas. It has defined the various open spaces in context of an urban area and goes on to describe about planning and maintenance of such areas which will be helpful in assessing the status of open spaces/green cover in a city and plan for future interventions.

Indicator 3: Urban Biodiversity

Users' Manual on City Biodiversity Index : Convention on Biological Diversity- The document discusses about the indicators used for City Biodiversity Index (CBI), issues with the methodology and discussion on the same for better understanding. It provides a base template to conduct a CBI.

Integrating Biodiversity with Local and City Planning: The Experience of the Studios in the Development of Local Biodiversity Strategies and Action Plans (LBSAPs)-The report has biodiversity assessment study for Bhopal city for the city biodiversity index. Their challenges with the Local Biodiversity Strategies and Action Plans (LBSAP).

Implementation of Biological Diversity Act in India: Overview and Case Study- The report highlights the guidelines for the local bodies(ULBs, Taluka panchayat, gram panchayats) as per the Biological diversity act-2002 in India.

Policy paper on Biodiversity Management Committees- The Biological Diversity Act, 2002 promulgated by India to achieve the objectives of CBD mandates constitution of BMCs at all local body levels for the purpose of conservation of biodiversity. This policy brief looks at the challenges, shortcomings, and status of BMCs in India.

The Biological Diversity Act, 2002- An Act by Government of India to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources.

Indicator 4: Disaster Resilience

Surat Resilience Strategy- The report is a roadmap for how to adapt a city resilience framework to identify the shocks and stresses (disaster risks) of the city. It further gives a framework to develop a comprehensive resilience strategy to address the same in the case of Surat city, India. The report also displays how to integrate the strategy with current plans and projects of the city, and who will be the key stakeholders for the implementation.

Chennai Resilience Strategy- Chennai resilience strategy highlights the disaster risks that are getting severe due to urbanization, the encroachment of natural habitats especially water bodies, and other ill practices. The strategies are the answer to interrelated to disaster risk issues and way forward for the city governance to address within the platform of a city resilience framework.

Pune Resilience Strategy- Pune resilience strategy gives a road map for community participation for city resilience planning. The strategies for coping with disaster risks are not limited to adaptive measure, but they are transformative measures within the city resilience framework and collaborating with different stakeholders.

Review of Early Warning System :Navi Mumbai- EWS report provides guidance as well as the levels for the development of EWS from the city level to the urban local body (ULB), disaster management institutions, stakeholders involved in design and implementation of early warning systems for coping with the disaster in an urban setup.

Navi Mumbai City Disaster Management Plan (regional language- Marathi)

National Disaster Management Toolkit for Urban Planning by NIDM- The tool kit focuses on the disaster profile of Indian city, types of the city (meso, macro, mega), engagement of urban governance for the DM. It also highlights the problems with the urban planning and DRR challenges for the Indian cities. With a given background, the tool kit lays the map for strategy building for city-level disaster management planning.

Urban Risk Reduction Project: Navi Mumbai – There are several documents which may be referred under this project:
Climate Risk Management project overview
Social Vulnerability Analysis by TISS
Earthquake Hazard Risk Assessment by IITB
Early Warning System – Action Plan
Sectoral Action Plan, Solid Waste Management

National Disaster Management Authority (NDMA) Guidelines, 2010, 2014, 2019: The guidelines provide a framework to reduce risk in case of natural and mana-made disasters like landslides, floods, earthquakes, chemical disasters etc. It describes the prevention and mitigation measures in detail for each type of disaster.
Guidelines on Incident Response System, 2010
Guidelines on Management of Tsunamis, 2010
Guidelines on Management of Dead in the Aftermath of Disaster, 2010
Guidelines on Management of Urban Flooding, 2010
Guidelines on Management of Drought, 2010
Community Based Disaster Management, 2014
Guidelines on Seismic Retrofitting of Deficient Buildings and Structures, 2014
Guidelines on Temporary Shelters for Disaster-Affected Families, 2019
Guidelines on Disability Inclusive Disaster Risk Reduction, 2019
Landslide Risk Management Strategy, 2019
Guidelines for Preparation of Action Plan - Prevention and Management of Heat Wave 2019

Standard Operating Procedure (SOP) on Urban Flooding, 2017: The document charts out the Standard Operating Procedure (SOP) or predetermined set of directives that is to be followed by an organization to mitigate and manage urban flooding.

