# Changing Climate Impacts on Small Town WASH - A local perspective of Chintamani

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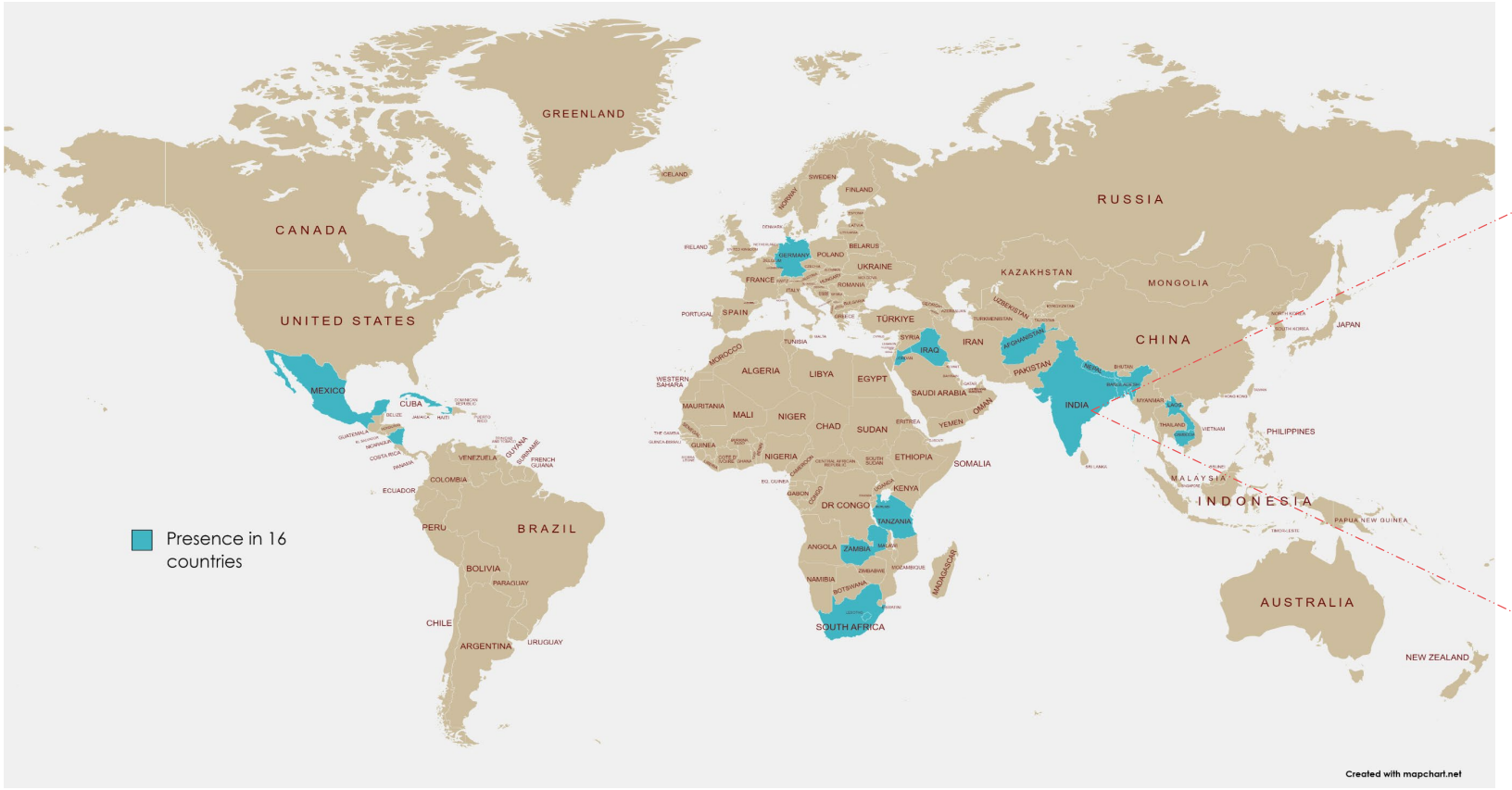
**Global South Academic Conclave on WASH and Climate 2025**

**21st - 23rd February 2025, Ahmedabad**

# BORDA South Asia

## Geographic Presence





Active since **1977**

**3** countries; **10** towns in South Asia

**46** motivated professionals in South Asia

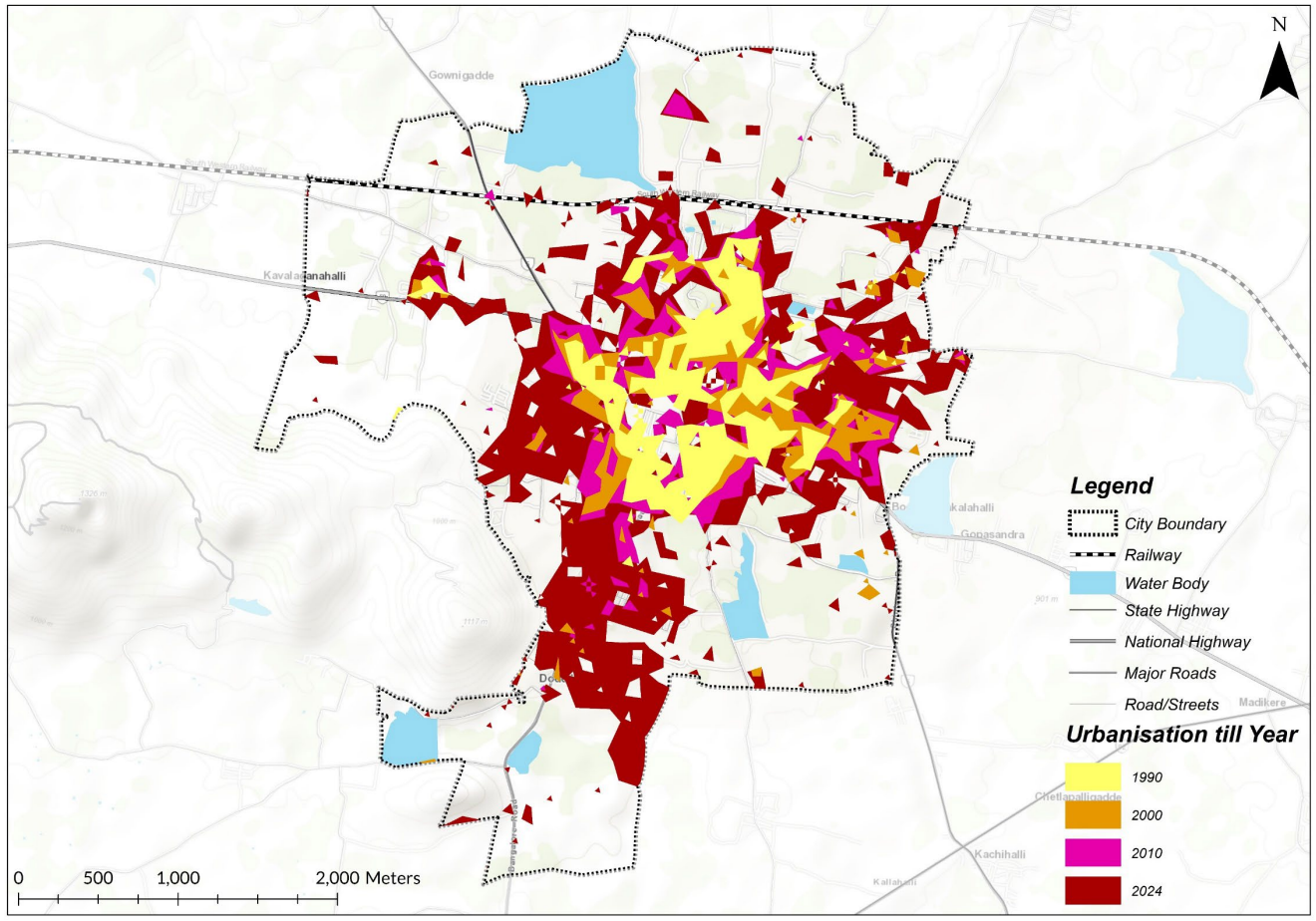
# Chintamani Town



# Chintamani – A Snapshot of the town


- Chintamani is a small town with a population of **92000 in 2022**
- Chintamani falls in the **tropical Semi-Arid to Arid climatic** region of India
- ULB- **City Municipal council**

# Chintamani – Key Challenges




**24% Increase in build-up area in last 30 years**

- High dependence—risk!!
- 300 bore well sites.
- Over - Exploited category (CGWB, 2017)
- High NRW

- **25%** registered sewerage connections
- **35%** STP capacity
- Faecal coliform in major lakes

