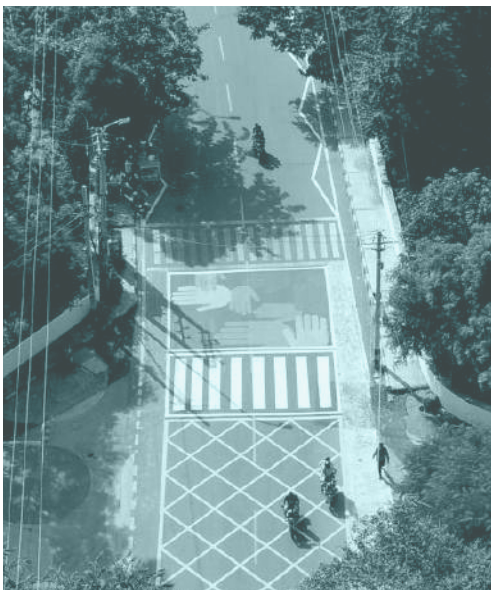
Assessing and Managing Loss and Damage for Children

Local-level evidence to inform global-level action in Udaipur, India

VOLUME I











ICLEI
Local Governments for Sustainability
SOUTH ASIA

Assessing and Managing Loss and Damage in Children

Local-level evidence to inform global-level action in Udaipur, Rajasthan, India

VOLUME I | Retrospective Loss and Damage Assessment

UN environment programme | copenhagen climate centre

supported by UNOPS

Partner:

UNEP - Copenhagen Climate Centre (CCC)

ICLEI Local Governments for Sustainability SOUTH ASIA

Transitions Research

Report submitted by:

ICLEI South Asia in partnership with Transitions Research

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Disclaimer
This document includes findings from the review of policies and plans at the National, State, and City level, largely based on the secondary background research conducted to arrive at the policy landscape that governs the loss and damage assessment in the Udaipur, Rajasthan, India and may require detailing as per the dedicated studies in the subsequent phases of the project.

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Abbreviations

AAQMS	Ambient Air Quality Monitoring Stations
ADB	Asian Development Bank
ABD	Area Based Development
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
AWC	Anganwadi Centre
AWW	Anganwadi Worker
BBB	Build Back Better
BPL	Below Poverty Line
CBOs	Community-Based Organisations
CDO	City Data Online
CDP	City Development Plan
CDPO	Child Development Project Officer
CMHO	Chief Medical & Health Officer
CRCAP	Climate Resilient City Action Plan
CRF	Calamity Relief Fund
DaLA	Damage and Loss Assessment
DDMA	District Disaster Management Authority
DDMP	District Disaster Management Plan
DDMC	District Disaster Management Committee
DEOC	District Emergency Operation Centre
DMHFW	Department of Medical Health and Family Welfare
DRR	Disaster Risk Reduction
ECCD	Early Childhood Care Development
FGDs	Focus Group Discussions
GDP	Gross Domestic Product
GEAG	Gorakhpur Environmental Action Group
GHG	Greenhouse Gas
GoR	Government of Rajasthan

Abbreviations

GoI	Government of India
GRADE	Global Rapid Post-Disaster Damage Estimation
ICDS	Integrated Child Development Services
IDI	In-depth Interview
IMD	India Meteorological Department
IRS	Incident Response System
JRDNA	Joint Rapid Damage and Needs Assessment
KII	Key Informant Interviews
L&D	Loss and Damage
LST	Land Surface Temperature
MHA	Ministry of Home Affairs
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoEFCC	Ministry of Environment, Forest and Climate Change
NCAP	National Clean Air Program
NCCF	National Calamity Contingency Fund
NDMA	National Disaster Management Authority
NDRF	National Disaster Response Fund
NELD	Non-Economic Loss and Damage
NFHS	National Family Health Survey
NGO	Non Governmental Organization
NIDM	National Institute of Disaster Management
NLCP	National Lake Conservation Plan
NPDM	National Policy on Disaster Management
OPD	Outpatient Department
PDNA	Post Disaster Needs Assessment
PHC	Primary Healthcare Centre
PHED	Public Health Engineering Department
PLA	Participatory Learning and Action
PRIs	Panchayati Raj Institutions

PWD	Public Works Department
PwDs	People with Disabilities
RCM	Regional Climate Modelling
RCPs	Representative Concentration Pathways
RHB	Rajasthan Housing Board
RINA	Rapid Impact & Needs Assessment
RNA	Recovery Need Assessment
RoW	Right of Way
RPCB	Rajasthan Pollution Control Board
RSDMA	Rajasthan State Disaster Management Authority
SAPCC	State Action Plan on Climate Change
SBCC	Social and Behaviour Change Communication
SCM	Smart City Mission
SDC	State Data Centre
SDMP	State Disaster Management Plan
SDRF	State Disaster Response Fund
SEC	State Executive Committee
STP	Sewage Treatment Plant
UCTSL	Udaipur City Transport Services Limited
UDA	Udaipur Development Authority
UMC	Udaipur Municipal Corporation
UNECLAC	United Nation Economic Commission of Latin American Countries
UNDG	United Nations Development Group
UNEP - CCC	United Nations Environment Programme Copenhagen Climate Centre
VBD	Vector Borne Diseases
WASH	Water, Sanitation and Hygiene
WB	World Bank
WS	Work Stream
WP	Work Package

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Executive Summary

The report is divided into three volumes:

Volume I: Literature review, primary data collection, system risk and vulnerability profile

Volume II: Development of Indicators, Stakeholder Engagement and Analysis

Volume III: Development of response measures, policy recommendations

This report is Volume I submission for assessing Loss and Damage (L&D) from the children's perspective. It examines policies and planning frameworks at the National, State, and City levels, alongside historical data on extreme climate events, to assess how Udaipur, Rajasthan, is managing the impacts of Loss and Damage from such events.

Key climate risks addressed include extreme heat, drought, urban flooding, and sea level rise. The report aims to identify vulnerabilities-both in infrastructure and within affected communities with a specific focus on women and children, to understand their exposure and associated risks. This stage of the study seeks to establish a baseline for Loss and Damage (L&D), which will guide future climate adaptation and management plans at the city level. In this study, loss and damage refer to climate and weather related impacts, including both extreme weather events and slow on-set events that occur despite, or beyond, existing risk reduction and adaptation efforts.

For young children (0–6 years) and pregnant women in Udaipur, loss and damage are organised across five domains:

(i) Health and Nutrition,

(ii) Education and Early Learning,

(iii) WASH and Healthy Environments,

(iv) Safety and Protection, and

(v) Cultural Identity and Social ties.

These domains capture both economic losses (for example, damage to housing, health expenditures, caregivers' income loss) and non-economic losses (for example, stress and anxiety, disruption of care, loss of safe play spaces and cultural practices) that can have long-term consequences. The methodology developed in Udaipur is designed for replication in comparable Indian and international cities.

Evidence and metrics generated across the three volumes will help Rajasthan and national authorities to:

(i) Strengthen reporting on loss and damage under relevant UNFCCC processes,

(ii) Identify and justify requests for technical assistance under global support mechanisms, and

(iii) Develop city and state-level inputs for accessing resources from the Loss and Damage Fund and complementary finance windows.

Acknowledging the Disaster Management framework within the Indian subcontinent, the report highlights that L&D assessment is governed by statutory frameworks (Acts, Policies, Plans, and Guidelines) at National, State, and District levels. The Ministry of Home Affairs (MHA) serves as the national authority for disaster finance, assisting states during disaster relief and funding transfers. At the state level, authorities such as the State Disaster Management Authority (SDMA) and District Disaster Management Authorities (DDMA) coordinate relief operations and work closely with rescue teams. In Rajasthan, city and wardlevel disaster management plans have been developed for Udaipur; however, these plans focus more on disaster preparedness and relief than on specific L&D assessment.

In this context, UNEP-CCC has commissioned a study, funded by DANIDA, to develop a city-level methodology for evaluating both economic and non-economic L&D. This study aims to inform the operationalization of the Loss and Damage Fund announced at COP28 by generating local-level evidence to support global L&D action in Rajasthan.

The report addresses several complex challenges inherent to this approach:

1. Data Collection on Slow-Onset Climate Risks: Collecting time-series data on gradual climate risks beyond disaster events.

2. Defining 'Irreparable' Loss and Damage: Identifying residual impacts that remain after adaptation efforts.

3. Assessing Non-Economic Losses: Characterizing prospective and retrospective non-economic losses, which are difficult to quantify.

4. Balancing Qualitative and Quantitative Methods: Determining the role of each method at different stages of the assessment.

Currently, post-disaster assessments of property and community damages occur after an extreme climatic event has been formally designated as a disaster zone, however, impacts on children are not taken into consideration. Traditionally, the Disaster and Loss Assessment (DaLA) framework, focused primarily on property and infrastructure damages, has been used. Recently, however, sub-national governments, with support from organizations like the World Bank, have adopted the Post Disaster Needs Assessment (PDNA) approach, which also includes non-economic dimensions like cultural heritage and livelihood related cascading losses at State and District levels.

This report discusses the approaches prevalent at scales of plans i.e. National, State, and City and also looks into climate change dimensions - future climate projections and related intensity of extreme climatic events and their implications on Children and women the L&D assessment under the five domains. The report has been structured into four (4) chapters and each one lends a unique dimension to the complex issues highlighted earlier and the process for establishing a city level L&D assessment methodology focusing on children.

