



12<sup>th</sup> High Level Seminar on Sustainable Cities Organized by IGES Japan

# INITIATIVES ON CARBON NEUTRALITY IN NAGPUR CITY



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Organized by IGES Japan



भूमी  
Earth



वायु  
Air



जल  
Water



अग्नी  
Energy



आकाश  
Enhancement



# भूमी

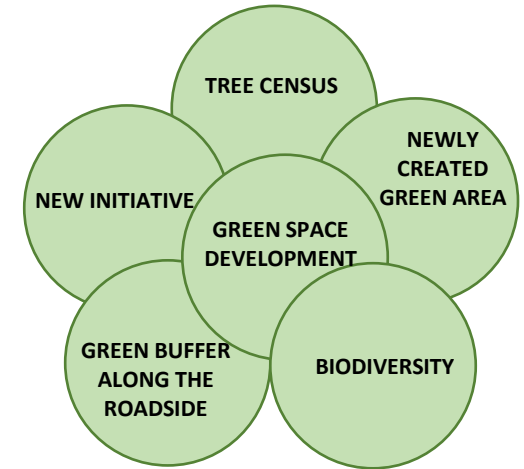
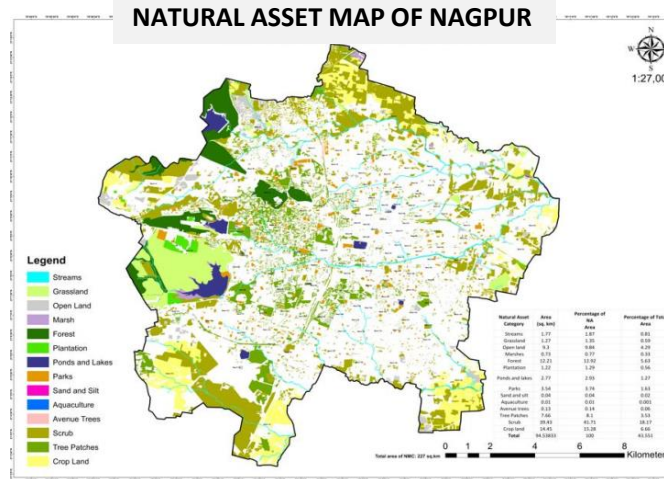


# Earth

## URBAN PARKS AND GARDENS IN NAGPUR

## GREEN COVER AND BIODIVERSITY

AUTHORITY	NO. OF PARKS / GARDENS	AREA (ACRES)
NMC	131	155
NIT	53	110
FOREST DEPARTMENT	1	50
DR. ANJABRAO DESHMUKH KRISHI VIDYAETH	3	75
<b>TOTAL</b>	<b>188</b>	<b>390</b>



2011: 2143838  
2022: 2500000 (Projected)  
Heritage Tree Age of Tree, UID & 31 other attributes (amendment 2021 in Tree act)

### TREE CENSUS



Amrut Gardens Created of Rs 4.47 Cr. : 07 nos.  
Theme Base Garden of Rs. 7.00 Cr. :05 nos.

### GREEN SPACE DEVELOPMENT



25km Green Buffer present on Road Divider  
41km Green Buffer preparation on Road Divider is in progress

### GREEN BUFFER



Prepared the Local Public Biodiversity Registered (Submitted to State Biodiversity Board)

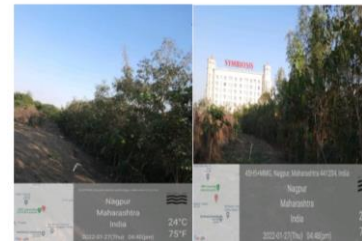
### BIODIVERSITY



In 2021 NMC planted 8008 Trees, Covering 62000 sqm with a Survival rate of 83%

### TREE PLANTATION

## PLANTATION



### MIYAWAKI PLANTATION BHANDEWADI

Area: 5000 sq m  
First of its Kind in India on Dumping Yard  
Total Species: 42 Indigenous Species  
Total Plants: 15000 no.



### ROAD SIDE

Green Buffer on Road Divider  
Length : 41km  
Plant Species suggested CSIR-NEERI



## GREEN SPACE DEVELOPMENT

### SANCTIONED PROJECT



Cost: 2 Cr.