Making CMDRR Operational At The Community Level: A Guide by Caritas Czech Republic- This document provides the users with a common understanding of the concepts and principles of Community-Managed Disaster Risk Reduction, defines common terms used, describes its evolution, and distinguishes it from other models. It provides practical knowledge and guidelines on how to implement, operationalize, and institutionalize DRR at all levels of development organization.

Indicator 5: City Climate Action Plan

UNICEF supported study on Children focused vulnerability assessment and city resilience action strategy: Udaipur - Though the resilience strategy is children centric, Chapter 6 to 8 highlights climate variability in the recent period, and how it has resulted in vulnerabilities in Udaipur city.

City Development Plan for Siliguri – 2041-As part of the climate action cities in India, chapter 11 is focusing on the climate change aspect of the city. CDP is a way to mainstream climate action planning within the urban planning, by identifying the level of climate resilience and addressing them with recommendations within the CDP.

National Mission on Sustainable Habitat: The National Mission on Sustainable Habitat was approved by the Prime Minister's Council for Climate Change in June 2010. The webpage leads to documents that detail out the guidelines of the mission along with specific theme based standards.

UN Habitat Guiding Principles: The Guiding Principles for City Climate Action Planning reviews typical steps in the city-level climate action planning process in light of a proposed set of globally applicable principles.

Durban Climate Action Plan 2019: Towards Climate Resilience and Carbon Neutrality - This plan aims to scale up action to limit temperature increase to 1.5°C with 33 actions and 149 sub- actions aligned to nine thematic areas that provide a pathway for Durban to achieve climate resilience and carbon neutrality.

LA's Green New Deal: Sustainable City plan (2019) - This plan provides a pathway for Los Angeles' to achieve an equitable and abundant economy powered by 100% renewable energy. This plan will support the creation of hundreds of thousands of good, green jobs in the city.

Reporting GHG emissions inventories using CIRIS Tool, C40 Cities: This webpage describes CIRIS tool for managing and reporting city GHG inventory data. Based on the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) standard, CIRIS facilitates a transparent calculation and reporting of emissions. It accounts for all the emission sources in the city and uses standardised conversion factor. This allows cities to compare their emissions on comprehensive and standardised parameters.

Measuring Progress in Urban Climate Change Adaptation, Monitoring - Evaluating – Reporting (MER) Framework, C40 Cities: Drafted in collaboration with cities globally, the document provides for a MER framework that will help cities "make the case" for climate adaptation and assist and incentivise targeted climate change adaptation initiatives. It will also help cities to compare themselves and improve progressively.

Global Environmental Disclosure System by CDP : CDP provides the global platform for cities to measure, manage and disclose their environmental data. 800 cities measure and disclose environmental data each year to manage emissions, build resilience, protect themselves from climate impacts and create better places for people to live and work. These cities disclose over 8,000 urban sustainability actions, demonstrating their commitment to building a sustainable economy and tackling climate change. The data from the CIRIS tool can directly be imported to CDP. The various cities reporting data on the CDP platform can be compared on many parameters.

Mobility and Air Quality

Indicator 1: Clean Technology Shared Vehicles
National Transit Oriented Development (TOD) Policy- The policy provides guidelines to transform Indian cities to be a compact walkable community with more access to public transport and make a shift from private vehicles. The guidelines consider social, economical, and physical aspects of urban planning to achieve low carbon mobility.
Moving Forward Together: Enabling Share Mobility - This report develops a common understanding of shared passenger mobility, discusses several factors that support and challenge the adoption of shared mobility in India, and provides suggestions to help develop and promote a shared mobility system. If pursued, such actions could support more efficient, equitable, and sustainable transportation systems for Indian communities.
Open Data Government Platform – This open data portal hosts information about registration of vehicles for cities