Chapter 1: Introduction to Economic and Non-Economic Loss and Damage (L&D) categorizes the economic and non-economic components of L&D based on an extensive literature review, drawing on multiple sources. This categorization informs our city-specific analysis of climate-related documents, such as Climate-resilient city action plans. Establishing these categories provides focus for the approach, particularly given the lack of global consensus on what constitutes non-economic L&D and how to assign value to losses such as loss of life, mental stress, cultural practices, and heritage. This chapter also explains the rationale for selecting on Udaipur city.

Chapter 2: Scope of the Work Package outlines the project's overall scope, structured according to work packages (WP) and work streams (WS) that were developed after a detailed examination of the project requirements. It emphasizes the two work streams included in Work Package 1, which are covered in this report as part of Phase 1 activities. Phase 2 activities will be addressed in a subsequent report.

- Literature Review and Secondary Data Analysis
- Primary Data Collection
- Data Analysis
- Development of Indicators
- Development of Response Measures

Chapter 3: Ex-Post Systems Characteristics examines global and national approaches to loss and damage assessment through a comparative analysis. It summarizes relevant policies at the national, Rajasthan State, Udaipur District, and city levels, highlighting key observations. The chapter also outlines the existing process for L&D assessment, identifying key documents that provide guidance for sectoral departments to report sector-specific damages and discuss mechanisms for compensation to states from the national government.

In this report, the assessment of L&D for young children and pregnant women is organized across five interconnected domains of well-being:

- **Health and Nutrition:** Illness spikes, malnutrition, disrupted feeding and antenatal care.
- **Education and Early Learning:** Absenteeism, school closures, loss of stimulation and developmental delays.



Classification of ELD and NELD for Udaipur

- **WASH (Water, Sanitation and Hygiene):** Water shortages, contamination, unsafe sanitation, and hygiene-related risks.
- **Safety and Protection:** Increased risks of injury, neglect, exploitation, psychosocial stress, and unsafe mobility.
- **Cultural Identity and Social Belonging:** Erosion of traditional practices, reduced cultural participation, and weakened intergenerational learning.

Together, these five domains capture both the **economic losses** (health expenses, lost wages, damaged infrastructure, declining household income) and the **non-economic losses** (child distress, learning setbacks, cultural erosion, reduced dignity and safety) that shape children's and pregnant women's lived experience of climate impacts. By foregrounding these five domains, the report provides a holistic understanding of how climate extremes disrupt early childhood development, maternal health, and community resilience and why tailored, child-responsive L&D strategies are important.

The chapter outlines the ICLEI methodology for risk and vulnerability analysis, presenting a tabular matrix for a composite analysis of sectors in relation to climate hazards.

Urban heat and urban flooding are particularly significant climate hazards for Udaipur.

Chapter 4: System Risk and Vulnerability Profile examines the current exposure and vulnerability of Udaipur. This is achieved through an analysis of existing data on climate hazards, Representative Concentration Pathway (RCP) scenarios, and future projections of extreme climatic events. The chapter also completes the tabular matrix introduced in Chapter 3, mapping sectoral profiles against identified climate hazards and the resultant fragility statements.

A critical challenge highlighted in this chapter is the significant data gap, as most sector-specific information is scattered across various para-statal bodies, state departments, and municipal corporations. To address this gap, stakeholder consultations, focus group discussions, and key informant interviews will be employed in the subsequent section.

The chapter also delves into climate risks and associated impacts, summarizing findings from the literature on the following components:

1. Risks from flooding.
2. Historical impacts of extreme climatic events.
3. Current status and projected risks.
4. Impacts on transport and mobility.
5. Effects of extreme heat.
6. Health risks, including communicable diseases.
7. Social cohesion erosion, leading to heightened vulnerabilities.

The chapter concludes by presenting the current status based on data analysis of risks and their associated impacts. It outlines the way forward, detailing how activities not covered in this phase will transition into the next phase of the project.

1 Introduction

This study aims to assess current and future climate change trends and conduct a city-level vulnerability analysis while focusing on understanding the impact of climate change and climate-induced risks on key sectors related to child development.

This assessment presents a review of loss and damage aspects specific to Udaipur, drawing from policy plans, reports, and published literature, with a focus on the impacts of extreme weather events such as floods and extreme heat on children. Udaipur's vulnerability to extreme weather events such as floods and heatwaves has significant economic and non-economic impacts. Children and vulnerable communities are disproportionately affected, with severe consequences for their health, safety, and well-being.

The study encompasses five critical areas essential to their well-being: health & nutrition, education, WASH (Water, Sanitation, and Hygiene), protection, and cultural identity.

The selection was informed by studies conducted globally, across India, and specifically in Udaipur. This approach ensures a comprehensive and grounded understanding of how climate change affects children. The organisation of the categories was adapted from a study by the Gorakhpur Environmental Action Group (GEAG, 2017), with additional areas tailored specifically for Udaipur.

Rajasthan, India's largest state by area is the 7th most vulnerable state for climate risks with a vulnerability index of 0.423 (CEEW, 2021).

Udaipur being the economic and tourist hub of Rajasthan attracts nearly 2 million visitors[1] (floating population) annually. The city has experienced rapid urbanization, with its population projected to reach approximately 0.63 million in 2025 and 0.72 million by 2031[2] based on Census 2011 data and UMC projections.. Udaipur is also emerging as an educational hub, home to several universities and research institutions, further contributing to the state's intellectual capital. Within its population, children number 47,932, making up 10.63% of the city's total population (Census, 2011). Child Sex Ratio in the city is 866 females per 1,000 males and is witnessing an increase in the younger population.

UNICEF emphasizes the importance of incorporating the voices, needs, priorities, and rights of children into public policies, urban planning, and decision-making processes. The Child Friendly Cities Initiative (CFCI), led by UNICEF, supports cities and municipalities in their efforts to create child-friendly environments.

Rapid urbanization is closely intertwined with the broader mega-trend of climate and environmental crises, a complex interplay of climate change, pervasive pollution, and biodiversity loss that is already reshaping the landscapes of developing countries. These dynamics are expected to intensify, increasing

1 Udaipur Times. (2024). Udaipur tourists data 2024: Record-breaking tourist numbers. Udaipur Times. https://udaipurtimes.com/travel-and-tourism/udaipur-tourists-data-2024/cid16013888.htm

2 World Population Review. (n.d.). Udaipur, India population 2025. https://worldpopulationreview.com/cities/india/udaipur

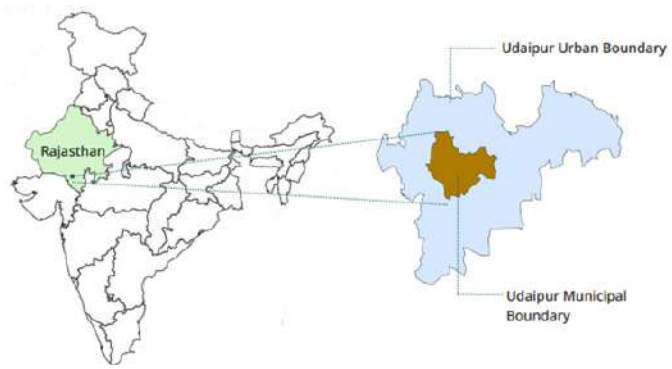
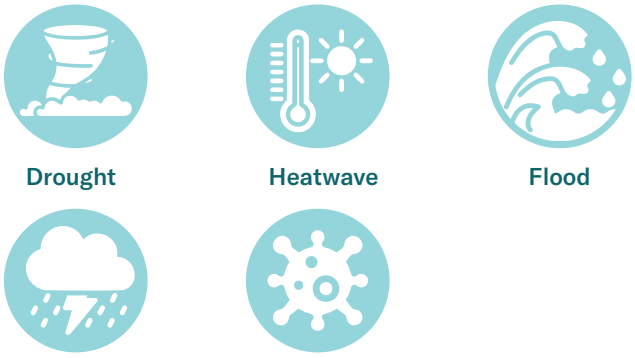


Fig1. Udaipur City locational map

Climate hazards in the state



exposure to elevated temperatures and frequent heatwaves, which pose significant risks to children's health and well-being (UNICEF, 2024). Many children will face heightened vulnerability, living in regions prone to droughts, cyclones, and floods, where access to safe water and nutritious food may become increasingly scarce.

UNICEF's State of the World's Children 2024 report underscores the urgent need to protect children's rights in this rapidly changing world. The report projects that, due to climate change, educational outcomes will be severely affected. By the 2050s, the share of children completing primary schooling is expected to decline significantly, with only one in two children completing secondary education. Additionally, more children will grow up in under-resourced settings compared to today, and the likelihood of experiencing extreme heatwaves is projected to increase by a staggering 13.5 times.

Children are particularly vulnerable to extreme climate events, lacking the resources and resilience that adults possess. Their heightened exposure to climate risks often leads to more severe and lasting impacts on their health, development, and well-being. Children's developing physiology makes them more susceptible to air pollution, and climate-induced impacts can adversely affect their physical and cognitive development.

This study aims to understand the impacts of climate change on children, focusing on sectors such as health and nutrition, education, water and sanitation, and child protection, while also assessing city-level vulnerabilities.

Note: Unless otherwise stated, population figures refer to Udaipur Municipal Corporation (UMC) limits. 'Agglomeration' figures follow UMC 2020 projections. 'Floating population' refers to non-resident tourists and short-term workers. Tourism and vehicle numbers are for the latest year of available data and are not directly additive with resident population. These conventions are applied consistently across maps, tables, and indicators.