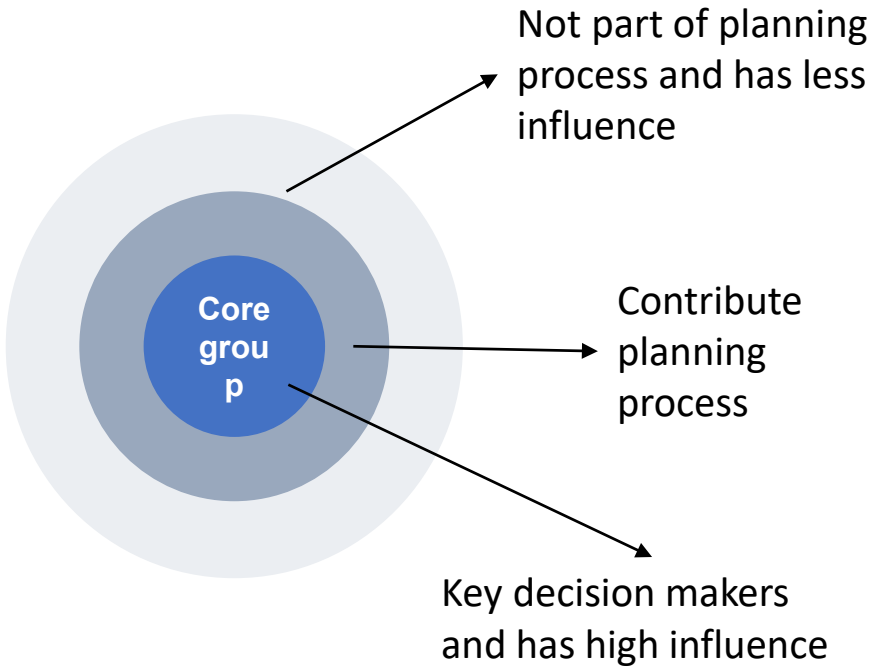
- 29TPD, Low focus on processing
- Legacy waste - 45K MT
- Dysfunctional infra

- High operational expenditure: 50%
- Low-cost recovery: 15%

# Chintamani – Key Stakeholder Mapping

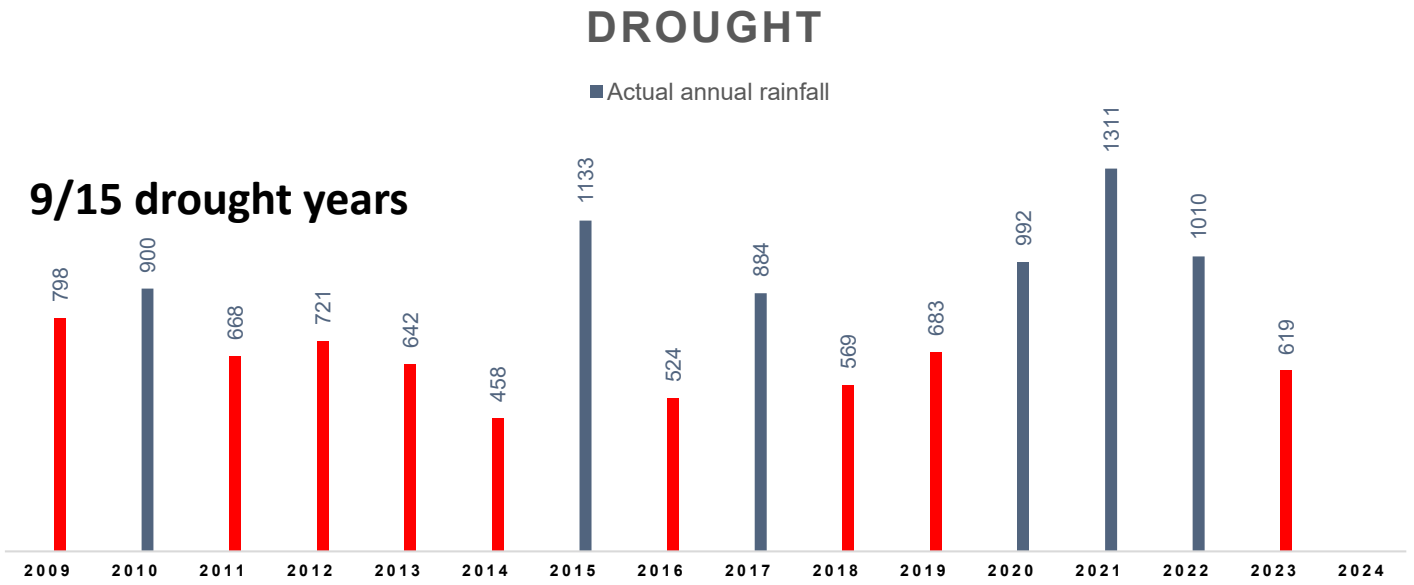
## Stakeholders for Chintamani climate action plan

| No | Stakeholders | Responsible | Accountable | Consulted | Informed |
|---|---|---|---|---|---|
| CITY | Commissioner | Y | Y | | |
| | Council body | Y | Y | | |
| | Health Department | Y | | | |
| | Engineering department | Y | | | |
| | Accounts department | Y | | | |
| | Sanitation workers | | | Y | |
| | Community | | | Y | |
| | Informal sector | | | Y | |
| DISTRICT | DUDC | Y | | Y | |
| | KUWSDB, Chikkaballapura | Y | | Y | |
| | Ground water development department, Chikkaballpur | | | Y | |
| | KSPCB, Chikkaballpur | | | | Y |
| | Minor irrigation department, Chikkaballapura | | | Y | |
| | Zilla Panchayat, Chikkaballpur | | | | Y |
| | MLA | Y | | | |
| | KUIDFC, District PMU | | | Y | |
| | Disaster management cell, Chikkaballapura | Y | | Y | |
| | Statistics Management cell, Chikkaballapura | | | Y | |
| STATE | Karnataka state disaster management Authority | | | | Y |
| | Karnataka State Natural Disaster Monitoring Centre | | | | Y |
| | Surface water data centre | | | | Y |
| | UDD | | | | Y |
| | SBM Section ,DMA | | | Y | |
| | AMRUT section, DMA | | | Y | |
| | NGT | | | | Y |

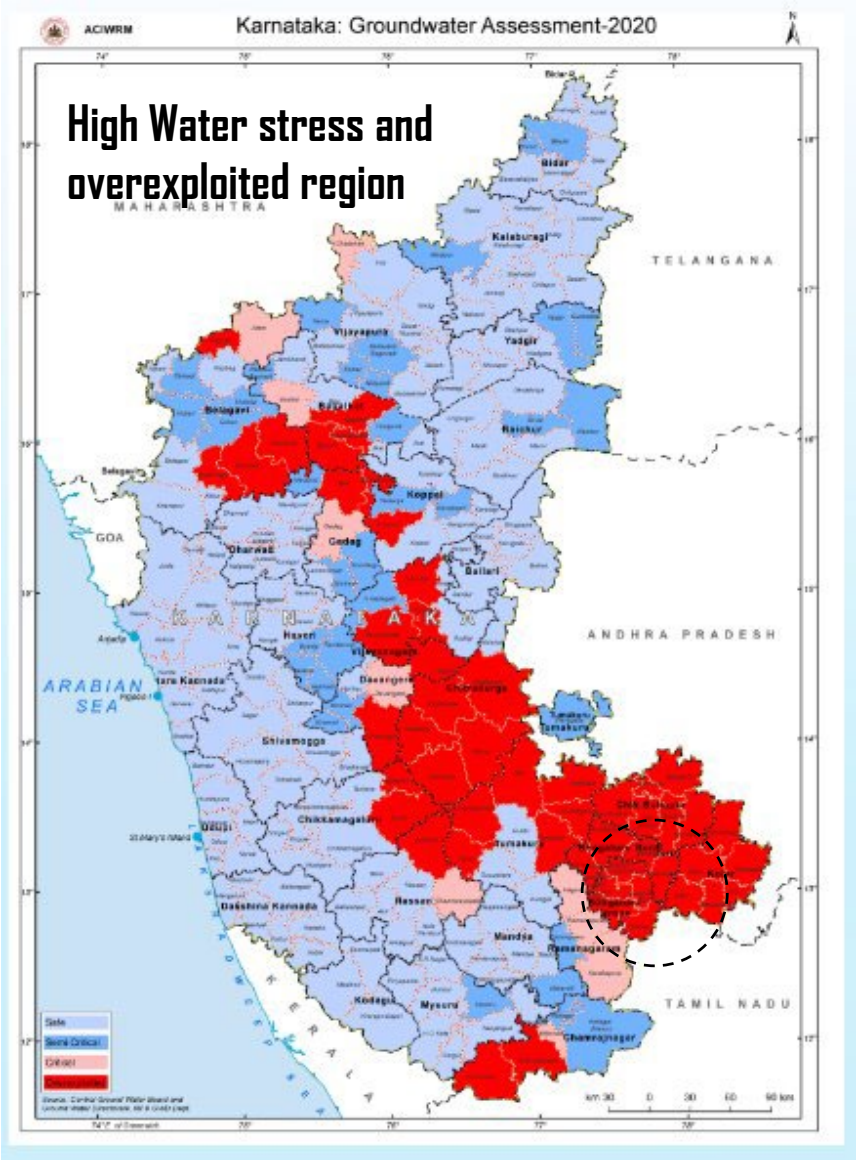



- Small town with 25 stakeholder directly/indirectly involved planning process
- Stakeholders8-City level, 10-District, 7 state level
- 13 stakeholders directly involved in decision making role from city level to state level