Indicator 2: Availability of Public Transport
Service Level Benchmarks for Urban Transport (MoHUA, 2010) – The document by Ministry of Housing and Urban Affairs details out service level benchmarks for various aspects of urban transport useful for comparison of performance of cities.
Best Practices in PPP for Urban Transport : Ahmedabad BRTS- The report starts with city context, before and after picture for the BRTS project in Ahmedabad. It follows on with the need for the BRTS, Project details, and the implementation strategy for the same. It lays down a detailed example for PPP within urban governance.
Indicator 3: Percentage of coverage of Non-Motorized Transport network (pedestrian and bicycle) in the city
Urban cycling design guidelines (UCDG) - These guidelines include a focus on some of the typical challenges for the design of cycle tracks (and lanes) with the objective to increase cycling-infrastructure usage and cycling in Pune. These guidelines should be seen as a more detailed specification of the Urban Street Design Guidelines, and can be a good point of reference for other cities.
Promoting Non-Motorized Transport in Asian Cities: Policymakers' Toolbox (UN-Habitat and Shakti Sustainable Energy Foundation; 2013) - This toolkit provides an overview of NMT in cities across Asia, diagnostic tools to assess walkability and cycling access and showcases guidelines and successful projects.
NMT Guidance Document, MoHUA- The guideline document provides an understanding of the concept, need, and significance or NMT planning at the city level. It further gives a road map for infrastructure planning, implementation model, and fiscal planning to adapt the NMT plan for Indian cities.

NMT City Specific Plan: Visakhapatnam- The document provides city specific plans, needs, and challenges for the NMT adaptation. It is an example for a coastal city in India planning according to the NMT guidelines.

NMT City Specific Plan: Aizawl- Aizawl is one of the demonstration cities for NMT Planning, where the five-step planning process recommended in the Guidance Document was applied to test its validity. The report highlights the research, analysis and stakeholder involvement activities that have been performed in the development of the NMT Plan; the resulting projects, programs and policies that comprise the Plan; and the implementation strategy.

Non-Motorized Transport (NMT) Network Plan: Coimbatore- The poster showcases the components considered for the planning of NMT in the Coimbatore, specifically the approach and the measures taken while implementing the plan.

Indicator 4: Level of Air Pollution

National Air Quality Monitoring Programme (NAMP), CPCB-There are 573 operating stations in 240 cities/towns under NAMP to monitor pollution level across India. Monitoring is carried out by different agencies such as CPCB, SPCB, pollution control committees, and National Environmental Engineering Research Institute (NEERI).

National Ambient Air Quality Standards - The National Ambient Air Quality Standards set by the Central Pollution Control Board

Central Control Room for Air Quality Management – Through this interactive portal, users can observe and monitor air pollution as captured by continuous stations across the country.

SAFAR - India, System of Air Quality and Weather Forecasting And Research- Through SAFAR, one can know the city air quality- overall city pollution and location-specific air quality- a relative contribution of different environments within the cities mainly- (Delhi, Pune, Mumbai, Ahmedabad).

Pathways to Achieve National Ambient Air Quality Standards (NAAQS),IIASA & CEEW- The report talks about current pollution monitoring standards, regulations and the future needs for alteration for them. There are existing monitoring and regulation for emission controls for large stationary sources and road vehicles. While these measures help separate air pollutant emissions and economic growth, their impact on ambient air quality is restricted by accelerated economic activities. These measures will be inadequate for stopping a further deterioration in air quality given the increase in GDP, which is expected by 2050.

Indicator 5: Clean Air Action Plan (Planning and Implementation)

National Clean Air Programme (MoEFCC, 2019) - National Clean Air Programme (NCAP) is a national-level strategy for reducing the levels of air pollution at both the regional and urban scales.

Clearing the Air: A review of 10 city plans by NRDC-The analysis recognizes a standard set of priority mitigation measures aimed at reducing emissions from important emission sources in the cities. It also highlights generic strategies for achieving pollution reduction goals, and contemporary ways to further grow city efforts.

Air Information and Response Plan: Ahmedabad- Through the AQI and the AIR Plan, lives can be saved from air pollution, while also opening collaborative pathways to pollution reduction. The city plan has five main strategies which are public health, awareness, safeguards for vulnerable groups, capacity building of officials, and research for mitigation and exposure reduction.

Air Pollution Knowledge Assessments (APnA) city program, India- It is to designed to provide a starting point for understanding air pollution in Indian cities. The database APnA city program is updated and carved from functional all India air quality modelling system, which can be used for long term policy assessments and short term air quality monitoring for 50 cities now.

Action Plan for Control of Air Pollution in Non-Attainment Cities of Rajasthan: Jaipur, Jodhpur, Kota, Alwar and Udaipur- The non-attainment cities are special case cities which do not meet the National Ambient Air Quality Standards. The document provides brief action plans for air pollution control in such cities of Rajasthan.

Water Management

Indicator 1: Water Resources Management

State of Urban Water Supply in India,2018 - The report shows current water resource challenges for urban India and urban governance around it. It also talks about current practices, upcoming methods such as PPPs for service provision for water supply. Further, the reports talk about the scope of reforms for water resource management in urban India.