1.1 Udaipur City | Rationale for city selection

Udaipur, situated on the bank of Lake Pichola with series of water bodies in and around the city is one of the internationally famous tourist destinations in Rajasthan that faces diverse climate related challenges making it as an potential city for assessing loss and damage.

Udaipur is facing rising temperatures and repetitive heatwaves from last few years. In May 2022, the city recorded temperatures as high as 43°C, significantly above the seasonal average. This issue is intensified because of rapid urbanization as it poses significant social, health and economic concerns.

Additionally, the city deals with intense rainfall events and flooding testing city's infrastructure and resilience. The city becomes more vulnerable in extreme climatic events due to its limited infrastructural and institutional capacities, constrained finances and growing population.

Many urban populations live in unrecognized settlements, while cities face growing demands with ageing infrastructure, leading to socio-economic losses during disasters, including flooding, diseases, and livelihood impacts. Urban poor children are most affected by climate change, prompting Loss and Damage-focused plans for Udaipur.

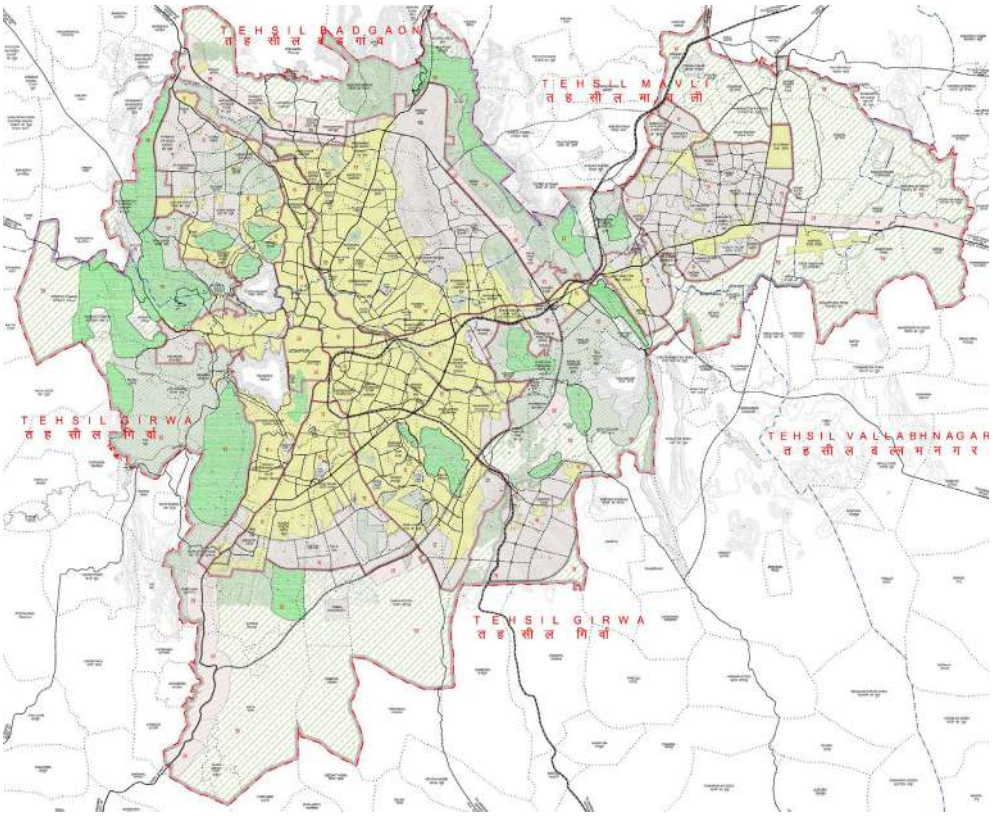
The impacts of climate change are first felt through water, and it is the urban poor children who bear the maximum negative impact. Considering the above factors, plans for Udaipur are being developed from a Loss and Damage perspective.



Map 1. Udaipur location in Rajasthan (ICLEI SA, 2024)

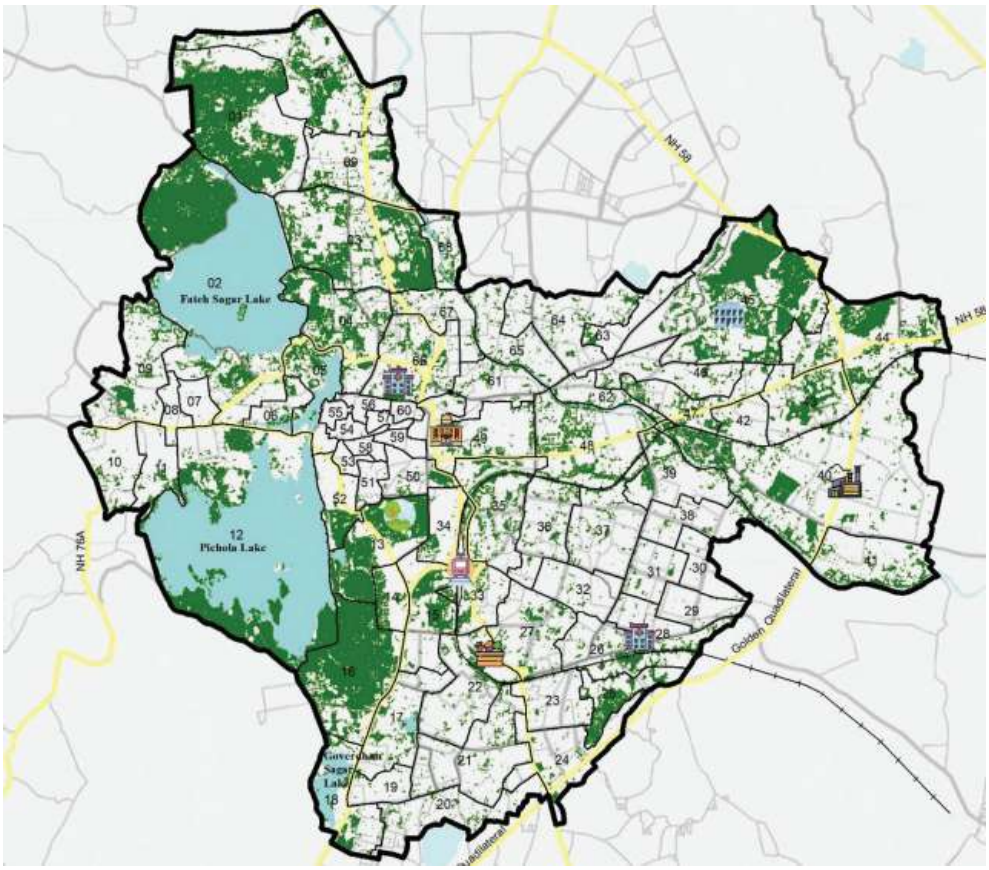
Udaipur is broadly representative of rapidly growing, tourism-dependent secondary cities in semi-arid India. Its combination of exposure to extreme heat and urban flooding, a significant share of informal settlements, and participation in initiatives such as Urban95 make it a relevant 'laboratory' for developing child-focused loss and damage metrics that can be adapted for other tier 2 cities in Rajasthan and comparable regions. This influences the design of methods and indicators, which are intended to be transferable beyond Udaipur.

Udaipur's participation in the Urban95 initiative underscores its commitment to creating child-friendly urban environments, making it ideal to undertake the study for assessment of L&D in Children. A child-centric expertise in planning that cater to the needs of infants, toddlers, and caregivers, focusing on safety, accessibility, and engagement is demonstrated in the city. Udaipur's municipal authorities have shown a proactive approach indicating a readiness to adopt innovative strategies that focus on children. The city's initiatives like CRCAP align with sustainable development goals, emphasizing the creation of resilient urban spaces that can adapt to climate challenges.



Map 2. Udaipur Urban Area Map 2031 (Udaipur Development Authority, UDA 2013)

*Udaipur city comprises **47,932 children**, constituting **10.63%** of the city's population.*



Map 3. Udaipur City with tree cover in the city (ICLEI, 2023)

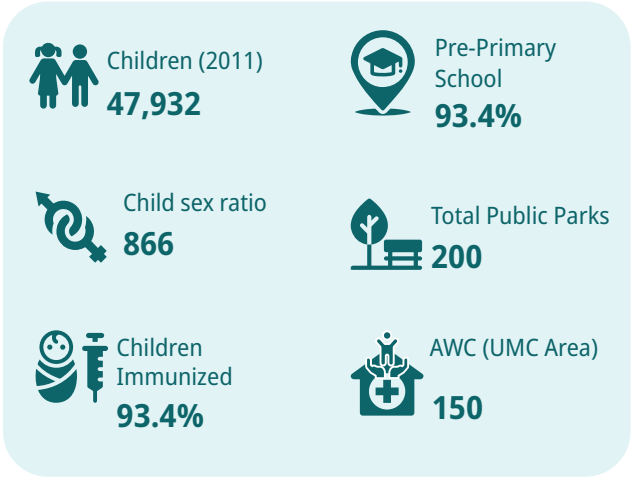
1.2 City Profile

Udaipur, one of India's oldest cities, is renowned as the "City of Lakes." Founded by Maharaja Udai Singh in 1559 as the capital of the Mewar kingdom, the city holds historical significance and continues to be a cultural hub. Established as a municipality in 1922, Udaipur was elevated to the status of Udaipur Municipal Corporation (UMC) in April 2013. In 2015, Udaipur was among the first 20 cities selected under the Government of India's Smart City Mission (SCM), reflecting its importance in urban development.