Lata Mangeshkar  
Garden, Surya Nagar  
(Butterfly Garden)



Cost: 1.41 Cr

Sant Gyaneshwar  
Sanjivan Samadhi  
Garden, Datatraya Nagar  
(Fragrance Garden)



Cost: 0.50 Cr

Bharatmata & Dr. Baba  
Saheb Ambedkar Garden  
(Rose Garden)



2.50 Cr

Vande Matram Garden,  
Bajeriya, Near Empress  
Mall



0.50 Cr.

Suyog Nagar, Co-Op.  
Society (Herbal &  
Aurvedic Garden)



Proposed

Gorewada Park  
(Adventure Park )

### PROPOSED PROJECT

### 20 theme based garden target till 2025

1. Native and endangered species garden
2. Aquatic Plants Garden (Lilly, Lotus)
3. Biggest Flower Garden Botanical Garden Futala
4. Sensory Park Dhantoli Garden
5. Cactus Garden
6. Adventure Park
7. Bird Park

## SUSTAINABLE GREEN POLICY

- Citizen will be given **2 meter height Sapling** free of cost. If person maintain the tree properly **2% property tax rebate for three year**.
- Developing **180 Gardens** on self sustainable manner and **150 km road dividers** and **10km green buffer zone** along the road through no loss no profit basis
- Land bank at **Bhandewadi Dumping Yard**, Smart City outskirts reserved land for open space, gardens, PU land Seminary Hills, NADT, PKV, VNIT etc...
  - **Total Site: 70 no**
  - **Approx. Area : 88 Acres**
- Expanding Present nursery of 1 acre to **20 acres in Gorewada and Bhandewadi Area**

## STEPS TO ENHANCE GREEN SPACES IN CITY

YEAR	LOCATION	STATUS
2020-21	Bhandewadi Dumping Yard (Miyawaki Plantation)	Completed
2021-22	Bhandewadi Dumping Yard, Sneha Nagar, Pandhribodi Lake & Abhay Nagar (Miyawaki Plantation)	Tender Published.
2021-22	Rastrasant Tukdoji Maharaj Vidhyapith Behind (Block Plantation)	Work Order Stage
2022-23	Nandgram Area Wathoda Plantation on Open Space	NMC Fund
2022-23	Various Outskirt Area Wathoda Bhandewadi, Somalwada, Besa, Hudkeshwar Dabha, Narsala (Plantation on Open Space, PU Land, Playground periphery and reserved garden land)	15 <sup>th</sup> Pay Commission

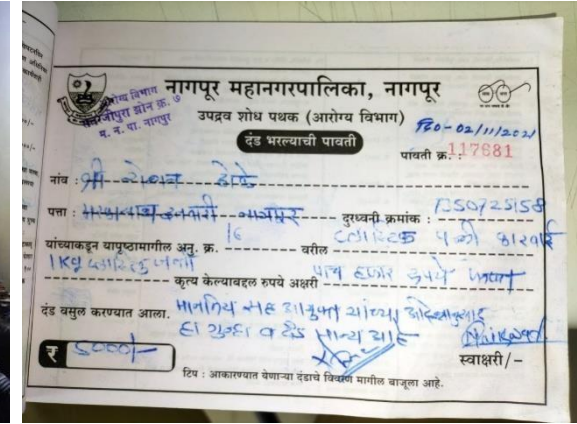


भूमी



Earth

## SINGLE USE PLASTIC BAN



## BIOMEDICAL WASTE MANAGEMENT



### AGREEMENT OF COLLECTION, TRANSPORTATION, TREATMENT & DISPOSAL OF BIOMEDICAL WASTE.

This Agreement for Collection, Transportation, Treatment and Disposal of Bio Medical Waste at Nagpur on this 12<sup>th</sup> day of August 2004 BETWEEN The City of Nagpur Corporation acting through its Authorized Health Officers Dr. Milind R. Ganvir, aged about 45 years, R/o. Nagpur hereinafter called and referred to as the **NAGPUR MUNICIPAL CORPORATION** (which expression shall unless repugnant to the context or meaning thereof always mean and include the said Nagpur Municipal Corporation, as well as its members, executors, administrators, successors and assigns etc.) OF THE FIRST PART,