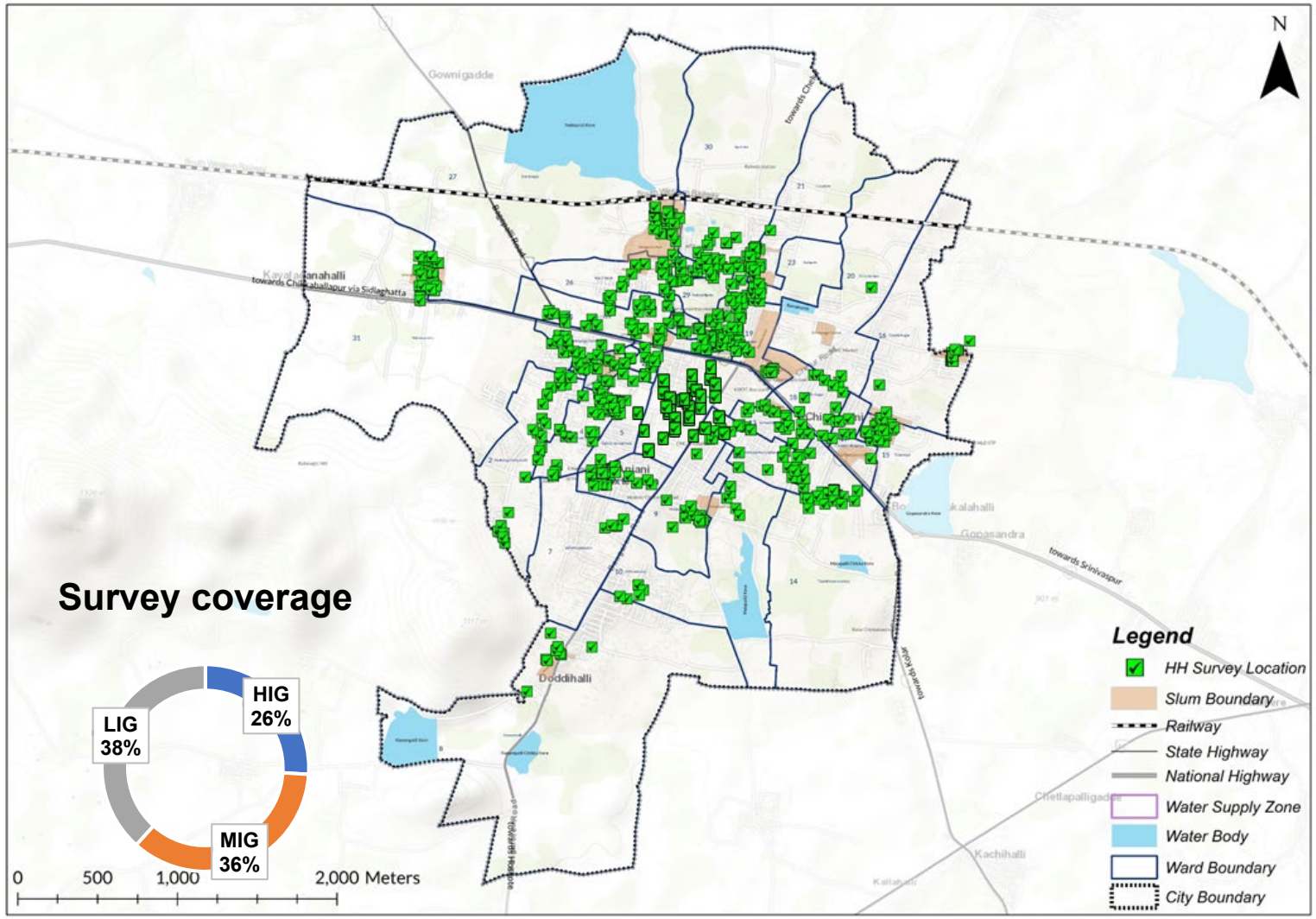
# Chintamani –Hazard Mapping



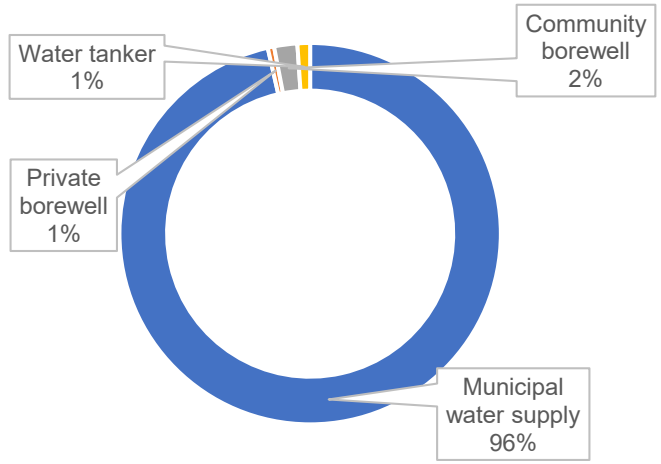

| **Hazard** | People | Natural Environment | WASH Infrastructure | WASH Service |
|---|---|---|---|---|
| Precipitation Change | M | H | L | H |
| Water logging | L to M | L | L | L to M |
| Drought | H | H | L | H |
| Water quality degradation | M to H | L | L | L |
| Thermal Stress | M to H | M | L | L |