The vision for Udaipur Smart City is "Eternal Udaipur: World's favourite Lakeside Heritage City." The initiative aims to modernize essential service infrastructure to enhance the quality of life for residents while preserving its iconic lakes and cultural heritage. Additionally, the city seeks to boost investment and tourism through smart city projects, ultimately strengthening the local economy and positioning Udaipur as a leading destination for heritage and modern urban living.

Udaipur, covering an area of 64 square kilometers, serves as the administrative capital of the district and is the only municipal corporation within it. The city is divided into 70 election and revenue wards, located between 24°28'49" and 24° 42' 56" N latitudes and 73°36'51" and 73° 49' 46" E longitudes, with an altitude of 598 meters above mean sea level. Surrounded by hills and lakes, Udaipur's growth is currently concentrated towards the northeast and west, along National Highways NH8 and NH76.

Over the past two decades, Udaipur has experienced significant development due to the establishment of industrial, administrative, and educational centers. Known for its rich history, culture, and scenic beauty, Udaipur is a major tourist destination, famed for its Rajput-era palaces and being the "City of Lakes." Its sophisticated lake system includes five major lakes - Fateh Sagar Lake, Lake Pichola, Swaroop Sagar Lake, Goverdhan Sagar, and Doodh Talai Lake - making it a symbol of natural beauty and architectural grandeur.



Area of Udaipur
64km²

Population
4,51,100
(UMC Census 2011)

Literacy Rate
80%

Sex Ratio
928

Geographical Coordinates
La 24.57; Lo 73.69

Climate
Tropical

Density
7,048

Household
94,704

Wards
70

Major languages
Hindi, Mewari

Average Annual Rainfall
637mm

AQI
70-200

Fig2. UMC-Udaipur City Profile 2019-20, Census 2011, NFHS-4, RMRS Health Bulletin 2020-21

1.2.1 Economic Activities

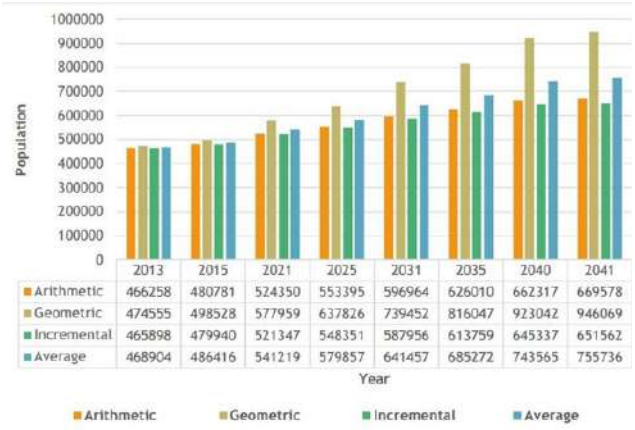
Udaipur, the regional headquarters for five districts in southern Rajasthan, hosts key state and regional offices—from the Director of Mines & Geology to the Commissioners of Excise and Tribal Area Development—alongside major PSUs like Hindustan Zinc Ltd. and Rajasthan State Mines & Minerals. Its diverse economy spans tourism, trade, and industry; the city also functions as an educational hub with three universities, six colleges, and 160 + high schools. Wholesale markets for grains and building materials support surrounding towns, while the Udaipur Development Authority plans a new sub-city center to ease commercial pressure on the historic core. Tourism remains robust, with 1.53 million visitors in 2022 and a 23 % rise in 2023, straining infrastructure and underscoring the need for strategic planning. Industrial activity clusters in areas such as Gudli, Madari, Sukher, and Mewar IT Park, focusing on mineral processing, manufacturing, chemicals, and pharmaceuticals; prominent players include Vedanta Hindustan Zinc, Wonder Cement, and the Udaipur Marble Association.

S.No	Urban Infrastructure Service	Planning, design & Implementation	Management & maintenance
1	Water Supply	PHED	PHED
2	Sewerage	UMC/ UIT/ PHED	UMC/ UIT/ PHED
3	SWM and Drainage	UMC	UMC
4	Urban Transport	UMC	UMC
5	Street Lighting	UMC/ UIT	UMC/ UIT
6	Environment Protection	RPCB	RPCB
7	Urban Poor Settlements	UMC, UIT	UMC, UIT

1.2.2 Demographics

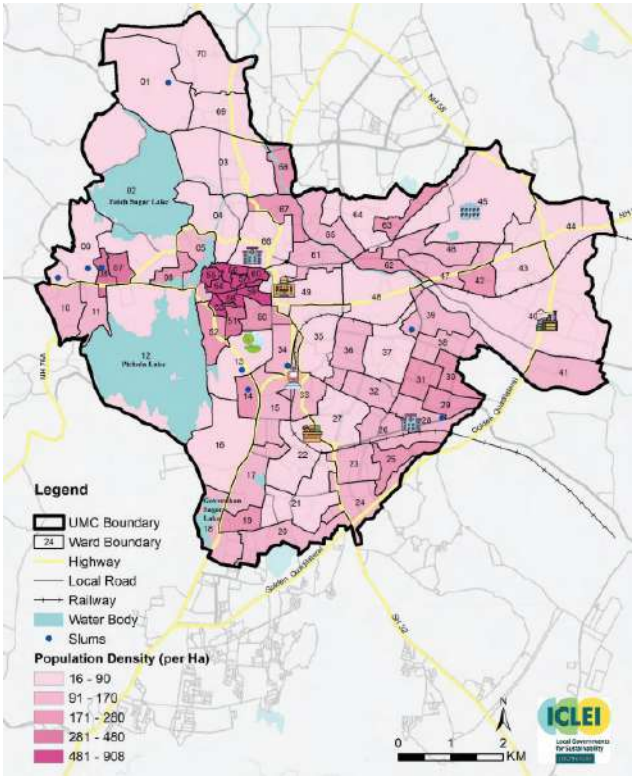
The population of Udaipur city is 451,100 (total 233,959 males and 217,141 females) as per census 2011. As per UMC present population of Udaipur Municipal area is approximately 0.5 million. As per the CDP the city has witnessed considerable population growth in the last four decades while acting as a major economic hub for the surrounding region. The growing economy and growing tourism sector have attracted both urban as well as rural populace. The city has witnessed high growth rate during 1971-1981 and 1981-1991. The decadal growth rate from 2001 to 2011 was 15.83% which is near to the natural growth rate of the population. It has reduced from previous decades, due to growth of outer peripheral areas. The population density of Udaipur city is 7,048 persons per sq. km as per Census 2011. The floating population of the city is 16,000 as per 2011 census. Udaipur has now become a renowned major tourist destination of India, as per the Tourism Progress Report 2019-20 prepared by Tourism Department Rajasthan 11,36,947 national and international tourists visited Udaipur in 2018. Historical tourism data of the decade 2011- 2020 shows that the overall tourist population has grown by 40% with an average growth rate of 6% annually.

The projected population for Udaipur city in 2021 (based on 2011 population) is estimated to be 0.54 million (5.41 lakhs) and 0.64 million (6.41 lakhs) in the years 2031.



	2013	2015	2021	2025	2031	2035	2040	2041
Arithmetic	466258	480781	524350	553395	596964	626010	662317	669578
Geometric	474555	498528	577959	637826	739452	816047	923042	946069
Incremental	465898	479940	521347	548351	587956	613759	645337	651562
Average	468904	486416	541219	579857	641457	685272	743565	755736

Table 1. Population growth and Projection for Udaipur City Agglomeration (UMC, 2020)



Map 4. Population density map of UMC highlighting identified slum locations (CRCAP Udaipur 2024)

1.2.3 Air Quality

The major sources of air pollution in Udaipur are vehicular emission, road dust, construction activities, industrial emissions etc. PM10, PM2.5 and SO2 has been identified as main air pollutants as these are found to be above the prescribed national standards. This indicates that the air is harmful and may bring discomfort to children, elderly people and people with heart diseases and lung diseases such as asthma. This is mainly due to re-suspension of road dust, emission from vehicles, D.G. sets, construction activities, open burning of solid wastes (sometimes), transportation of construction materials such as 18 sands, soil etc. without covering and emission from industrial areas situated in and around Udaipur (Madri and RIICO), emissions from marble mining and cutting.

According to the recently released figures by RSPCB for first six months of 2018, the level of pollution in Madri Industrial area of Udaipur was much higher than Delhi from February 2018 to May 2018. It has also been noted that in the industrial area, the level is three times higher than normal and it can be extremely harmful to the inhabitants of these areas. NO2 also has been observed at an alarming level. This is mainly due to vehicular emissions. Plying of old vehicles and traffic congestion causes higher level of NO2. It has been observed that air quality of Udaipur during winter season becomes very poor & severe due to condensation of fine particulate matter in the lower portions of the atmosphere. AQI level of Udaipur range in between 70 to 200, which is in moderate range as per the NAQI level CPCB.