AND

M/s Superb Hygienic Disposal, a partnership firm, registered under the provisions of partnership Act, having its office at 84, Rajiv Nagar, Somalwade, Nagpur represented through its Managing Partner Shri. Atul Marotrao Zolting,



## NAGUR DECLARED AS ODF++ CITY



### REPORT FOR TPI OF NAGPUR ULB FOR WATER+ ASSESSMENT

Date of TPI	20 July - 06 August 2021
Result Status	ODF++

#### City Profile:

State	Maharashtra
District	Nagpur
Census Code	802710
Total Population	2405665



## LEGACY WASTE MANAGEMENT (BIO-MINING OF EXISTING DUMP)

LOCATION	BHANDEWADI, NAGPUR
AREA COVERED BY WASTE	53 ACRES
AGENCY NAME	M/S ZIGMA ENVIRO GLOBAL SOLUTIONS
COMMERCIAL OPERATION DATE (COD)	24 <sup>TH</sup> OCT 2019
TOTAL CONTRACTED WASTE	1000000 MT (APPROX.)
COMPLETION OF WORK	3 YEARS FROM COD
LEGACY WASTE PROCESSED TILL DATE	66.78 %
TOTAL LAND RECOVERED	30 ACRES
CO <sub>2</sub>	465959 MY (EMISSION SAVED)
PROJECT COMPLETION EXPECTED	DEC 2022

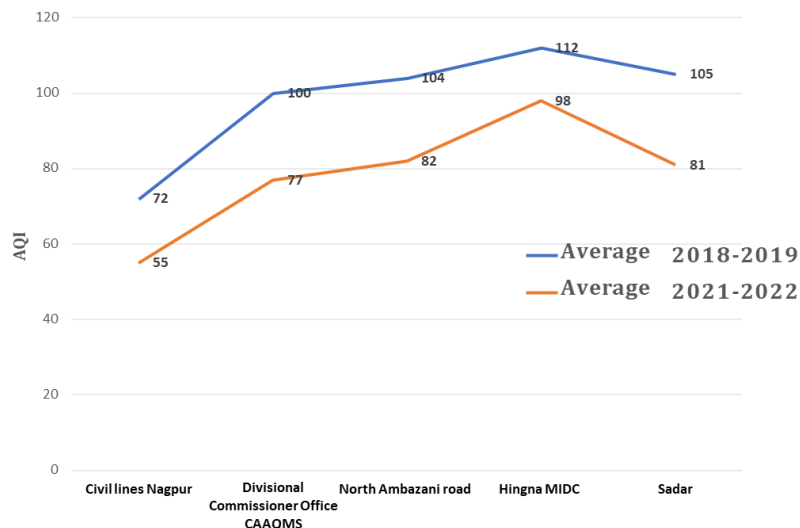
## CONSTRUCTION AND DEMOLITION (C & D) WASTE MANAGEMENT OF CITY

- Nagpur City Generates approximately **100-150 TPD** of C & D Waste
- Presently **C&D Waste collected** from 10 Nos. of Zone **by Mechanical means**.
- The C&D waste transported to **Bhandewadi** at reserved **05 Acres of Land for Processing**.
- Collected waste **segregated and filled in low lying area**
- As per SBM Sanctioned DPR for New C&D Waste Management (150 TPD) Facility Project is in tendering technical evaluation stage. It expected to commission within 1 year



## AMBIENT AIR QUALITY MONITORING STATIONS

Nagpur City Air Quality Index



## MECHANICAL ROAD SWEEPING (MRS) MACHINE

- NMC has **procured 2 Nos. of MRS** under National Clean Air Program.
- Each MRS covers **40 kms per day**. (5kms per hour)
- 8 Nos. MRS proposed** under 15<sup>th</sup> Finance Commission Grant by NMC.
- MRS helps in **dust mitigation** eventually improving the Air Quality of the city by reducing particulate matter (PM10 & PM2.5).