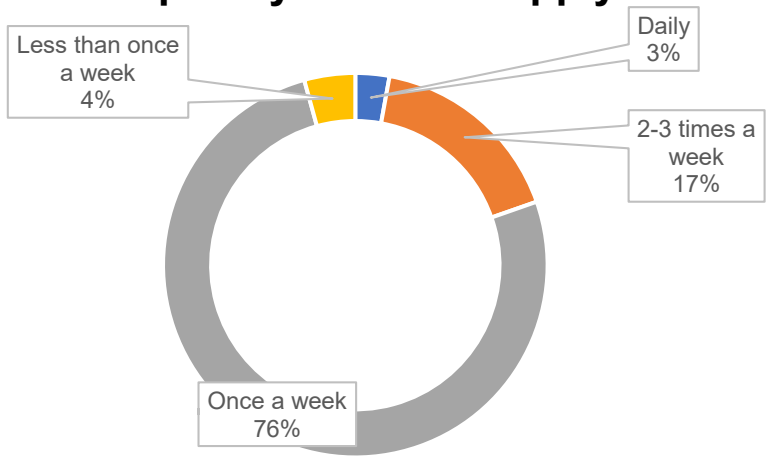
# HH Survey- sample and distribution




## Source of water



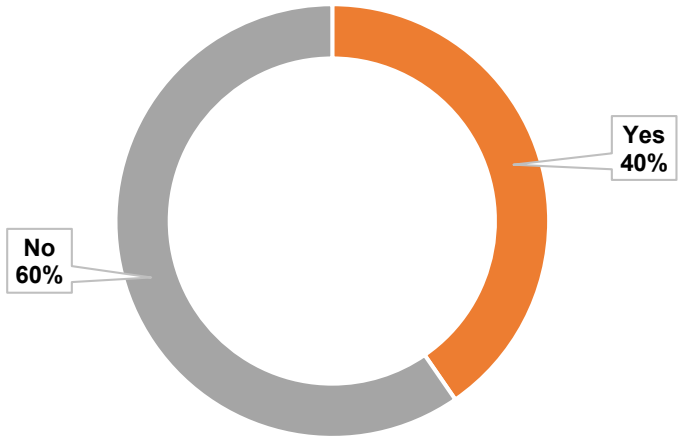

## Frequency of water supply



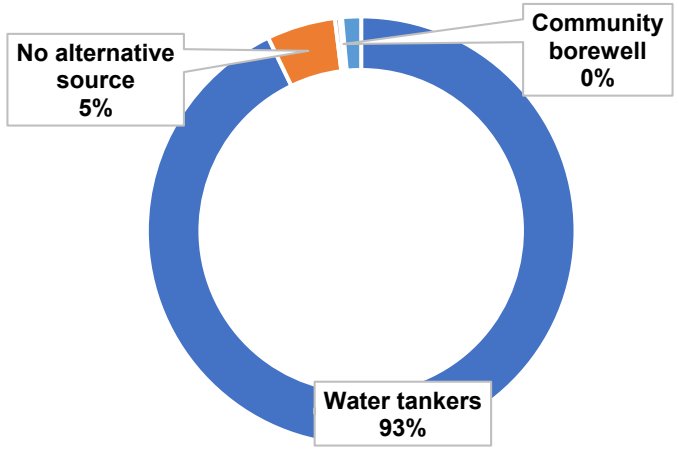

**95%** respondents associates CC with rainfall variation

# HH Survey- Assessment

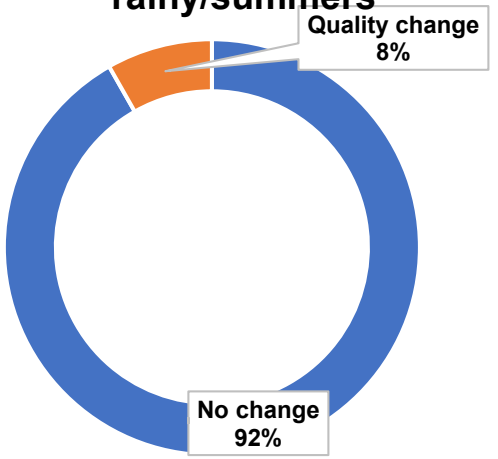
## Water shortages-Summers



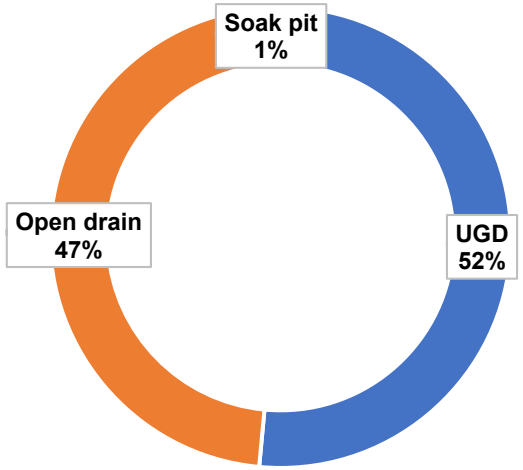

## Alternate source during summers



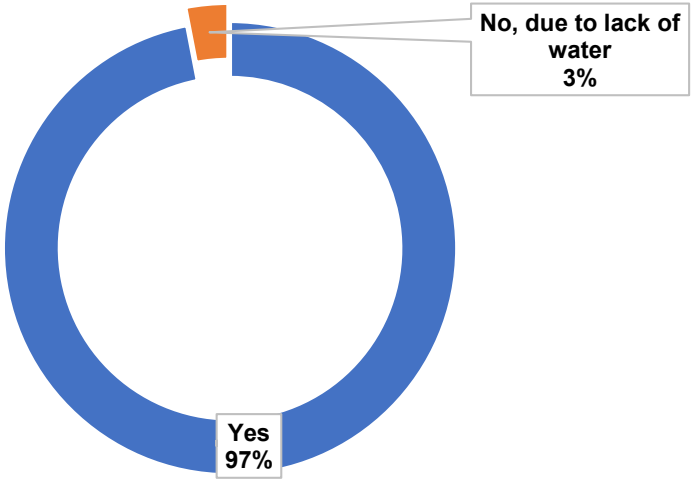

## Water quality change during rainy/summers



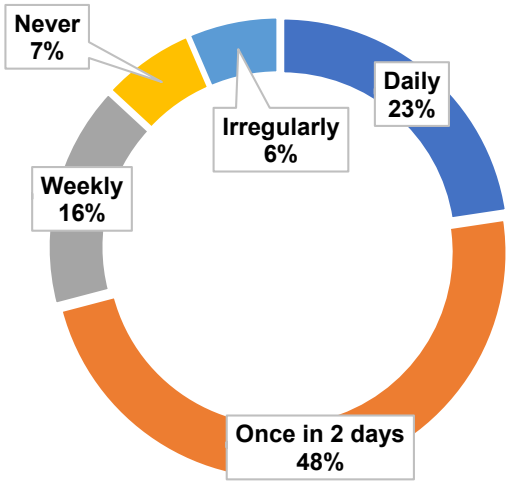

## Greywater Discharge




## Toilet functionality during water shortage




## Waste Collection frequency



# Climate WASH- Risk and Vulnerability assessment

- Rainfall variation
- Drought
- Temperature

HAZARD-Macro

## Impact assessment- Micro

### Water resource

- Surface water
- Groundwater

### Service

- Network Coverage
- Supply frequency
- Functionality
- Collection

### People

- Slums
- Economic
- Gender
- Disadvantaged

## Mitigation

### GHG Analysis

- WASH GHG baseline
- GHG trend analysis

# Climate Parameters: Future trend analysis

**SSP2-4.5:**

Middle of the Road, envisions a future characterized by a balanced approach

## Base year: 1995-2014

**2X population**

184000 population by 2050. at 3% annual growth

SSP 2-4.5

**> 2.71°C Temp**

Increase from 23.13° avg temperature in base year to 25.84°C in near term

SSP 2-4.5

## Near term: 2015-2040

**< 3.42% rainfall**

Dip from 847.36mm avg rainfall in base year to 818.33mm avg rainfall near term

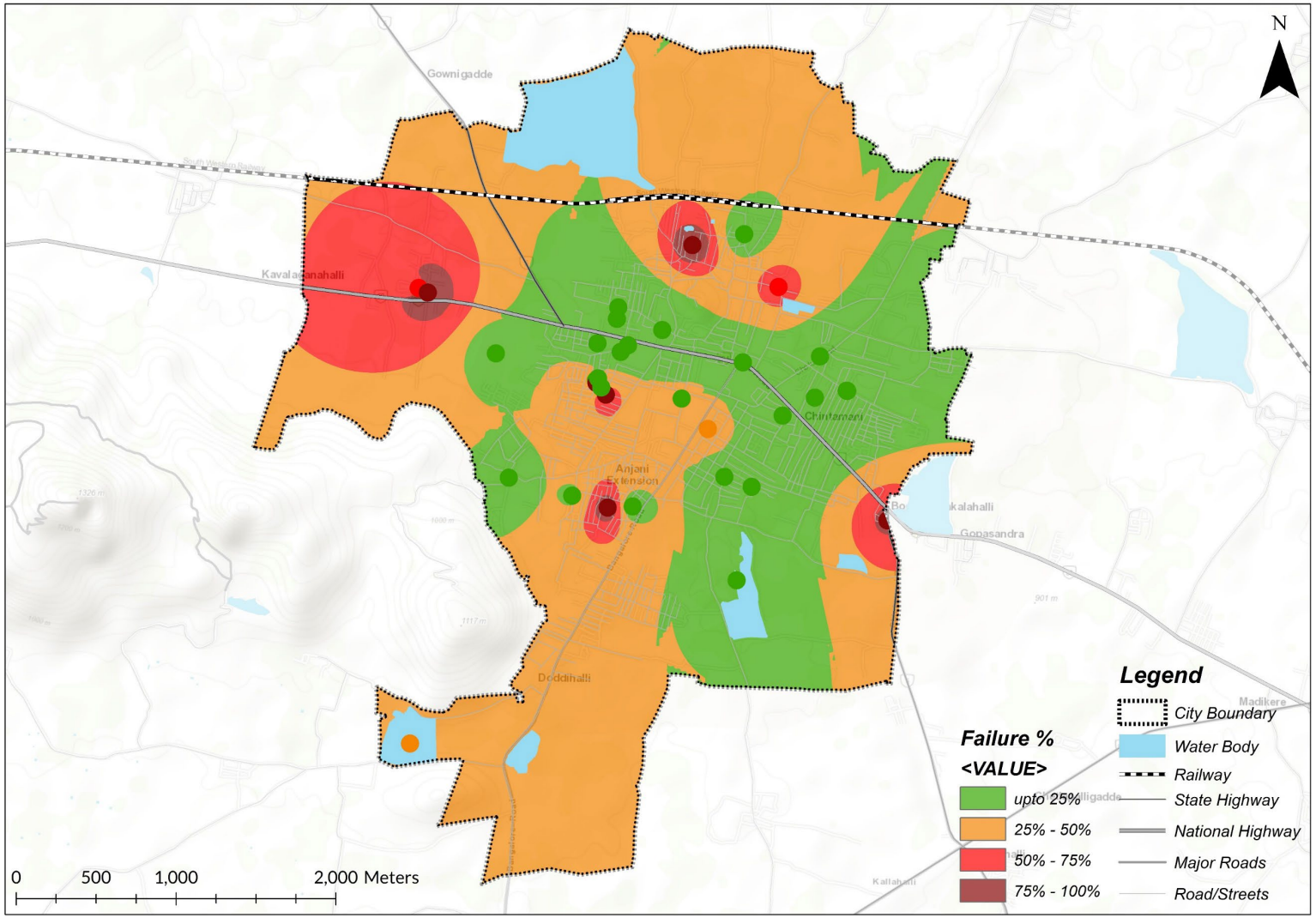
SSP 2-4.5

**> 4X Extreme hot days**

Increase from 18.3 days to 76.8 days by 2040.