1.2.4 In-migration

Additionally, Udaipur experiences seasonal migration of families with young children from surrounding villages and districts, as they seek employment opportunities in various sectors, including construction, Watchmen role in industries and residential apartments, marble cutting and polishing, and domestic work. Many of these families move to the city temporarily to secure livelihoods during peak work

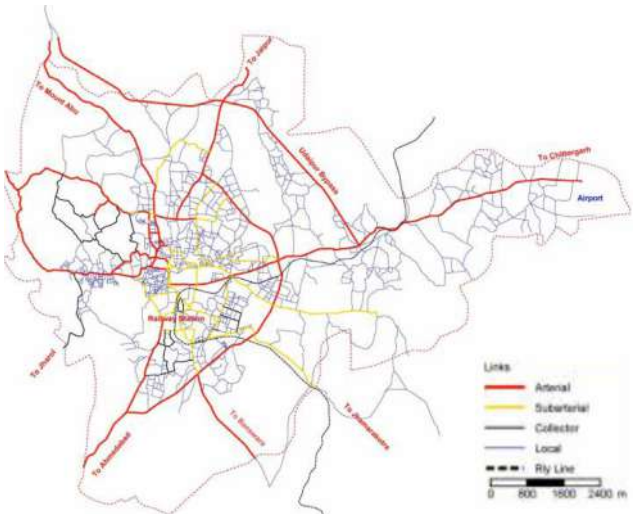
In many cases, young children accompany their parents and live with their caregivers at the work sites. However, for families residing in slum areas, the situation can be different. In these cases, children often remain at home, where older siblings assume the responsibility of caring for them. This dynamic can pose challenges for both the children's welfare and the ability of families to balance work and family obligations, as older siblings may be required to forgo education to fulfil caregiver duties. As a result, this seasonal migration phenomenon has significant implications for the health, education, and overall well-being of young children within these families..

1.2.5 Road Network

Udaipur has 11 arterial roads and 26 sub-arterial roads, connecting the major residential areas to other areas of the city. A major road in the city includes Hathipole, Surajpole, Delhi Gate Chauraha, Udaipole Chauraha, and Chetak Circle. Most of these roads cater to Intra and inter-city traffic and have high vehicular movement. About 5% of road length has over 35 M right of way (ROW), 14% has ROW of 20 M to 30 M, 56% has ROW between 10 M to 20 M, and the rest 23% roads have ROW below 10 M.

Road Category	Length (KM)	Width of the road (Mt)	% to Total
Arterial Roads (NH, SH)	85	30 to 50	4%
Sub Arterial Roads	223	20 to 30	16%
Collector roads	365	15	18%
Other roads	912	10	62%
Total length of the Roads	**1585**		**100%**

Table 2. Road Network, Udaipur (Interim CDP, Udaipur 2014)



Map 5. Road Network, Udaipur (Interim CDP, Udaipur 2014)

1.2.6 Vehicular Growth

Number of registered vehicles in Udaipur has increased from 290567 in 2001- 11 to 571350 in 2015- 16, i.e., an average growth rate of 7% per year, which is lesser than the country's vehicular growth rate. Among these, 2 wheelers constitute about 78% of total registered vehicles. Cars constitute 9% while buses constitute only 1% of the total registered vehicles.

S. No.	Type of Vehicle	2016-17	2017-18	2018-19	2019-20
1	**Goods Vehicles** (Truck, Lorries, Tanker, 3-wheeler, E-rickshaw with cart)	2372	1704	2023	1936
2	**Passenger Vehicles** (Buses, Cars, Taxi cab, School bus, Ambulance, Jeep, 3-wheeler auto-rickshaw, E-rickshaw)	2586	11454	11704	11709
3	**2-wheeler** (Motorcycle, Scooter, Mopeds)	54507	54643	64160	64077
4	**Tractor**	1132	1448	1347	1601
5	**Trailer**	-	20	2	3
6	**Others** (JCB, Crane, Loader etc)	264	1189	1198	663
	Total	**60861**	**70460**	**80434**	**79989**

Table 3. Year-wise vehicle population in Udaipur (Vahan data only), (RTO Udaipur, March 2020).

1.2.7 Main Urban Services in Udaipur & Responsibility Matrix

SN	Urban Infra Service	Planning & Design	Organization & Management	Policy Making	Regulation
1	Water Supply	PHED	PHED	GoR	PHED
2	Sewerage	UMC/UDA/PHED	UMC	GoR	UMC
3	SWM & Drainage	UMC	UMC	GoR	UMC
4	Urban Transport	UMC	UMC	GoR	UMC
5	Street Lighting	UMC/UDA	UMC/UDA	GoR	UMC/UDA
6	Environment Protection	RPCB/UMC/UDA	RPCB/UMC/UDA	GoR/ MoEF	RPCB
7	Urban Poor Settlements	UMC/UDA	UMC/UDA	GoR/ GoI	UMC/UDA
8	Women and Children Health	DMHFW	DMHFW/UMC/UDA	GoR	DMFHW
9	ECCD	ICDS/DMHFW	ICDS/DMHFW/UMC	GoR/ GoI	ICDS

Table 4. Key Urban Services in Udaipur and Responsibility Framework

2 Scope of Work Package

2.1 Objectives and activities

Objectives of the Study

1. Assess the economic and non-economic loss and damage experienced by children in selected areas due to climate-related extreme and slow-onset events.
2. Identify the specific vulnerabilities and needs of children in relation to climate-related loss and damage.
3. Develop response measures to address the economic and non-economic loss and damage experienced by children, including measures for prevention, mitigation, and rehabilitation.
4. Link the findings to the Loss and Damage Fund to ensure financial and policy responses are effectively targeted.
5. Develop indicators for measuring the effects on children to enhance transparency in reporting and monitoring.
6. Provide input to the Santiago Network and the Warsaw International Mechanism (WIM) on the importance of addressing the effects on children.

Theory of Change

The study assumes that if robust qualitative and quantitative evidence on child specific loss and damage is generated at city level, and if this evidence is translated into practical indicators and response options co developed with local and state actors, then authorities will be better able to integrate children's needs into climate and disaster planning and to articulate support and finance needs to national and international mechanisms.

To support this,

Volume I establishes the baseline and system profile;

Volume II co creates and validates indicators through stakeholder engagement; and

Volume III converts findings into response measures, investment priorities, and inputs for national reporting and engagement with the Loss and Damage Fund and other support channels.

I. Literature Review and Secondary Data Analysis

- Conduct a comprehensive literature review on the impacts of climate change on children, focusing on economic and non-economic loss and damage.
- Analyse existing data and reports on climate-related events and their impacts in the selected regions, including data from government agencies, non-governmental organizations, and academic institutions.

II. Primary Data Collection:

- Conduct household sample surveys 3and focus group discussions with children and their families in the selected region to gather data on their experiences of economic and non-economic loss and damage due to climate-related events.

- Use participatory methods like community mapping and storytelling to capture children's perspectives and experiences.
- Engage with local stakeholders, including government officials, civil society organizations, and community leaders, to understand their perspectives and priorities.

III. Data Analysis

- Analyse the collected data using both quantitative and qualitative methods to assess the economic and non-economic loss and damage experienced by children.
- Identify the specific vulnerabilities and needs of children in relation to climate-related loss and damage, considering factors such as age, gender, disability, and socioeconomic status.

IV. Development of Indicators

- Develop a set of indicators for measuring the economic and non-economic effects of climate-related loss and damage on children.
- Ensure these indicators are disaggregated by age, gender, disability status, socioeconomic status, and geographic location to capture the disproportionate impacts on different groups of children.
- Include both quantitative indicators (e.g., mortality rates, malnutrition prevalence) and qualitative indicators (e.g., children's perspectives and experiences) to capture the multidimensional impacts of climate events on children.
- Involve children, communities, and local stakeholders in the development and monitoring of these indicators to ensure they are culturally appropriate, inclusive, and aligned with local priorities.

V. Development of Response Measures

- Based on the findings from the data analysis, develop a comprehensive set of response measures to address the economic and non-economic loss and damage experienced by children.
- The response measures should include strategies for prevention, mitigation, and rehabilitation, and should consider both short-term and long-term interventions.
- Engage with local communities, stakeholders, and policymakers to ensure the response measures are inclusive, culturally appropriate, and aligned with local priorities.
- Link the response measures to the Loss and Damage Fund to ensure targeted financial and policy responses.

3 Ex-post System Characteristics

3.1 Global, National & State Policy Linkages for Child-Centered Loss & Damage Assessment

Loss and Damage (L&D) assessments in India and globally are largely disaster-focused, and oriented toward infrastructure, economic losses, and sectoral recovery, rather than the lived experiences of children and vulnerable groups. International methodologies, such as

- Damage and Loss Assessment (DaLA),
- Post Disaster Need Assessment (PDNA),
- Recovery Need Assessment (RNA),
- Global Rapid Post-Disaster Damage Estimation (GRADE), and
- Rapid Impact & Needs Assessment (RINA)

provide structured approaches for calculating damages, economic losses, and recovery needs, but they have limited mechanisms for capturing household-level, social, psychological, or developmental impacts on children.

India currently uses DaLA and PDNA, with the PDNA tools being recently adapted by NIDM for Indian conditions, yet these too have minimal integration of child-specific metrics or non-economic dimensions like learning loss, protection risks, or cultural disruption. Some dimensions such as educational impact are mandated to be collected as socio-economic impact assessment as per the data reporting templates.

At the **National Level**, the Disaster Management Act (2005) and National Policy on Disaster Management focus on prevention, preparedness, response, and relief, with emphasis on structural mitigation, minimum standards of relief, and "Build Back Better".

However, these frameworks do not explicitly define Loss and Damage nor do they mandate city-level L&D assessments or require disaggregated assessments for children, pregnant women, or marginalized groups.