National Compilation on Dynamic Ground Water Resources of India, 2017- The assessment involves the estimation of dynamic groundwater resources across the country or annual extractable groundwater resource, total current annual groundwater extraction (utilization) and the percentage of utilization concerning recharge.

Future Proofing Indian Cities, Action Plan for Water and Sanitation Infrastructure: Bangalore- This report is the water and sanitation action plan for Bangalore, which provides a basis to address the climate risks and development needs of the Indian cities, especially related to water resource management.

Guidelines for Improving Water Use Efficiency in Irrigation, Domestic & Industrial Sectors- These are PAN India guidelines for administration, innovation in technology for conservational practices, regulation and monitoring practice for improving water usage domestically at household level in the cities, industrial usages, as well as irrigation.

Guidelines for Water Quality Monitoring by CPCB - The Document brings out major considerations to design water quality monitoring network, procedures for sampling, laboratory analysis, data storage, data analysis, presentation, interpretation, reporting and quality assurance.

Indian Standard Drinking Water — Specification (Second Revision) by BIS 2012 - The standards have been formulated with the objective of assessing the quality of water resources, and to check the effectiveness of water treatment and supply by the concerned authorities.

Guidelines for Integrated Water Resources Development and Management by Government of India Ministry of Water Resources, River Development and Ganga Rejuvenation Central Water Commission Basin Planning and Management Organization

Technical Material for Water Resources Assessment, World Meteorological Organization (2012) - The publication provides technical material in a reasonably logical progression as required for carrying out a water resources assessment (WRA).

Strengthening Water Security in Asia and the Pacific, Asian Water Development Outlook, ADB (2016) – The document provides a rigorous analysis that provides a country-wise snapshot of the region's water security status, enabling policy makers, financing institutions, and planners to make more informed decisions on how to improve their performance in the water sector

Indicator 2: Extent of Non-Revenue Water

The Issues and Challenges of Reducing Non-Revenue Water, ADB- The report talks about challenges of NRW not just as an engineering or administrative problem but also reflects a sociocultural situation that requires changes in community behavior.

NRW Reductions and Management in Water Supply Distribution System: Surat - The presentation showcases different policy tools adopted by the Surat Municipal Corporation, such as monitoring and regulation with metering and auditing, leakage mapping; accompanied by operation & maintenance practices with technology such as Supervisory Control and Data Acquisition (SCADA).

Designing an Effective Leakage Reduction and Management Program (WSP; 2008) - This field note captures the core principles for the effective implementation of nonrevenue water programs through real world examples of service providers implementing such programs in India and Vietnam.

Indicator 3: Wastewater Recycle and Reuse

Closing the water loop: Reuse of treated wastewater in urban India, PwC: Reuse of treated wastewater in urban India-Water supply-demand is increasing with the urbanization both at domestic and industrial level. The study showcases schema to incorporate schema for reuse of the water at both the level, with detailed technical plan flow, institutional roles, and other players in the urban governance for the same.

Wastewater Recycle and Reuse - Indian Experience- MoUD Several cities have conducted the wastewater reuse pilots in India. The presentation is a compilation of such pilot project with specifics about the projects such as capacity, technology and, end quality.

Handbook of Service Level Benchmarking(CPHEEO; 2008) – The document provides service level benchmarks for various urban services including water supply and wastewater management.

Chapter 7: Part A: Engineering, Recycling and Reuse of Sewage, Manual on Sewerage and Sewage Treatment Systems (CPHEEO; 2013) – Part of CPHEEO manual dealing with wastewater management which details out aspects of engineering in recycle and reuse of sewage.

Indicator 4: Flood/water stagnation risk management

Strategic Plan for Risk Reduction: Rishikesh - Risk profiling of the Rishikesh indicates that flash flood and flood are moderate to higher risks for the city. The report further indicates critically vulnerable areas along with the facilities and resources available to cop with them, and how both the factors are used to build a risk reduction strategic plan for Rishikesh.

Flood Risks, Climate Change Impacts and Adaptation Benefits: Mumbai- The study covers the assessment of flood risk for Mumbai city based on previous events. It shows a level of intensity and spatial exposure of the risk. The analysis also demonstrates that adaptation could significantly reduce future losses.