## GREEN TRANSPORTATION INITIATIVES

### EXISTING E-VEHICLE STATUS IN CITY

TYPE OF VEHICLE	FUEL OPERATED	ELECTRIC VEHICLE	%
Rickshaw	23150	1256	5.43
Two- Wheeler	1504135	439	0.03
Four Wheeler	216609	188	0.09
Transport Vehicle	118996	0	0
City Buses (Aapli Bus)	438	7	1.6

### EXISTING FLEET

BUS TYPE	NO. OF BUSES	FUEL
Standard	167	Diesel
	70	CNG
Midi	150	Diesel
Mini	45	Diesel
Midi	6	Electric
Total	438	





## PROPOSED E-BUSES FLEET



## NMT INITIATIVE



- Total **13 km cycle track** developed.
- **Public Bike sharing (PBS)** started at all Metro stations
- **Tri-party MoU** to be signed between NMC, Metro and Agencies **for PBS**

## CHARGING INFRASTRUCTURE

### PLANNING BY NMC



### BY OTHER ENTITY



LOCATION		CATEGORY	Area (Ha)
East Zone	Watoda	Mother Charging Station	4.5
	Lakadganj (In Operation)	Opportunity Charging	0.36
West Zone	Wadi Naka	Opportunity Charging	1.13
North Zone	Koradi	Opportunity Charging	1.78
South Zone	Khapri	Opportunity Charging	3.54
Centre Zone	Morbhavan	Opportunity Charging	2.33
	Zero Mile	Opportunity Charging	0.41
Suresh Bhatt Sabhagruha	Reshim Bagh 50 KW	Solar Powered EV Charging Station	0.15
LOCATION		CATEGORY	No.
Maha Metro	Selected Metro Station	Opportunity Charging	25
Nagpur Smart City	Charging Station	Opportunity Charging	13





## WATER AND WASTEWATER SCENARIO



## UTILIZATION OF OPEN WELLS

Wells	Year	Number
Total Public Wells		720
No. of Public Wells Rejuvenated	2019-20	502
	2021-22	148
	Proposed 2022-23	70

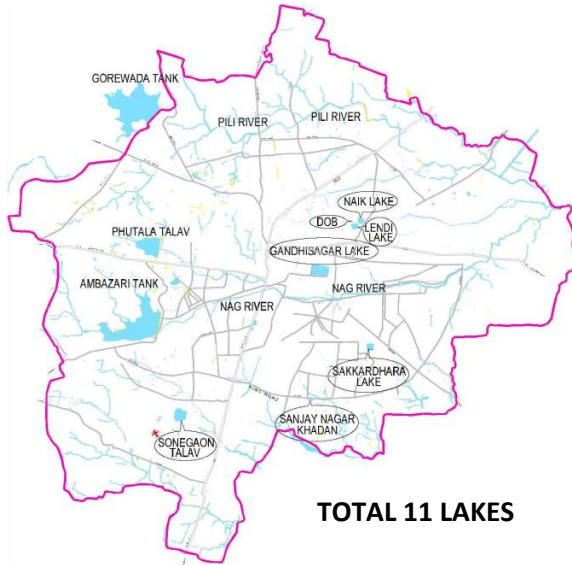
## WASTEWATER RECYCLING PROJECT

- NMC has Setup **Decentralized Water recycling plants** across **12 Gardens** located next to **Nallas**
- Total potential savings of ground/fresh water – 4 Cr Liter/Yr
- Water to be supplied via **Red Tankers** for non-potable uses like construction, gardening, washing etc.
- Flagship Project** under Water Conservation and Recycle & Reuse policy
- 30-40% recycled water will be used for gardening** and excess water will be sold by operator through tankers for construction





## LAKE REJUVENATION AND BEAUTIFICATION PROJECT



NAME	PHYSICAL PROGRESS
ONGOING	
Sakkardara Lake	35
Sonegaon	15
Gandhinagar	15
PROPOSED	
Naik	Work order issued to NEERI
Lendi	DPR under preparation
Binaki Megalwari	DPR under preparation