The **Rajasthan State Disaster Management Act and Plan (SDMP 2014)** provide a broader risk governance framework, identifying vulnerable populations, including children, but still treat L&D primarily as post-disaster damage and needs assessments (housing, livelihoods, infrastructure). Although the SDMP recognizes social sectors like health, nutrition, education, and cultural heritage in the PDNA structure, the assessment practice remains for overall population and infrastructure-centric, with limited mechanisms for quantifying non-economic loss and damage relevant to children (psychosocial stress, service disruption, developmental delays).

At the **district scale**, the **Udaipur District Disaster Management Plan (DDMP 2024–25)** identifies multi-hazard risks, particularly floods, droughts and extreme heat and acknowledges vulnerable groups including children and pregnant women. Preparedness, mitigation and early warning components are strong, but L&D is still viewed through immediate impacts and post-disaster reconstruction rather than slow-onset, climate-induced, cumulative impact that children face, such as malnutrition, school discontinuity, or cultural identity loss.

Key Takeaways from the policy framework:

- L&D is seen primarily as economic damages and sectoral losses after disasters (infrastructure, agriculture, livelihoods).
- National and state systems rely on DaLA/ PDNA methodologies, are not designed to capture city-level ELD/NELD or child-specific vulnerabilities.
- Non-economic losses, such as trauma, learning loss, disruption of care, or loss of cultural identity, are not well accounted for in existing frameworks.
- City-level L&D assessments are not mandated, resulting in major data and governance gaps.

Child/Health or Social Provisions

- Children, pregnant women, and vulnerable groups are mentioned in relief guidelines (minimum standards of relief, special provisions), but no child-centered L&D methodology exists.
- Health, Education, WASH, are recognized in PDNA sectors but impact on children is not disaggregated or operationalized through indicators.
- The DDMP identifies children as vulnerable, yet L&D measurement does not extend to service disruption, developmental effects, or non-economic harms relevant to children.

Note: A comprehensive overview of the global, national and sub-national policy frameworks, including their objectives, core focus areas, institutional responsibilities, operational guidelines and relief mechanisms is provided in the annexure.

S. No.	Level	Instrument
1	Global	Post-Disaster Needs Assessment (PDNA)
2		Damage & Loss Assessment (DaLA)
3		GRADE / RNA / RINA (Rapid tools)
4	National Level	National Disaster Management Act, 2005
5		National Policy on Disaster Management (NPDM), 2009
6	State Level	Rajasthan State Disaster Management Act, 2005
7		Rajasthan State Disaster Management Plan (SDMP), 2014
8	District/City Level	District Disaster Management Plan (DDMP)
9		City CRCAP, Smart City Mission, Urban95

How L&D is Treated	Child / Health Provisions	Implications for L&D for Children
Comprehensive assessment of sector wise damages, economic and non-economic losses and long-term recovery needs. Uses multi-sector and household-level approach	Explicit sectors: Health, Education, Cultural/Tourism; identifies vulnerable populations (women, children, socially excluded)	Need child-disaggregated PDNA templates for AWC/health facilities/ school closures/learning loss/ health expenditures; ward-level PDNA reporting
Focus on asset loss and flow loss valuation; Economic focus on infrastructure & productivity reduction	No dedicated child-specific or social vulnerability components	Expand valuation to include nutrition cost increases, childcare time loss, safe play space damage; develop methodology for caregiver income loss
Rapid estimation methodologies for emergency response; Short-term prioritization	Considers population groups needing priority safety support during emergencies	Requires rapid-reporting indicators such as medical cases in children during heatwaves, displacement numbers, school disruption hours
Guides relief, response, rehabilitation & reconstruction; Mandates state/district responsibilities	No explicit reference to children's needs; Absence of L&D assessment mandate; Limited recognition of heat	Strengthen recognition for L&D beyond disasters; Develop protocols for slow-onset heat/air pollution/Water crises affecting children and pregnant women
Includes recovery, livelihood restoration, Build Back Better (BBB)	Mentions vulnerable groups (women-headed households, artisans, informal workers); Indirect benefits for child well-being	Enable framework to justify funding for nutrition services, mobile health, school resilience, psychosocial care
Establishes state and district institutional roles; Emergency relief responsibilities	Acknowledges participation of communities and vulnerable groups	Introduce ward-level reporting templates aligned to child domains; clarity needed on institutional ownership
Uses PDNA for disaster-recovery sectors; includes social, productive & infrastructure sectors	Explicit coverage of Health, Nutrition, Education & Cultural Heritage	Requires age-disaggregated indicators, integration of WASH and safety data at UMC/ward levels; standard reporting lines across ICDS/Health/Education
Relief-centered; Response protocols for floods, heat and emergency support.	Limited focus on L&D and none on non-economic losses; No focus on children	Institutionalize L&D data flows across ICDS, schools, PHC/CHCs, and UMC; Track indicators: AWC access hours lost, OPD load for child illness, child displacement, child safety incidents
Climate-vulnerability mapping & resilience planning	Recognises caregivers and urban poor; Supports safe mobility, public spaces & services for infants, toddlers & caregivers	Use existing vulnerability datasets to generate ward-level L&D dashboards, integrate nutrition and education disruptions, link PDNA logic to local planning

Table 5. Disaster and loss-and-damage instruments and their relevance for city level, child focused loss and damage

3.2 Economic and Non-Economic Losses

The analysis further delves into the economic and non-economic impacts of disasters on these cities, with a particular emphasis on capturing a broad spectrum of loss and damage. The report utilizes Loss and damage resulting from natural disasters or climate change can be categorised into two main types: economic losses and non-economic losses.

Economic losses (ELD) refer to tangible damages that can be quantified in monetary terms, including damage to infrastructure, loss of property, and decreased productivity.

Non-economic losses (NELD) are distinguished by their irreversible nature, which indicates that they cannot be entirely repaired or compensated for with monetary means. Non- economic losses encompass intangible impacts, such as loss of life, displacement, psychological trauma, and cultural heritage damage.

These losses frequently have substantial and long-term consequences for individuals, communities, and nations, far beyond the immediate aftermath of a disaster. While economic losses may be assessed and compensated for, non-economic losses present unique challenges due to their subjective and multifaceted nature.

The significance of resolving non-economic losses is a challenge due to the absence of a standardised technique for quantifying and managing these impacts. Despite their serious repercussions, non-economic losses are overlooked in disaster response and recovery efforts. By developing strategies to effectively manage and mitigate these losses, communities can better address the holistic impacts of disasters and improve overall resilience.



Rather than focusing simply on monetary reparations for previous episodes of loss and damage, the proposed technique creates strategies for the effective management of non-economic losses. Managing non-economic losses necessitates a multifaceted strategy that covers both current demands and long-term resilience-building activities. This includes recognising vulnerabilities, taking preventive actions to lessen the likelihood and severity of future events, offering support and assistance to impacted communities, developing social and institutional resilience, and fostering community empowerment in order to cope with and recover from the intangible impacts of disasters.

By reviewing existing policies and frameworks, this report aims to identify gaps in current assessments and offer insights into city-specific vulnerability metrics and risk profiles.

Additionally, this report also presents the stakeholder engagement processes the team is planning to take in the subsequent steps of the project. The engagement plan focuses on methodologies like Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) to better understand local perspectives. Through the engagement and thematic analysis of the data collected, in the next steps of the project, the team aims to develop a contextual set of loss and damage metrics for the two cities, with evidence from the ground.

Impacts of Climate Change

Slow Onset Events

- *Rising Temperature*
- *Sea level rise*
- *Loss of Biodiversity*

Extreme Weather Events

- *Drought*
- *Flood*
- *Heatwave*
- *Cyclone*

*By 2050, the risk of exposure to extreme heat waves among children is projected by UNICEF to be **13.5 times higher.***

*Business as usual scenario predicts about **eight times as many children are projected** to live in countries at **high risk** of exposure to **extreme heatwaves** by **2050.** (UNICEF SOWC, 2024)*

3.2.1 Existing official process for estimating Loss and Damage

Assessment of losses and damages

Once a disaster is announced, the first step is to coordinate rescue and relief operations. The team on the ground, whose size and composition are determined by the magnitude of the disaster, collects damage-related data.

Once the disaster ends, the revenue department and disaster management officials at the district level verify the information and upload it to the centralised National Disaster Information Management System.

The state disaster management authority reverifies the information and calculates the economic value based on the Norms of Assistance, a Central document which assigns values to different losses, to avail funding from the state disaster relief fund and the state government's budget.

If there is a gap in funding, they prepare a memorandum to close the gap with funding from the National Disaster Relief Fund. It is subject to approval by a central team that revisits the data.

In the case of slow-onset extreme events like drought, agencies monitor its onset by looking at precipitation and soil moisture levels. After the onset, district and panchayat level teams create seed, fodder banks and create jobs under Mahatma Gandhi National Rural Employment Guarantee Act 2005.

When state decides that the existing mechanism is unable to handle disaster management operations, international agencies like World Bank are roped in to carry out Joint Rapid Damage and Needs Assessment.

3.2.2 Slow-onset loss and damage for young children

Young children and pregnant women in Udaipur are affected not only by discrete disasters but also by slow onset climate processes, such as gradually rising temperatures, deteriorating air quality, and recurring periods of water scarcity. These processes contribute to chronic under nutrition, increased respiratory and vector borne disease burdens, learning interruptions, and heightened stress within households.