Addressing flooding in the city of Surat beyond its boundaries - The paper discusses flood risks faced by Surat, one of India's most developed and also most flood-prone cities. The flood risk is due to the location of the city, heavy precipitation in and around the city and also from heavy precipitation upstream and high tides downstream. Reducing the risks from upstream depends on better water management in a water catchment area and dam reservoir located far outside the city authority's jurisdiction and in another state. It also suggests that part of the city's response needs to be a greater ability to live with floods while minimizing the damages.

City Resilience Strategy: Surat- Flood has been one of the major hazard risks for Surat city. The document provides a framework for the development of a Climate resilience strategy for hazard risks for the Surat city. It gives a road map to involve different city stakeholders, sector studies conducted to understand different dimensions for the situation analysis and further strategy building. (see the 100 RC strategy too in the Urban Planning section)

Flood Risk Management Approach, ADB-The flood risk management is a long term and wholesome approach considering dimensions of vulnerabilities, sustainability and ecosystem protection. It considers the vulnerability of different sectors in a city and ways to address them comprehensively.

Online Collaboration Platform for cloud based open source flood modelling tools for Chennai - Chennai has developed an online portal for flood risk management. FRM plan follows the approach developed by the ADB, as mentioned above.

Guidelines for Mapping Flood Risks Associated with Dams by Central Water Commission Ministry of Water Resources, River Development & Ganga Rejuvenation Government of India

Manual on Storm Water Drainage System, 2019 by CPHEEO – The manual details out all engineering aspects related to storm water drainage systems.
Management of Floods, National Disaster Management Guidelines (NDMA; 2008)
NDMA guidelines for urban flood management
SOP for urban flood management as per MoHUA guidelines - The document charts out the Standard Operating Procedure (SOP) or predetermined set of directives that is to be followed by an organization to mitigate and manage urban flooding.

Indicator 5: Energy-efficient water supply system

Draft General Guidelines For Water Audit & Water Conservation, Evaluation Of Water Utilisation Directorate, 2017 by CWC and CGWB
Manual for the Development of Municipal Energy Efficiency Projects. BEE (2008) - This manual is a practical tool for the development, financing and/or implementation of a municipal energy efficiency project using a performance contract. The manual is intended for the public sector and lay audiences, as well as for those who need a reference regarding the project development process.
A Primer on Energy Efficiency for Municipal Water and Wastewater Utilities (ESMAP; 2012)

Indicator 6: Energy-efficient water supply system in the city

Mainstreaming Energy Efficiency In Urban Water And Wastewater Management In The Wake Of Climate Change, CSE- The paper provides a joint opportunity for resource conservation for both sectors- water and energy. The paper discusses the water-energy nexus, introduces 'Watergy' approach and the relationship between water–energy and climate change. The policy paper also mentions the challenges for mainstreaming the 'Watergy' approach.

Waste Management

Common References
Swachh Survekshan Draft Toolkit 2021
Solid Waste Management Rules, 2016
Manual on Municipal Solid Waste Management, 2016-   All ULBs are required to meticulously plan, implement and monitor all systems of urban service delivery especially that of municipal solid waste. The manual is to provide basic infrastructural and service delivery with respect to sanitation facilities to every family, including toilets and adopting the scientific methods to collect, process and disposal of municipal solid waste. Manual Part I Manual Part II
Swachh Survekshan 2020- INNOVATIONS & BEST PRACTICES
Swachh Survekshan 2020- Assessment of 97 Ganga Towns
IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories- The report provides guidelines for managing green house gases (GHGs) in various sectors. Chapter 5 of the report engages specifically with the solid waste and the emission and scientific estimation of the GHGs.
GHG Platform India- National Level Greenhouse Gas Estimates for the Waste Sector- The report engages with the categories of GHGs , their sources, and challenges with the waste management in the Chapter 3, specifically.
Indicator 1: Waste minimization initiatives undertaken in the City
BULK SOLID WASTE GENERATORS: A Step by Step Guidance for Urban Local Bodies to implement the Solid Waste Management Rules, 2016
Guidance on Efficient Collection and Transportation of Municipal Solid Waste
Transforming urban landscapes of India Success Stories in Information & Communications Technology (ICT)
Advisory on On-Site and Decentralized Composting of Municipal Organic Waste
TRANSFORMING URBAN LANDSCAPES OF INDIA Success Stories in Information, Education & Communication (IEC) & Behaviour Change – The document describes the success stories in IEC and Behaviour Change related to sanitation and SWM practices.