SSP 2-4.5

# Water resource: Groundwater assessment

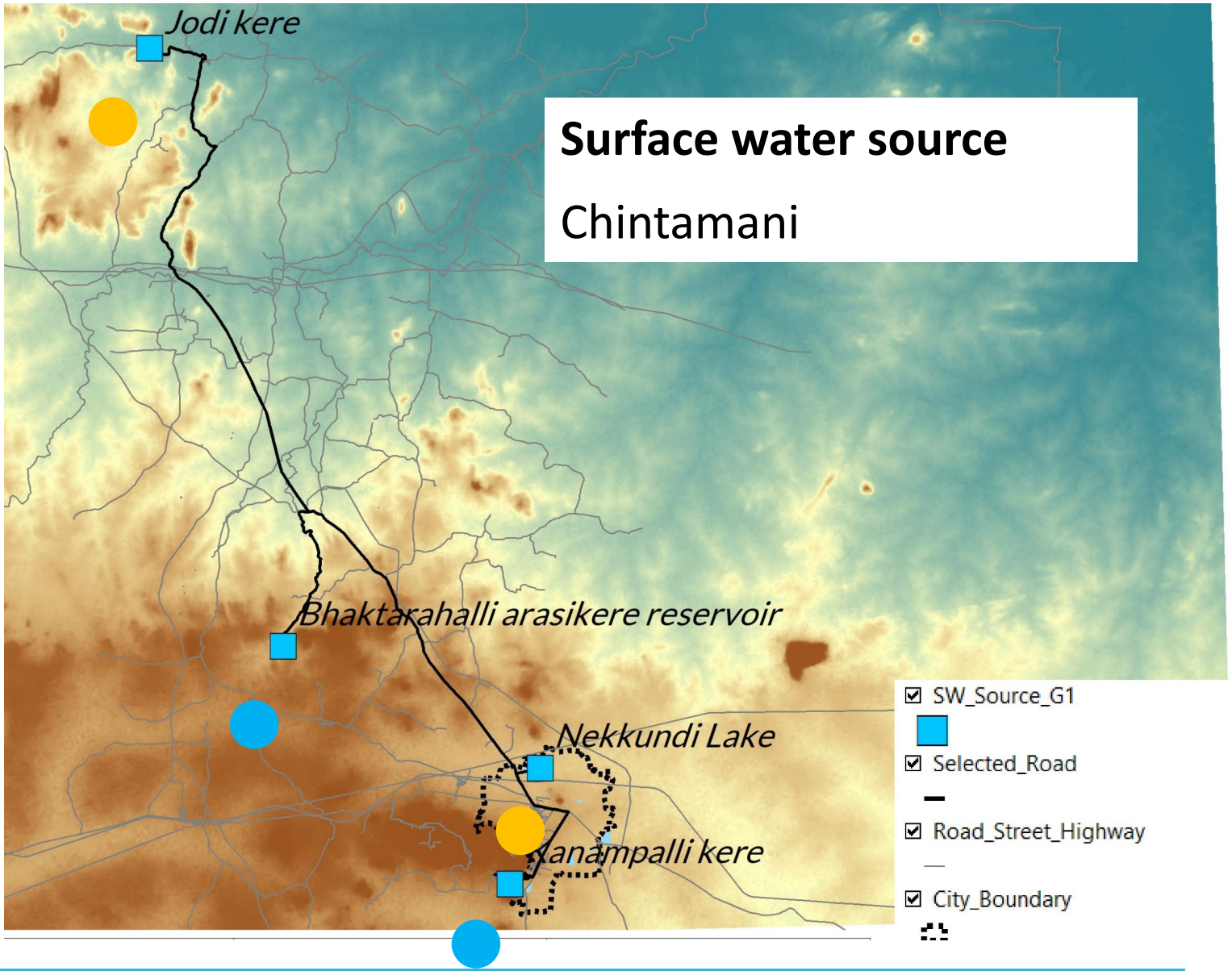



**300+ Borewell site.**
Only 60% yield water. CMC continue to dig more.

**85 borewell** functional in 2024. 24X7 pumping.

**35% existing** borewell are in critical condition. Dry in summers

# Water resource: Surface water assessment



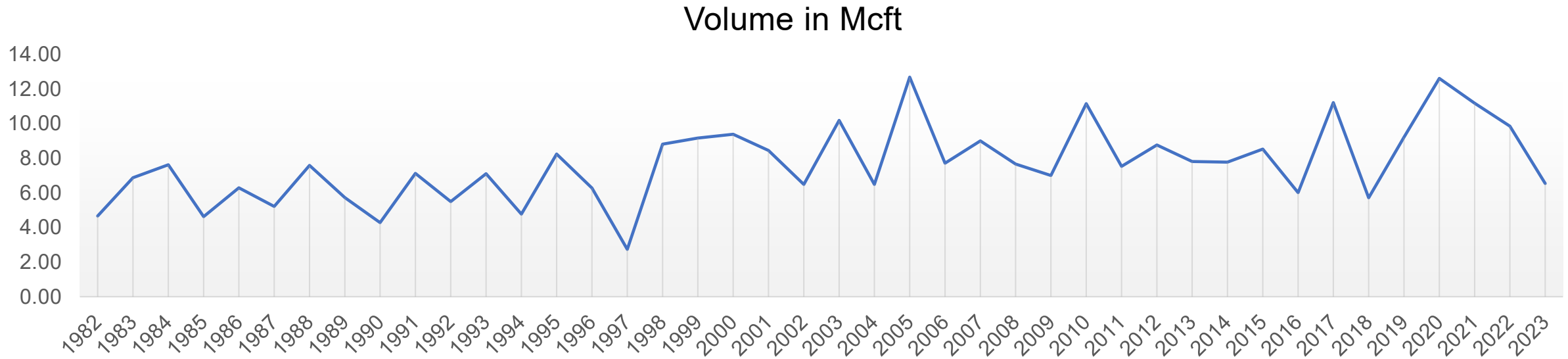

**Lake distance and supply:**

| Name | Distance | Planned Supply |
|---|---|---|
| Kanampalli | 2.5 Km | 1.6 MLD |
| Nekkundi | 2.0 Km | Unfit |
| Bhaktharahalli | 15 Km | 3.0 MLD |
| Jodi kere | 38 Km | Proposal |

Potential water source identified **38.0 KM** from the city

# Catchment and runoff analysis- Kanampalli lake

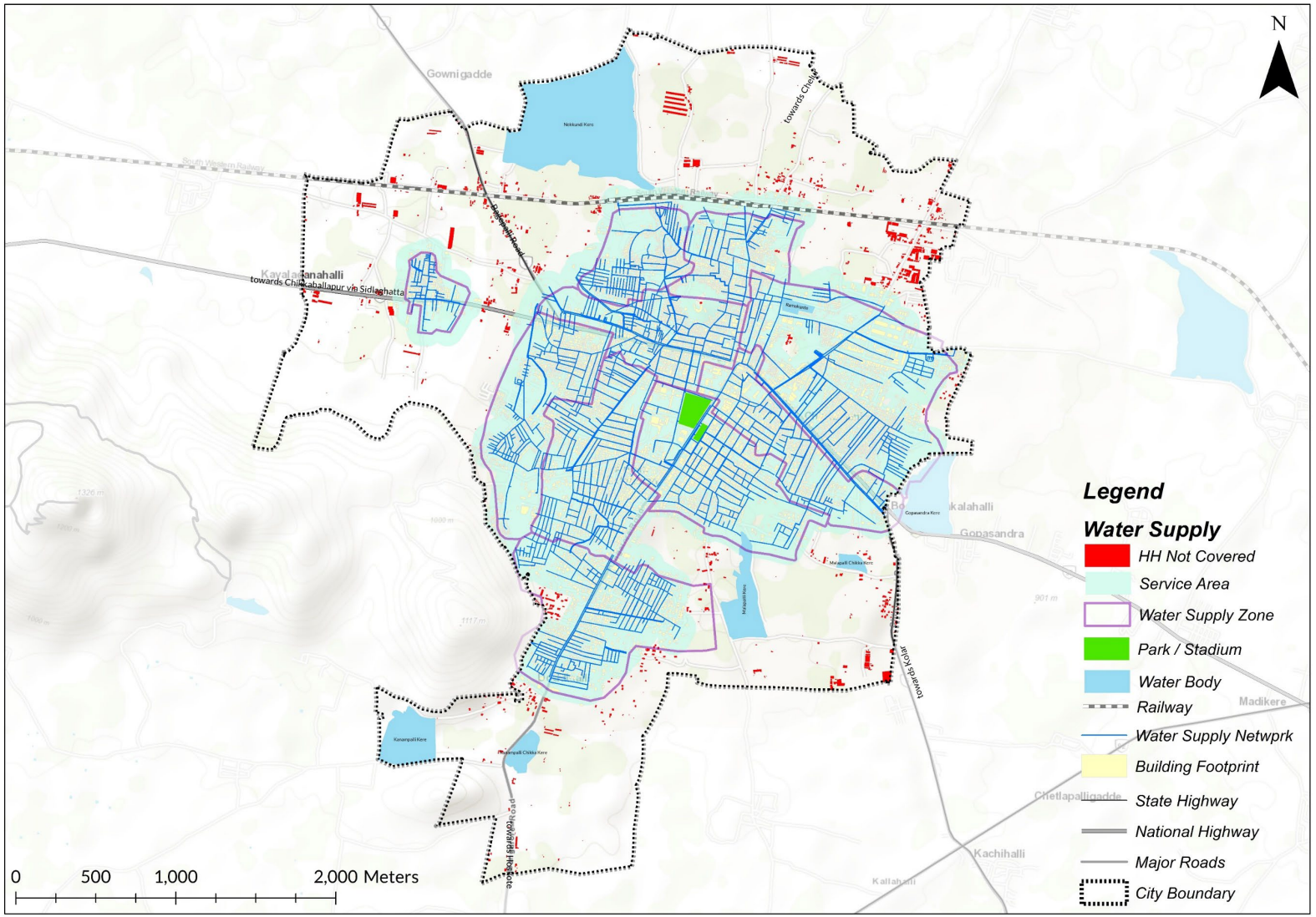
**Lake catchment area: 2.6 Sqkm**




**Annual water availability:**

| | Avg | Min avg | Max avg |
|---|---|---|---|
| **Volume in Mcft**<br>*1.0 Mcft = 28.31 MLD* | 7.65 | 4.58 | 11.5 |
| **Supply @1.6MLD** | 135 days | 81 days | 204 days |