The study therefore treats slow onset processes as part of loss and damage and proposes to track them through time series indicators (for example, heat index days during pregnancy, long term under nutrition trends, and outpatient visits for respiratory illnesses) and qualitative narratives, which will be developed in Volumes II and III.

Use of robust tools

In 2018, India for the first time, used the post-disaster needs assessment tool for the Kerala floods, which had already been used across the world since 2008. In 2019, cyclone Fani in Odisha was the second disaster that used this tool. A post-disaster needs assessment has been undertaken for the Assam floods of 2022 as well.

It replaces an accepted tool called damage, loss and needs assessment, which focuses on physical infrastructure and not on social sectors. In India, the Bhuj Earthquake of 2001 and tsunami of 2004, used damage, loss and needs assessment for funding from the World Bank.

Besides analysing immediate damage, a post-disaster needs assessment, carried out along with international agencies such as World Bank, looks at macro-economic costs such as the impact of the disaster on the local economy. It has a third component that looks at improving the resilience of the region.

In 2019, India released a manual for this assessment, and this year at least eight states are using it for floods. The country plans to migrate to this tool for all kinds of disasters over the next three years.

Precedent:

The Kerala floods 2018, cyclone Fani in Odisha in 2019 and Assam floods of 2022 used the **Post-Disaster Needs Assessment tool** for assessing the impact of the disaster and improving resilience.

Fund compensation

While the disaster is underway, only relief is provided. All compensation occurs post-disaster. Each state has a disaster relief fund, which is financed by the Union Ministry of Home Affairs, and the respective state/UT budget. The amount and the Centre-state share is decided by the Finance Commission.

State relief funds are allocated money based on a combination of capacity (as reflected through expenditure), risk exposure (area and population) and hazard and vulnerability risk index.

The Fifteenth Finance Commission (2021-26)[1] allocated a total of ₹1,60,153 crore for disaster management, with the Centre contributing ₹1,22,601 crore. This fund is disbursed annually in six instalments to state funds, addressing issues like urban floods and landslides. States may provide additional compensation to expand coverage; for example, Maharashtra has previously offered compensation for farmer suicides[2].

1 Government of Tamil Nadu. (2021). Gist of Fifteenth Finance Commission Main Report Along with Action Taken Report. Finance Department, Government of Tamil Nadu.

2 National Disaster Management Authority. (n.d.). XVth Finance Commission Recommendations for Disaster Risk Management.

3.3 Udaipur Loss and Damage Assessment

3.3.1 Economic Impacts

This assessment presents a review of loss and damage aspects specific to Udaipur, drawing from policy plans, reports, and published literature, with a focus on the impacts of extreme weather events such as floods and extreme heat.

Udaipur's vulnerability to extreme weather events such as floods and heatwaves has significant economic and non-economic impacts. Children and vulnerable communities are disproportionately affected, with severe consequences for their health, safety, and well-being.

Trade and Supply Chain

Udaipur's local markets, particularly small vendors and traders, are highly vulnerable to extreme weather events. During heavy rains and flooding, vendors selling perishable goods face the risk of spoilage, leading to increased debt. The supply chain for goods is also disrupted, reducing availability and raising costs.

Loss of Infrastructure

Udaipur has experienced substantial infrastructure damage due to flooding. Reports indicate that major trade centres, roads, and market areas have been affected, with severe water-logging disrupting transportation networks and access to markets. Flooding in 2022 led to an estimated loss of INR 500 crore in trade and infrastructure.

Livelihood

Heat-related Livelihood Losses

Extreme heat events are increasingly affecting productivity, especially for outdoor workers. With rising temperatures, vendors, labourers, and small traders face health risks, which in turn reduces their working hours and income. Extended periods of heat waves have intensified economic vulnerabilities for these populations.

Extreme rainfall and flooding

It has resulted in loss of working days, particularly for those living in informal settlements. In these areas, workers face severe difficulties in reaching their places of employment due to waterlogged roads and damaged infrastructure. The informal workforce, including daily-wage labourers and street vendors, is disproportionately affected.

3.3.2 Non - economic Impacts



Loss of property

Flooding in areas near the Ayad River has caused significant property damage in low-lying settlements. Informal settlements in particular lack adequate infrastructure to withstand such events, leading to higher losses in assets. An estimated 400 houses were severely damaged during recent flooding events, with numerous vehicles submerged in waterlogged areas.



Displacement



Flood-Induced Displacement

Flooding along the Ayad River and other low-lying areas of Udaipur has led to temporary displacement of families, particularly those residing in informal settlements. Displacement disrupts access to essential services, including healthcare and education for children, and often forces families to seek shelter in overcrowded and unsafe conditions.

Impact on Informal Settlements

Informal settlements, with inadequate infrastructure and poor drainage, are highly susceptible to flooding. Residents in these areas often face repeated displacement, compounding the challenges of rebuilding their lives and livelihoods after each event.



Loss of Life



Heat-Related Mortality

Udaipur has seen a steady rise in heat-related mortality. During the 2023 heatwave, the city recorded over 15 heat-related fatalities, primarily among vulnerable groups such as the elderly and young children. The increasing frequency and intensity of heatwaves pose significant risks to public health.



Flood-Related Mortality

Flooding events have also led to casualties, with several deaths reported in areas affected by severe waterlogging. The lack of preparedness in low-lying areas, particularly informal settlements, has heightened the risks faced by vulnerable populations.

Loss of ecosystem services and Biodiversity

Degradation of Green Spaces: Udaipur's green cover is rapidly declining, further increasing the city's vulnerability to extreme heat. Green spaces such as parks and lakes, which provide relief from heat and improve air quality, are being lost to urbanization. This loss reduces the city's resilience to the urban heat island effect, particularly affecting children who rely on these areas for recreation and physical activity.

Socio-economic Inequality

Unequal Access to Services: Vulnerable populations, particularly those living in informal settlements, have limited access to early warning systems, healthcare, and relief during extreme weather events. This lack of access exacerbates socio-economic inequalities, as those with fewer resources are less able to recover from the impacts of floods and heatwaves.

Health related

Heat-Related Health Issues

The rising frequency of heatwaves has resulted in an increase in heat-related illnesses, particularly among young children and the elderly. In 2023, Udaipur recorded over 400 cases of heat-related illnesses, including heatstroke.

Post-Flood Health Burden

Flooding has increased the prevalence of water-borne diseases such as diarrhea and dengue, particularly in children. The health burden in informal settlements is especially high, as inadequate sanitation and water management exacerbate the spread of infections during and after flooding.

Linking economic and non economic loss and damage to child focused domains

For the development of robust indicators, it is essential to explicitly map how each domain manifests specific economic losses and non-economic harms for children. This requires a more systematic alignment, showing, for example, how disruptions in health services translate into both increased household costs and developmental setbacks, or how education disruptions generate measurable wage losses for caregivers alongside learning deficits for children.

Making these connections explicit will strengthen attribution and ensure that the resulting indicators capture the full spectrum of child-specific climate impacts as deatiled in Table 6.

Indicator Type	Economic *(Losses and Damages)*	Non Economic *(Losses and Damages)*
Health and Nutrition	• Increased spending on private OPD visits and medicines due to illness spikes during heatwaves/floods. • Transport costs to distant PHCs when local facilities become inaccessible. • Spoilage of THR/perishable foods during extreme heat, requiring purchase of substitutes. • Lost caregiver wages due to time spent caring for sick children.	• Heat-related illness (dehydration, rashes, fainting). • Diarrhoea, malaria, skin infections during floods. • Missed immunisation and disrupted growth monitoring. • Irregular feeding/breastfeeding during extreme weather. • Developmental delays linked to repeated illness and stress.
Education	• Additional expenditure on private tuition to compensate for learning loss. • Repair and replacement costs for school materials damaged during floods. • Extra transport costs due to unsafe or waterlogged school routes.	• School closures (during floods; reduced hours during heatwaves). • Heightened absenteeism, especially among girls and migrant children. • Reduced concentration and performance due to overheated classrooms. • Learning loss, delayed re-enrolment, reduced peer interaction.
WASH	• Purchase of bottled/tanker water during shortages (₹500–1500/month). • Expenses on hygiene materials and cleaning after toilet flooding. • Costs for desilting, drain clearance, and WASH repair in schools/AWCs	• Exposure to contaminated water leading to diarrhoea and skin diseases. • Increased open defecation during floods, impacting dignity and safety (especially for girls). • Hygiene stress and reduced access to safe water. • Interrupted drinking water availability in schools/AWCs.
Safety	• Additional expenses for safe travel, esp girls • Medical expenses due to heat injuries, falls, burns, snake/insect bites. • Household costs for repairs or temporary shelter after flooding.	• Increased drowning risk in drains and waterlogged areas. • Harassment and mobility fears for girls due to unsafe sanitation and routes. • Psychosocial distress from isolation during heatwaves. • Heightened risk of neglect, exploitation or unsafe environments during migration.
Culture	• Loss of income for families involved in puppetry, drumming, folk art and tourist-based performances. • Damage to traditional instruments, costumes, props due to heat/humidity or flooding.	• Cancellation of festivals, fairs and cultural events that shape children's identity. • Decline in intergenerational learning, folk songs, storytelling, healing traditions. • Reduced cultural participation and weakened community bonds. • Loss of traditional play materials and cultural learning opportunities.