Compendium of Best Practices in SWM: Pune, Vrindavan, Mumbai, Chennai, Srinagar, Ahmedabad, Bangalore, Gangtok, Warangal, Pammal, Patna- The PEARL report is a knowledge sharing initiative in association with NIUA. It engages through various aspects of solid waste management such as segregation, collection, waste recovery, and better disposal mechanisms. It also talks about policies and programs to mainstream the practices.

Municipal Solid Waste Management In India Cities, FICCI- A Review- Federation of Indian Chambers of Commerce and Industry (FICCI) conducted a survey of 22 cities to highlight the current state of Municipal Solid Waste Management in Indian cities. The survey respondents included Municipal Corporations of 17 Class I cities and 5 Class II cities. The survey reveals the enormity of the solid waste problem in urban centers where most of the waste is getting disposed in existing unorganized dumpsites without any scientific treatment.

Integrated End-to-End Solid Waste Management in Kanpur City, Uttar Pradesh- A SWM good practice compilation for Kanpur, Uttar Pradesh.

Case Study of Mumbai: Decentralised Solid Waste Management- A SWM good practice compilation for Mumbai.

Transforming urban landscapes of India Success Stories in Solid Waste Management

Indicator 2: Extent of dry waste recovered & recycled

Plastic To Liquid Fuel Conversion: Phitsanulok, Thailand - A SWM good practice compilation for Phitsanulok, Thailand.

Plastic Waste Management Issues, Solutions & Case Studies – The document provides insights on plastic waste management in our cities, the problems faced and possible solutions demonstrated through case studies.

Guidelines on Usage of Refuse Derived Fuel in Various Industries

Advisory on Material Recovery Facilities (MRFs) for Municipal Solid Waste (MSW)

Indicator 3: Construction & Demolition (C&D) waste management

Strategy on Resource for construction and Demolition Sector- Ministry of Housing and Urban Affairs has recognized the challenge with SWM in construction and demolition through parts of the report and aiming to develop and mainstream the good practices along with specialized agencies and/or empanelled consultants and the ULBs for C&D waste management.

Strategy for Promoting Processing of Construction and Demolition (C&D) Waste and Utilisation of Recycled Products, MoHUA and Niti Ayog

Guidelines On Environmental Management Of Construction & Demolition (C & D) Wastes, CPCB

Tool Kit On Construction & Demolition Waste Management Rules 2016 – Detailed toolkit as a follow up to C&D Waste Management Rules 2016.

Utilisation of Recycled Produce of Construction & Demolition Waste A Ready Reckoner

CONSTRUCTION & DEMOLITION (C&D) WASTE MANAGEMENT AND UTILIZATION OF RECYCLED PRODUCTS: CHANDIGARH

Indicator 4: Extent of Wet Waste Processed

Policy on Promotion of City Compost- City compost promotion covers component of Swatch Bharat Abhiyan, reduction of landfill, organic carbon increase for soil fertility, and prevention of harmful greenhouse gases (especially methane) and toxic material that pollutes groundwater.

"Waste To Wealth" A Ready Reckoner For Selection Of Technologies For Management Of Municipal Waste - This compendium will let one explore various technology options that are now available to generate wealth from waste.

Advisory on On-Site and Decentralized Composting of Municipal Organic Waste

Indicator 5: Scientific Landfill availability & operations

Zero Landfill & Bin Free City: Jabalpur - A SWM good practice compilation for Jabalpur.

A Case Of Decentralized Solid Waste Management System Towards A Bin Free & Landfill Less City: Panaji - A SWM good practice compilation for Panaji.

A comprehensive study on landfill site selection for Kolkata City, India – A research on landfill site selection for Kolkata city.
Advisory on Landfill Reclamation

Indicator 6: Landfill/ dumpsite Scientific Remediation

Waste To Wealth- A Ready Reckoner For Selection Of Technologies For Management Of Municipal Waste - This compendium will let one explore various technology options that are now available to generate wealth from waste.
Bioremediation/ Bio Mining Of Legacy Waste: Deoguradia - A SWM good practice compilation for Deoguradia
Dumpsite Rehabilitation Manual The objectives of this manual are to ensure that the open dumps are fully characterized, investigated, remediated and closed properly and to assure public health and safety. Primary focus was given to the upgrading of the operating/ existing dumpsites, the most common practice of waste disposal in Asian countries.

Notes

Notes

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