# Service coverage assessment: Water supply

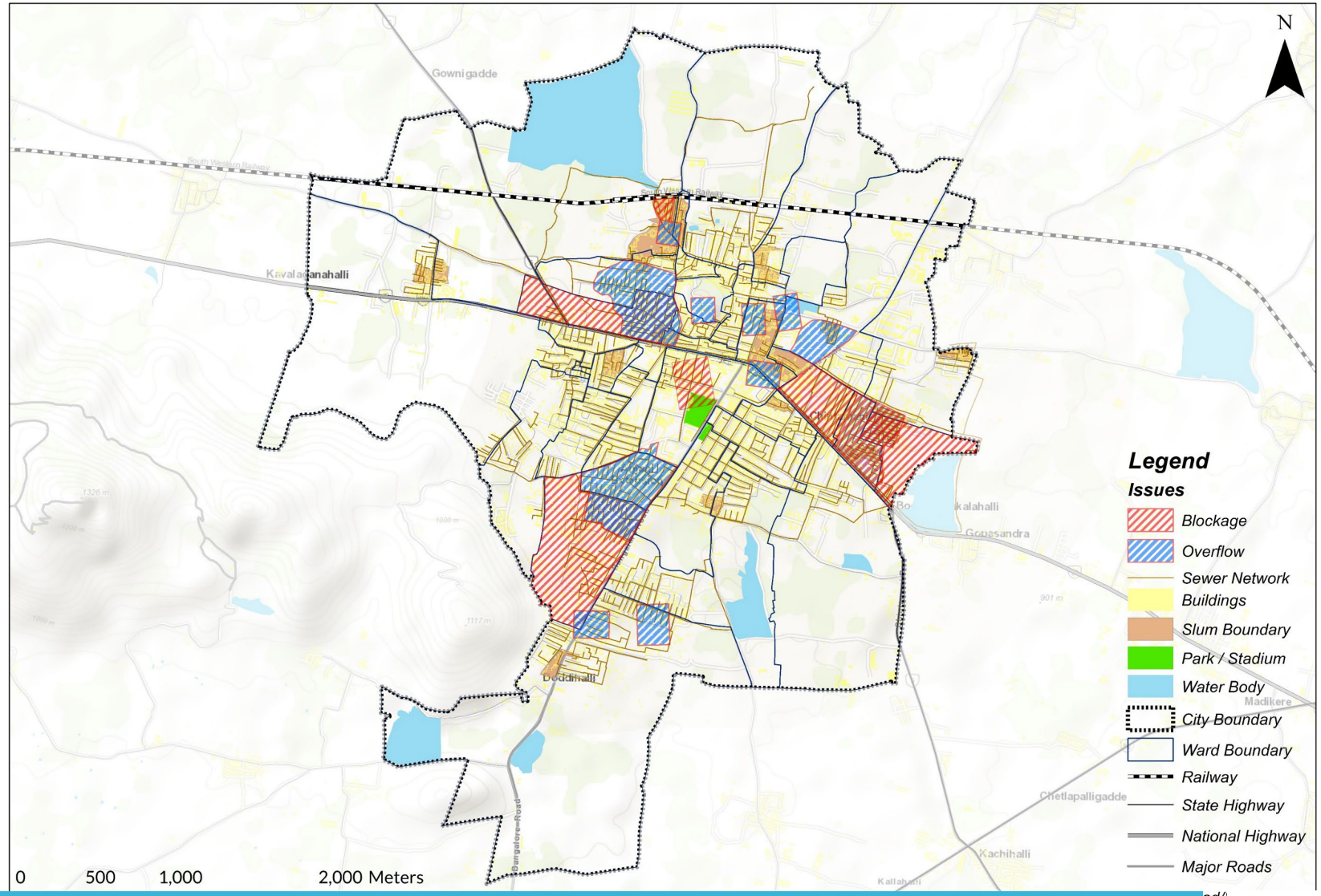



**65% GW, 35%- Both** dependent. 100% **Switch to GW when SW not available**

**1332 Properties** **out network coverage area. Dependent on private well/Tankers**

**45-100 lpcd- 70%** **Lower income and middle income HH**

# Water resource: Surface water assessment



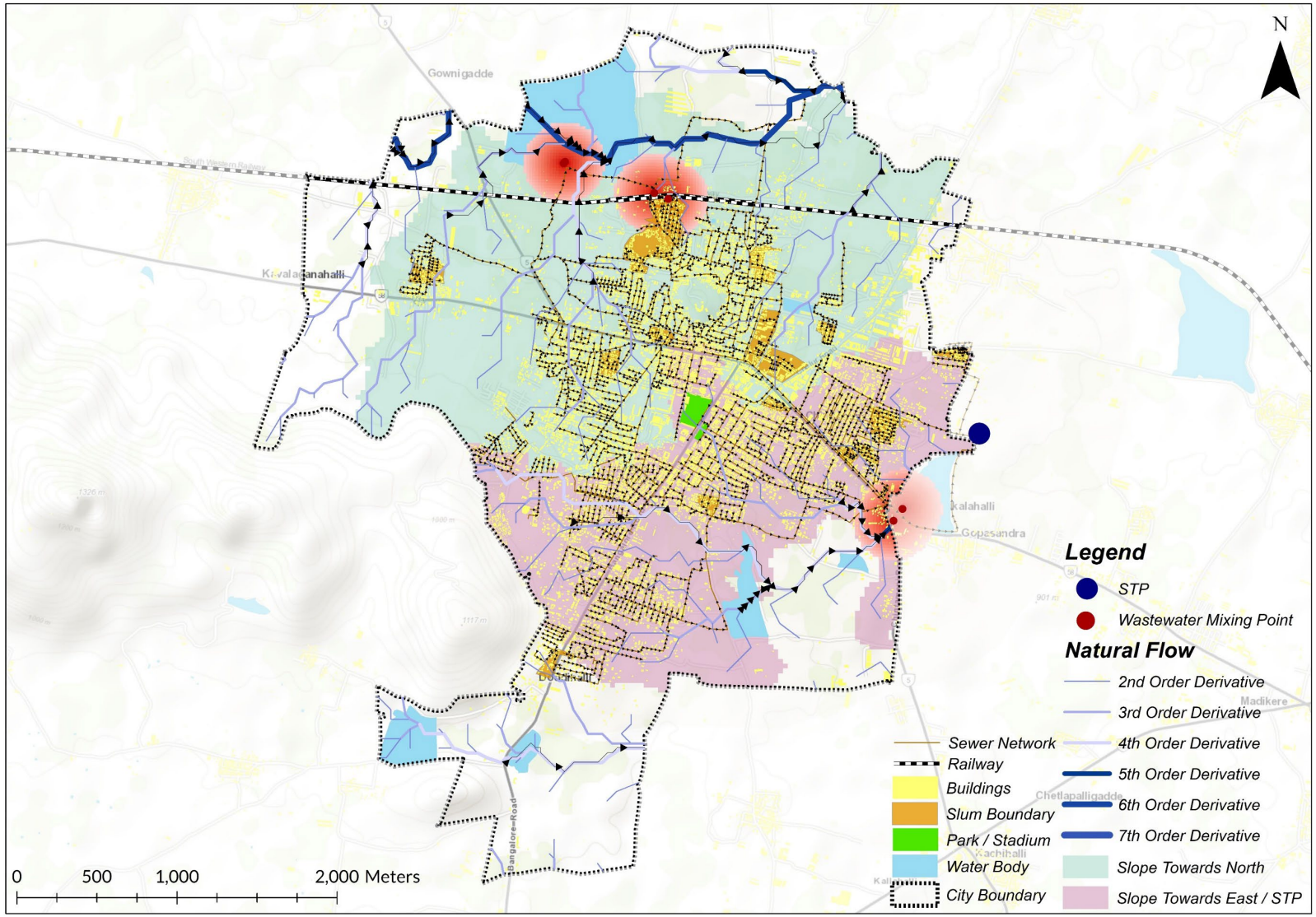

**Overflow: 3878 properties (19.40%)**

11 location under risk of overflow during wet seasons

**Blockage : 3573 Properties (17.87%)**

05 identified location with issue of overflow in the sewer systems

# Water resource: Surface water assessment

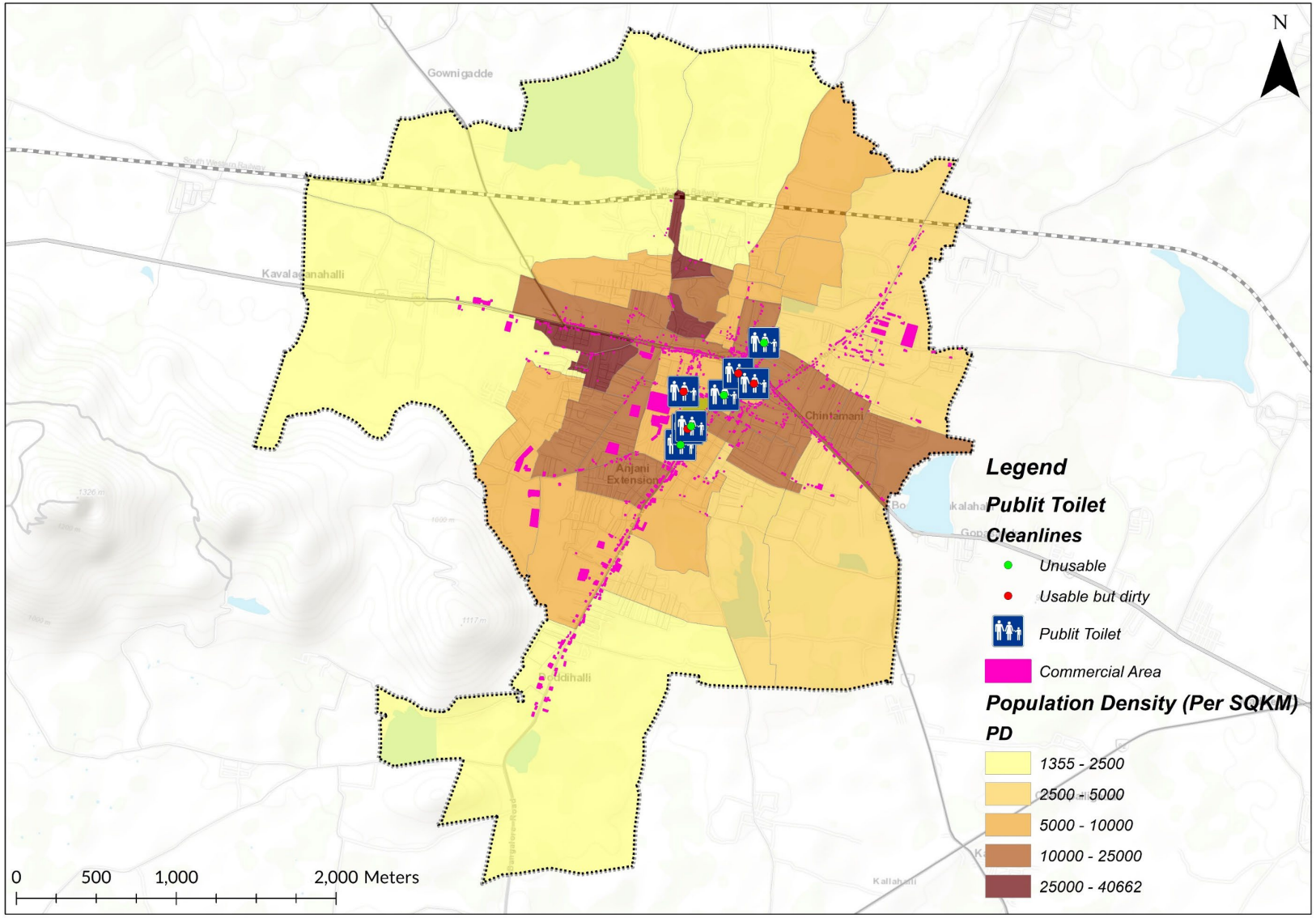