### PROJECT COMPONENTS

Desilting of lake

Trapping of Pollution Sources

Stopping of Pollution Channel

Recharger Shaft

Construction of Retaining Wall

Walking Track

Green Zone Plantation

Garden & Children Play Zone

## SEWERAGE GENERATION, TREATMENT, RECYCLE AND REUSE

NAGPUR CITY GENERATES 520 MLD OF WASTE WATER

TOTAL SEWAGE TREATMENT CAPACITY 370.3 MLD

### NAGPUR 200 MLD STP TREATMENT AND REUSE ON PPP BASIS



### NAGPUR 130 MLD STP TREATMENT AND REUSE





### LED STREET LIGHTS IN THE MISSION PERIOD

#### BEFORE 2017

Total Conventional Street Lights	129040 Nos.
Actual Load	17.36 MW
Actual Consumption in Lacs	556 Units

#### IN 2022

Total No. of Street Lights	152569 Nos.
Actual Load	8.23 MW
Energy Saving	52%
Conventional Street Lights Left for Conversion	835 Nos.

### ENERGY CONSERVATION PROJECT

- Total conventional Sodium Vapor lamps by LED
- Total 1.45 Lakh Street lights replaced from 2017
- Total energy savings to the tune of 52% as compared to energy consumption in 2017, despite the hike in tariff.
- Budgetary provision is being made to provide street lights in non-eliminated area in the city.

### ENERGY AUDIT OF PUBLIC BUILDINGS & ENERGY SAVING EFFORTS BY NMC

- In 2018-2019, replaced all conventional in NMC buildings by energy efficient LED Lights.
- Also replaced all ceiling fans of 80 Watt plus by energy efficient ceiling fan of 50 Watt.
- Energy saving potential Rs. 92 Lakhs and Total expenditure Rs. 250 Lakhs.
- It is encouraged by NMC to state government & private buildings to adopt energy efficiency majors

### SOLAR INSTALLATION ON ROOFTOP OR IN COMPLEXES OF PUBLIC BUILDINGS



- **200 KVA** Roof top Solar plant is installed in 2017 at Late Suresh Bhatt Auditorium; this has resulted in the use of renewable energy.
- **3.5 KVA** Roof top Solar plant is being installed at Hedgewar e-library





## MAJHI VASUNDHARA ABHIYAN

- Pledge
- 47 Plantation Drive events total number of events conducted for 85 promotion activities of Abhiyan
- 15 no community activities
- Star Municipal Leadership Award 2020 on Poornima Day for Electricity reduction campaign
- Shahar Green Karo Award for Environmental Activity
- Facebook post with highest engagement on remarkable/innovative work done by respective ULBs/PRIs:-
- Average no. of likes and shares for the Facebook post:- 300





## FOCUS AREAS 2022-23

- EV Buses and Charging Infrastructure
- Lake Rejuvenation
- Sewer Network
- 100% Treatment of Wastewater
- Plantation: Miyawaki and Block plantation
- NMT Promotion
- Processing of Solid waste
- Energy and Water Audit of Public Office
- Creation of new Urban Spaces

## CLIMATE ACTION PLAN PROCESS

GHG Emissions Inventory  
(completed)

- Sectoral Energy & Fuel Use Mapping for 5 years
- Sectoral GHG Emissions estimation using GPC Protocol
- Identification of key sectors for potential emission reduction

Climate Risk & Vulnerability  
Assessment (CRVA)  
(completed)

- Assessment of Municipal Services
- Identification & Mapping of vulnerable population towards climate hazards such as heat waves, low lying areas.

Technical Studies & Pilot  
Project (Completed)

- Stakeholders Consultations with ULB departments to identify city's needs and high impact climate action interventions
- Nagpur- Biodiversity Conservation and Ground Water Augmentation

Climate Action Plan

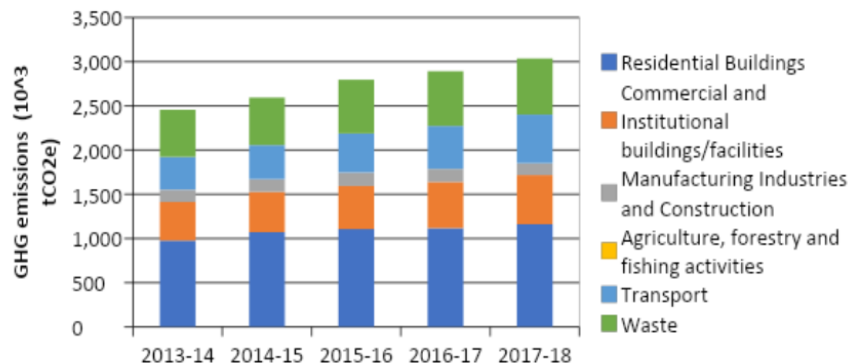
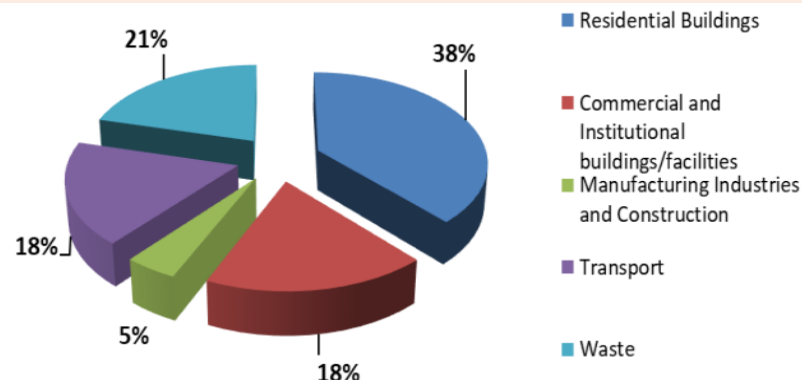
- Sectoral Mitigation Strategies based on GHG Inventory, CRVA Analysis & City's needs
- Adaptation strategies based on CRVA
- Advanced climate actions, institutional mechanisms and policy interventions

## GHG EMISSION INVENTORY (2017-18)

Energy Consumption for Nagpur	7.09 GJ/capita
GHG Emission for	GHG Emission Per Capita
Nagpur	1.13 tCO <sub>2</sub> e
India (Average)	1.96 tCO <sub>2</sub> e
World (Average)	6.55 tCO <sub>2</sub> e

\*Source: India Third Biennial Update Report to The United Nations Framework Convention on Climate Change. India & Global emissions including Land Use, Land-Use Change and Forestry