**1436** properties located away from network area.

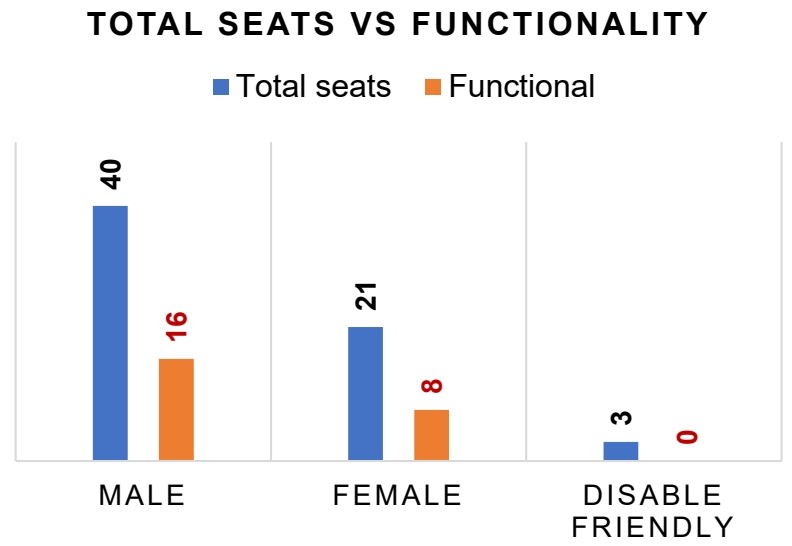
**2795** slum HH discharge grey water to storm drain

**700 HH** at high risk due to WW discharge

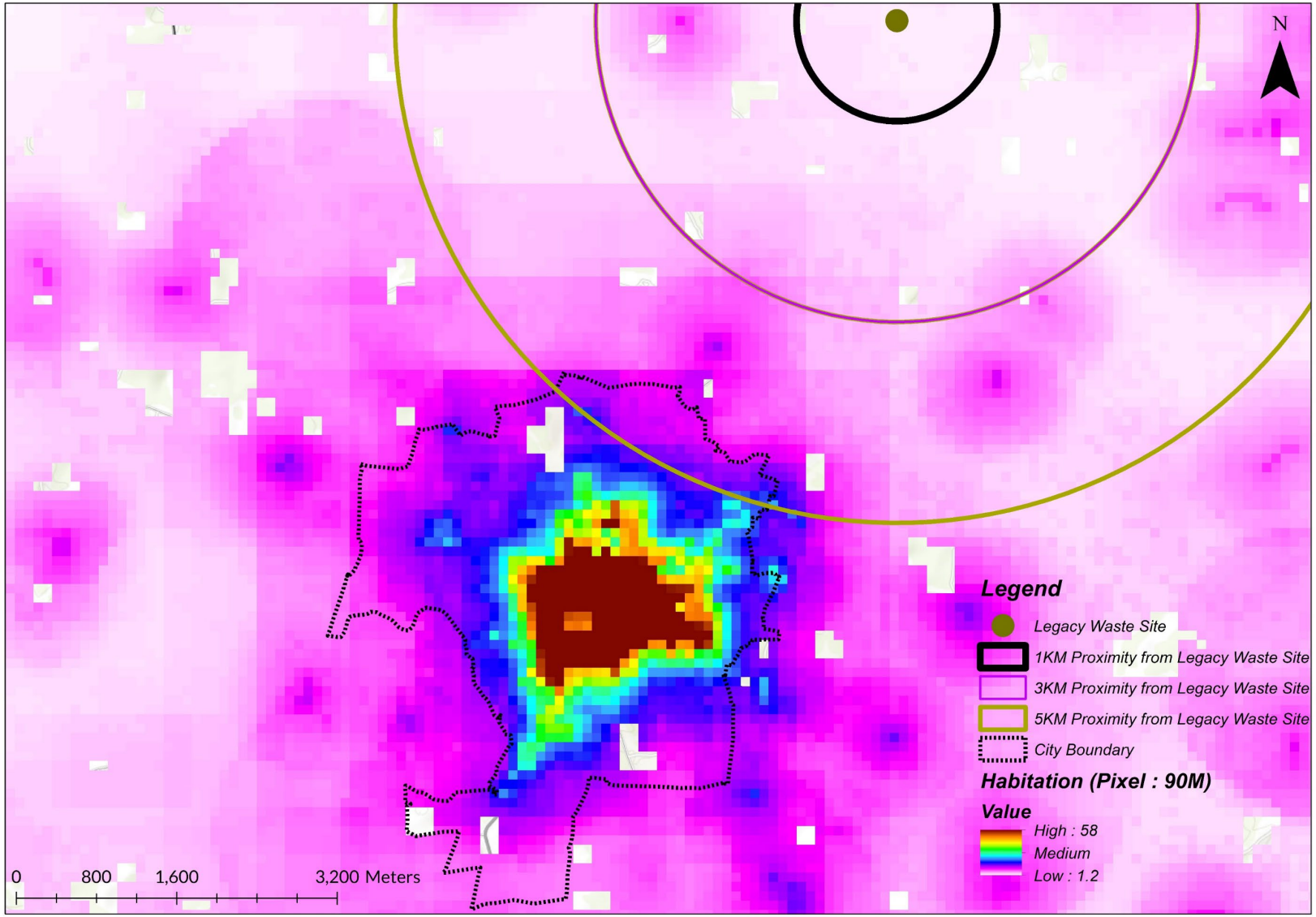
# Pubic toilet : Accessibility and Functionality




| No. | Name | Water source |
|---|---|---|
| 1 | Bengaluru Circle | Tanker |
| 2 | IB Circle | Tanker |
| 3 | RK Nursing Hom e | Tanker |
| 4 | Azad Chowk | Tanker |
| 5 | IDSMT complex | Tanker |
| 6 | Court | CMC |
| 7 | Stadium | CMC |
| 8 | KSRTC | CMC |



# Impact assessment- Legacy Waste Site



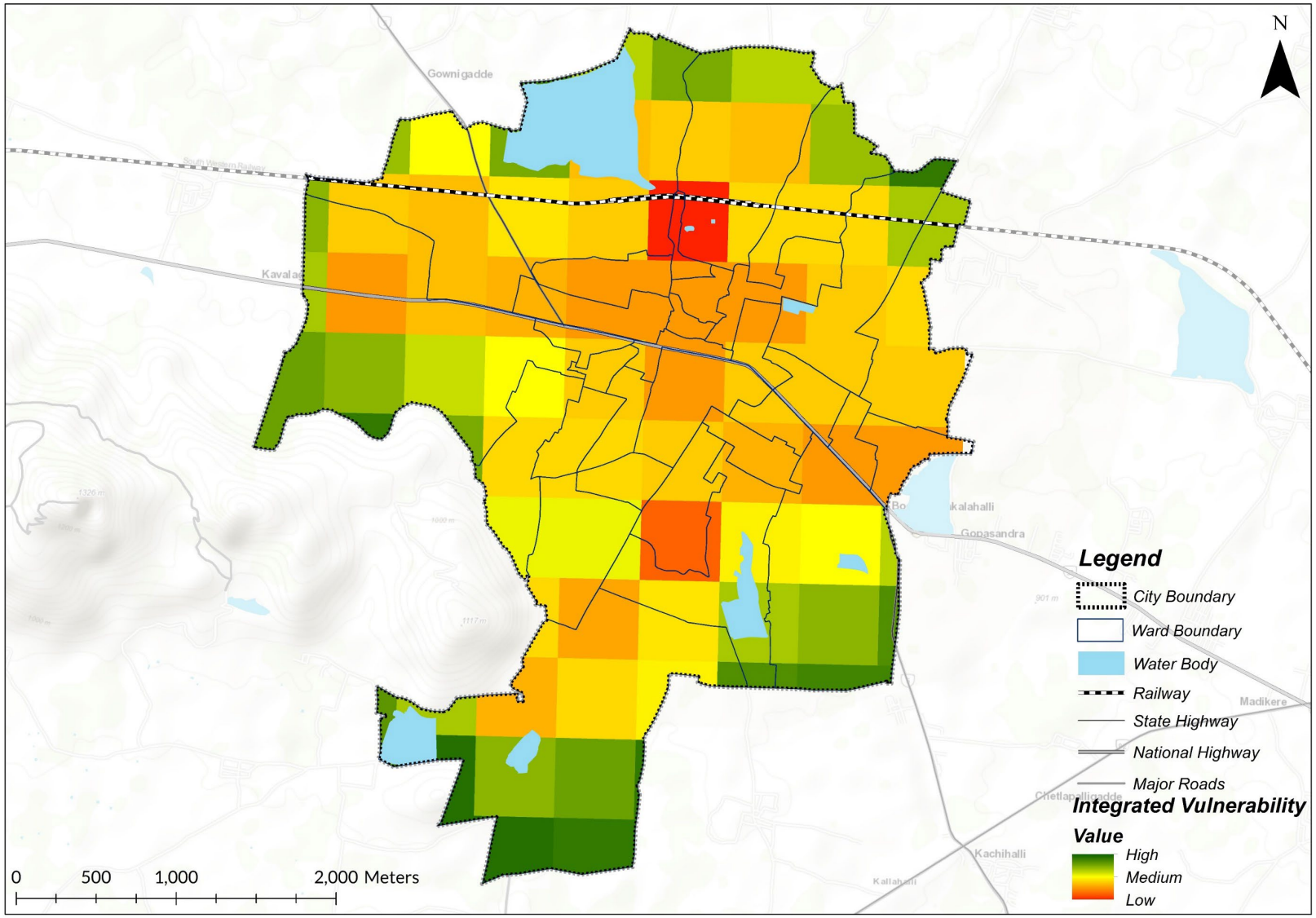

## Habitation Count

- 3-5 KM Proximity : 6232 Count
- 1-3 KM Proximity : 980 Count
- 1 KM Proximity : 46 Count

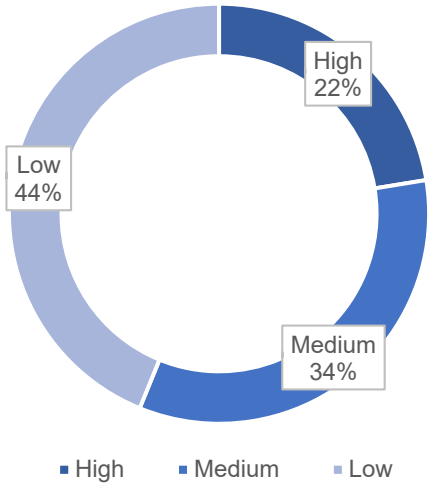
**45,000 MT** of solid waste in the last 20 years. Increasing at a rate of

**1.087 Sqkm** area in the risk area

# Climate WASH- Risk and Vulnerability



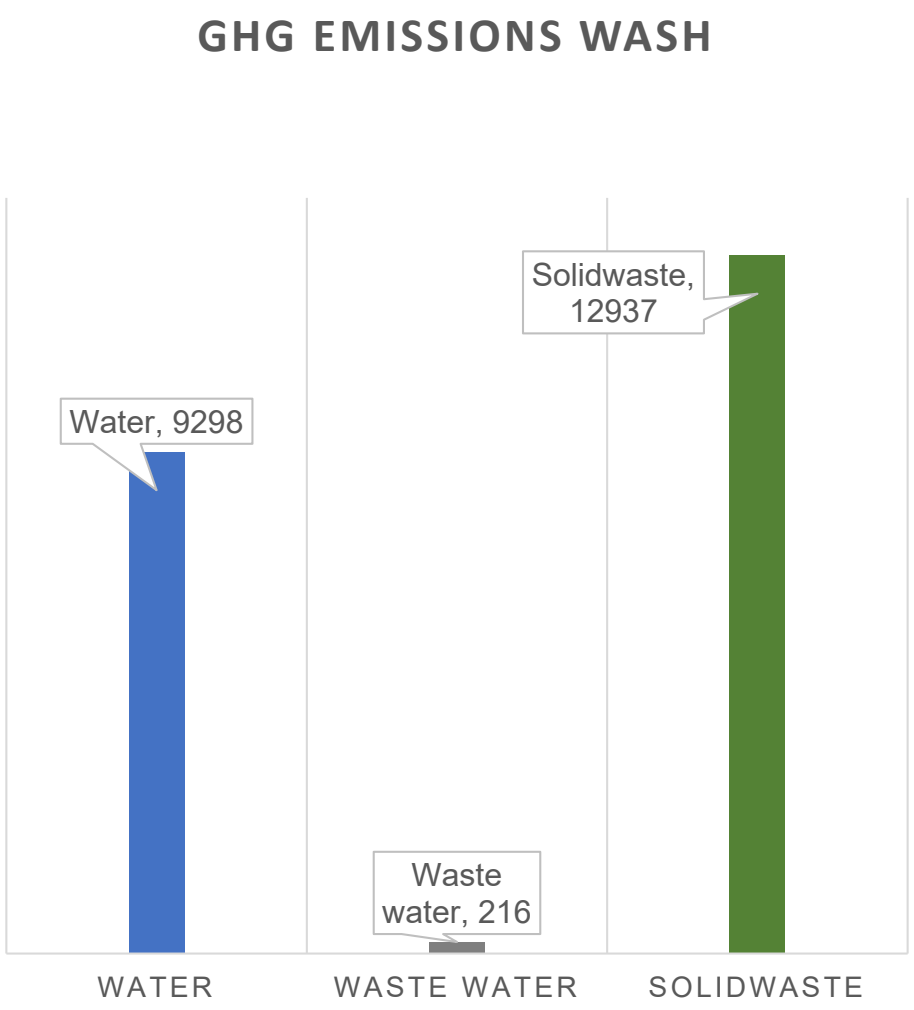

## Economic vulnerability

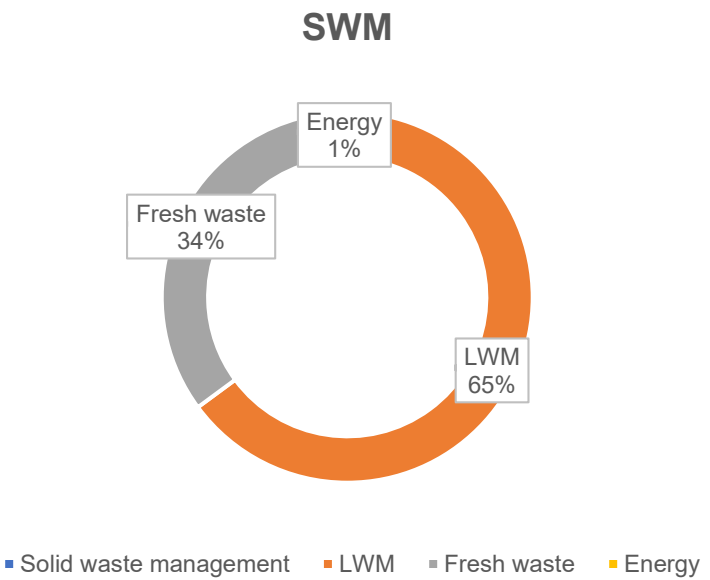


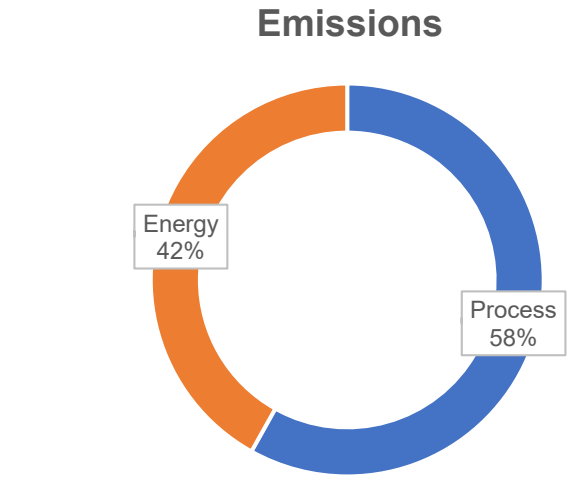

## Climate WASH risk and Vulnerability

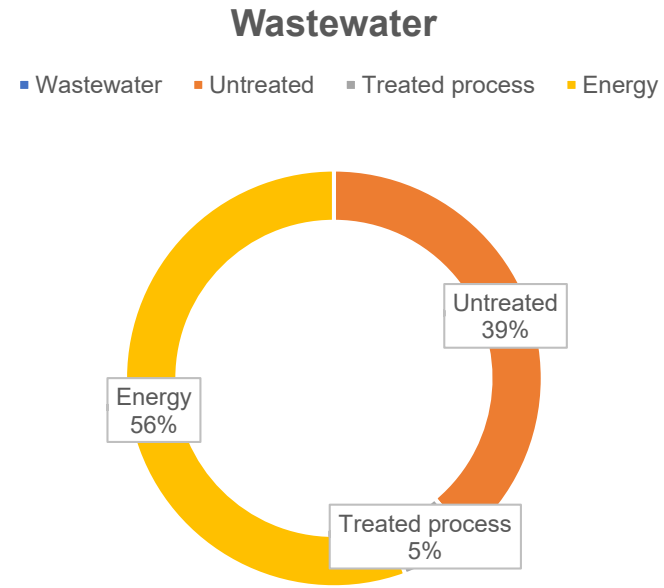
| | |
|---|---|
| High Risk | 24% |
| Medium Risk | 48% |
| Low Risk | 28% |

# GHG – WASH Analysis




## GHG EMISSIONS PROJECTIONS

| | |
|---|---|
| **2024-Baseline** | **22,451** tCO2e |
| 2050-BAU | **63989** tCO2e |
| 2050-SSP-2.45 | **7080** tCO2e |

# Our Learnings

1. More nuanced understanding-CC impact

2. Focus on adaptation, Process emissions-Mitigation

3. Changing dynamics-Plan for short-med horizon

4. Satellite data good. But, doesn't always reflect ground reality

# Questions in our mind...

High degree of urban-Rural Linkages in resource sharing.

**How to Incorporate Planning Processes?**

Complex process and resource intensive engagement.

**Any alternative?**

Small town adaptation V/s Mitigation pathways

**What's more important?**

Global SSPs and its relevance to small town

**Should we have localised development scenarios?**

# Thank You

**Global South Academic Conclave on WASH and Climate 2025**

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