## SECTOR-WISE GHG EMISSION INVENTORY (2017-18)

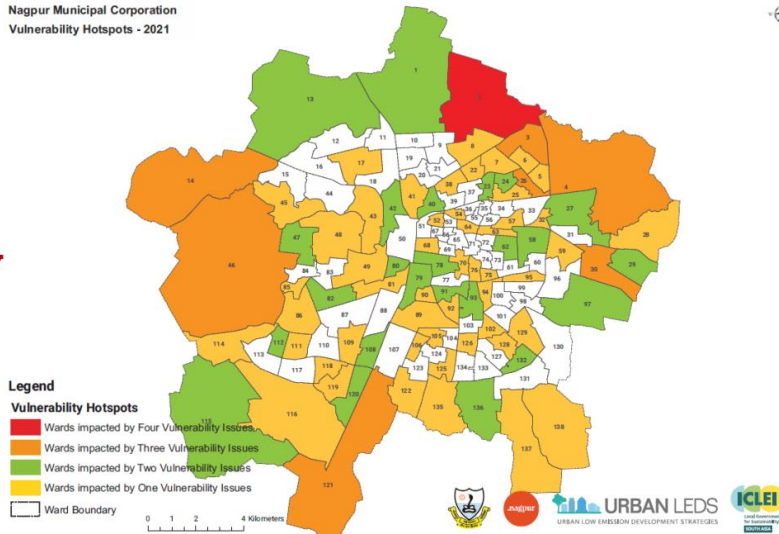






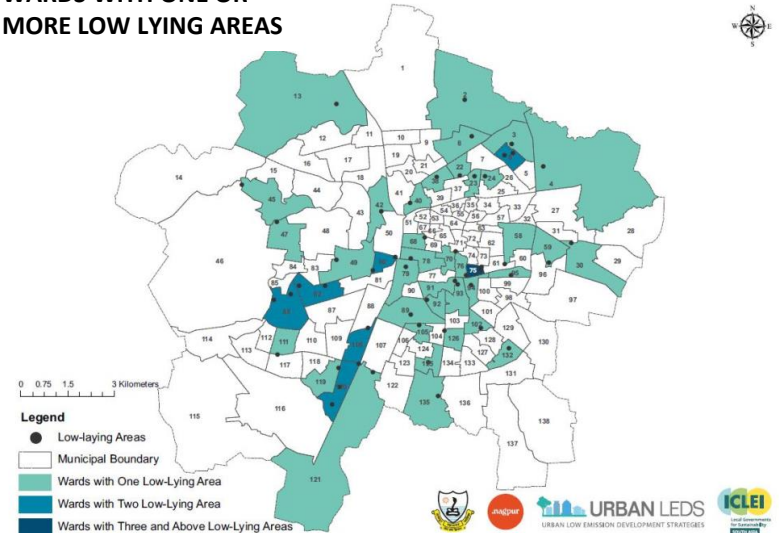
## NMC VULNERABILITY HOTSPOTS (2021)

Nagpur Municipal Corporation  
Vulnerability Hotspots - 2021



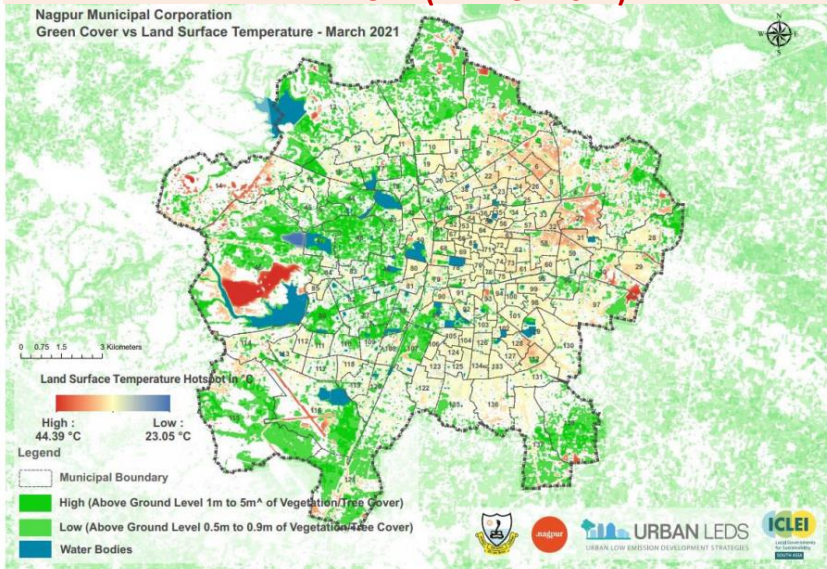
## NMC LOW LYING AFFECTED WARDS (2021)

WARDS WITH ONE OR MORE LOW LYING AREAS



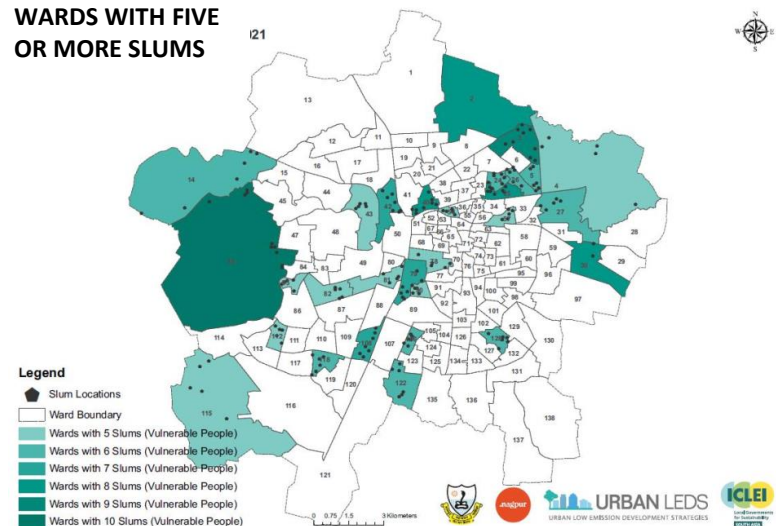
## NMC CLIMATE VULNERABILITY GREENCOVER VS SURFACE TEMPERATURE ( MARCH 2021)

Nagpur Municipal Corporation  
Green Cover vs Land Surface Temperature - March 2021



## NMC VULNERABLE PEOPLE-MAJOR SLUMS (2021)

WARDS WITH FIVE OR MORE SLUMS

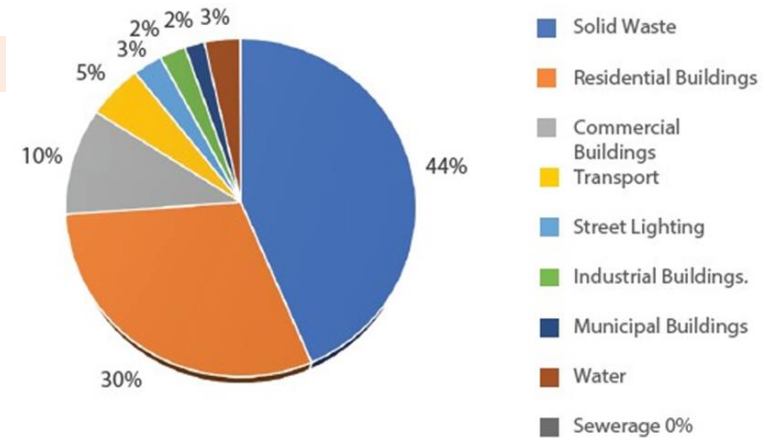




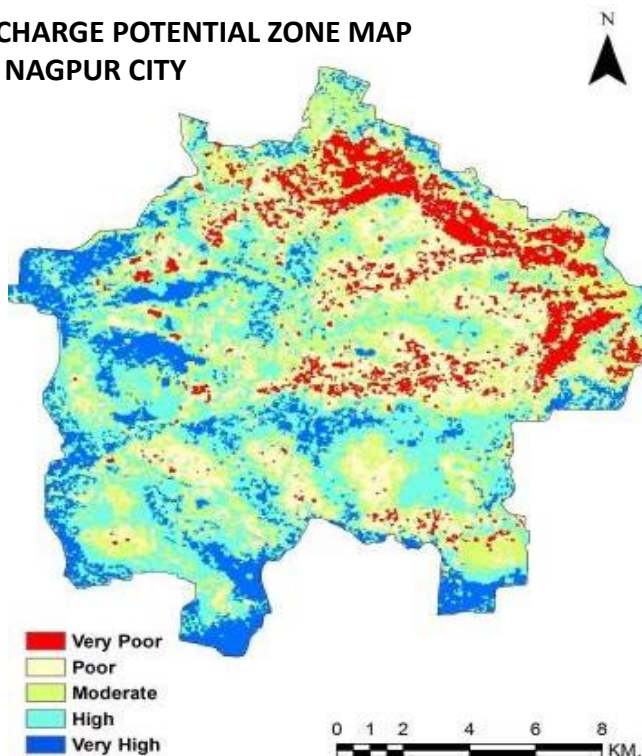


## CLIMATE RESILIENT CITY ACTION PLAN

- Following the Climate Resilient Cities methodology - an action planning process tailor made for local governments for the development of a Climate Resilient City Action Plan.
- Includes sectoral mitigation and adaptation strategies based on GHG inventory, Climate risk and vulnerability assessment and City's needs



RECHARGE POTENTIAL ZONE MAP OF NAGPUR CITY



## RAIN WATER HARVESTING & IoT BASED GROUND WATER RECHARGE

To assess potential and identify and demonstrate actions for augmentation of local water resources through groundwater (GW) recharge and rainwater harvesting (RWH)

### ACTIVITIES

- City's Baseline hydro-geological study
- On-ground survey of GW level, usage & quality in the city
- Technological options for aquifer recharge and IoT solutions for GW level, quality monitoring
- City-wide plan of solutions, actions and priority locations for ground water augmentation
- Pilot project at 2 NMC schools with 8 lakhs liters ground water recharge potential, equipped with IoT system

**THANKYOU**