Table 6. Linking economic and non economic loss and damage to child focused domains with example indicators (to be developed in Volume II)

3.4 Loss and Damage Assessment for Young Children and Pregnant Women in Udaipur

Young children (0-6 years) and pregnant women are highly vulnerable to the impacts of extreme weather events such as floods and heatwaves. These events exacerbate health risks, nutritional deficiencies, and accessibility to essential services, further deepening socio-economic inequalities. The Loss and Damage for children have been categorized into five critical areas, encompassing five categories essential to their well-being: health & nutrition, education, WASH (Water, Sanitation, and Hygiene), protection, and cultural identity.



Health & Nutrition



Education



WASH



Safety



Cultural Loss

The indicators are intended to provide a clear understanding of the challenges faced by children, enabling decision-makers to take action to protect and support the youngest residents of Udaipur both now and in the future.

The indicators under these five areas intent to identify and monitor the effects of climate change on children's lives in Udaipur. By collecting information on how various aspects of their lives are influenced, we aim to assist local officials, NGOs, and community organisations in directing targeted support and resilience-building initiatives. The indicators address immediate needs, such as access to healthcare, as well as long-term consequences, including disruptions in education and nutritional deficiencies.

The loss and damage experienced by these groups highlight the need for urgent policy interventions to build climate resilience in healthcare, education, and community infrastructure.

3.4.1 Health and Nutritional Impacts

Increase in Vector-Borne Diseases (VBD): Flooding and Water logging in low-lying colonies like Ayad, Nela Talab, and Roop Sagar create breeding grounds for mosquitoes, leading to a significant rise in vector-borne diseases like malaria and dengue. Post-monsoon, these areas report a surge in cases, severely affecting young children, who have weaker immune systems. In Mallah Talai and Alipura, stagnant water after flooding intensifies mosquito breeding, leading to outbreaks of diseases, particularly in households without proper sanitation.

Waterborne Diseases: During heavy rainfall and flooding in areas like Khempura, Bhilurana kacchi basti Area, Savina, Bohra Ganeshji-Pratap Nagar road and Ayad, the contamination of drinking water sources poses a severe risk of waterborne diseases such as diarrhea and cholera.

Young children in these colonies are particularly vulnerable, with a higher risk of severe dehydration and malnutrition if not treated promptly. Pregnant women in flood-affected areas are more susceptible to waterborne infections, increasing risks during pregnancy and childbirth.

Airborne Diseases: Increased dust, pollution, and poor air quality during extreme heat and post-flood recovery periods in Bhattiyani Chohatta (Old City), Sevashram- Pratap nagar road, Sardarpura, Shaheed Bhagat Singh Nagar, Chetak- Hathipol and Govardhan Vilas exacerbate respiratory conditions such as asthma and pneumonia. Pregnant women and young children, especially in colonies with poor waste management, suffer from aggravated respiratory issues due to the rise in airborne pollutants, which can lead to chronic health problems.



दोहरे मौसम की मार... एमबी की ओपीडी 600 के करीब, 60% वायरल के रोगी

रात से 5 गुना ज्यादा गर्म दिन, खांसी-जुकाम के साथ बच्चों में निमोनिया के मामले बढ़े

हेल्थ रिपोर्टर | उदयपुर

सर्दी का मौसम खत्म होने और गर्मियां शुरू होने की तैयारी के बीच दिन-रात के तापमान में आया फासला सेहत पर भारी पड़ रहा है। बदले-बदलाव में सर्दी-खांसी से बच्चों में निमोनिया की शिकायत बढ़ गई है। एमबी अस्पताल में मेडिसिन ओपीडी में रोज आने वाले रोगियों का आंकड़ा 600 के करीब पहुंच गया है। यह अमूमन 400 तक रहता है। इसमें 60 फीसदी मौसमी बीमारियों से पीड़ित मरीज आ रहे हैं। एमबी के साथ अंबामाता-हिरणमगरी सेटेलाइट के साथ निजी अस्पतालों में भी मरीजों की भरमार है।

दिन और रात के तापमान में आधी करीब 20 डिग्री का अंतर है। इससे दिन में गर्मी तो रात में ठंड पड़ रही है। इससे लोगों में खांसी, सर्दी और जोड़ों में दर्द की शिकायत आ रही है। वायरल बुखार के कारण मरीजों को ठीक होने में चार से पांच दिन का समय लग रहा है। जबकि, सर्दी-खांसी की शिकायत 8-10 दिनों तक चली हुई है। विशेषज्ञों के अनुसार मौसम में परिवर्तन और लापरवाही के कारण बीमारियां बढ़ रही हैं। इन दिनों चल रहा शादियों का सीजन भी बीमारी का एक बड़ा कारण है। हालांकि रात की बात यह है कि कोई भी रोगी गंभीर बीमार नहीं हो रहा है। इससे आईपीडी की संख्या में बढ़ोतरी नहीं हुई है।

400 तक रहती है अमूमन एमबी अस्पताल की मेडिसिन की ओपीडी।

350 से ज्यादा मरीज रोज सर्दी-खांसी के पहुंच रहे।

विशेषज्ञ बोले- बच्चों को गर्म कपड़े पहनाएं, गुनगुना पानी पिलाएं

एमबी अस्पताल के अधीक्षक डॉ. आशुतोष सुमन का कहना है कि मौसम में बदलाव के कारण बुखार-खांसी-जुकाम के मरीज ज्यादा आ रहे हैं। दोपहर में तापमान बढ़ते ही लोगों ने गरम कपड़े पहनना कम कर दिया है। लेकिन शाम को सीधी ठंडी हवा से संपर्क में आ रहे हैं। ऐसे में सर्दी और गर्मी के फेर में बीमारी के चपेट में आ गए। बचाव के लिए बच्चों को गर्म कपड़े पहनाएं और गुनगुना पानी पिलाएं। ठंडे भोजन के सेवन से बचें। बच्चों को खांसी होने पर मास्क लगाएं, ताकि स्कूल में सहपाठियों या अन्य सार्वजनिक स्थानों पर अन्य लोग संपर्क में आकर बीमार न हों।

बीते 10 दिन...दिन 32° तक पहुंचे, रात 4.8° तक ठंडी

तारीख	दिन	रात	ओपीडी
7	24.1	4.8	459
8	28.5	5.0	430
9	30.7	6.1	163
10	32.3	7.7	559
11	30.2	8.7	571
12	28.4	8.7	439
13	29.7	8.0	517
14	30.2	8.5	550
15	31.0	9.6	500
16	31.6	11.6	----

(पारा डिग्री में, ओपीडी के आंकड़े एमबीएम के मेडिसिन विभाग के।)

दिन 31.6°, रात 2° बढ़कर इस माह पहली बार 11.6

रविवार को दिन और रात का तापमान बढ़ोतरी पर रहा। दिन का पारा 0.6 डिग्री बढ़कर 31.6 डिग्री पर पहुंच गया। यह फरवरी का दूसरा सबसे गर्म दिन था। इससे पहले 10 फरवरी को 32.3 डिग्री पारा रहा था। दूसरी ओर, रात का तापमान 2 डिग्री बढ़कर 11.6 डिग्री दर्ज हुआ। यह अभी तक की सबसे गर्म रात रही। मौसम केंद्र जयपुर के विशेषज्ञों के अनुसार 17 और 19 फरवरी को प्रदेश में नया पश्चिमी विक्षोभ सक्रिय होगा। इससे हल्के बादल छाए रह सकते हैं, लेकिन तापमान में ज्यादा गिरावट की संभावना नहीं है।

Fig3. Increasing cases of pneumonia among children due to fluctuating weather conditions. Dainik Bhaskar (Udaipur edition)

Extreme weather has led to an increase in pneumonia cases among children due to sudden weather changes. The OPD registrations spike during higher temperatures and 60% cases are viral infections. This highlights that the unseasonal warm days and cold nights are the primary cause for leading to a rise in respiratory infections among children. This is validated with the coincidence of a steady increase in hospital visits with extreme temperature fluctuations[1].

1 *Health Reporter. (2025, February 17). Extreme weather impact: Increase in pneumonia cases among children due to sudden weather changes. Dainik Bhaskar (Udaipur edition)*

Delay in Referral Services

Interrupted Access to Healthcare: During floods and heavy rainfall, accessibility to healthcare services, including referral services for pregnant women and children, is severely impacted. Delayed access to emergency care, antenatal care, and postnatal services can result in higher rates of maternal and child mortality. Roads leading to healthcare facilities are often inaccessible, which puts both pregnant women and young children at high risk.

Closure of PHCs & AWCs: Primary Health Centres (PHCs) and AWCs, which provide essential healthcare, nutrition, and preschool education services to young children and pregnant women, often close during extreme weather events. This interruption not only limits access to essential services but also affects the overall development of children during their formative years.

There is an alarming issue of child malnutrition in Rajasthan, where 1.94 lakh children are affected. The highest number of cases is recorded in Udaipur (12,976 cases). Despite government efforts, malnutrition remains a significant challenge in the state.



Fig4. Heat Wave: No relief from scorching heat in Rajasthan, hospitals are overcrowded | ABP LIVE

The report highlights the severe impact of the ongoing heatwave in Rajasthan, especially in Udaipur, where hospitals are overwhelmed with patients suffering from heatstroke, dehydration, and other heat-related ailments. The rising temperatures are making daily life challenging, and there is no immediate relief in sight.


राजस्थान में 1.94 लाख कुपोषित बच्चे, सबसे ज्यादा उदयपुर में

बच्चों को कुपोषण से बचाने के लिए प्रदेश सरकार कई स्तर पर प्रयास कर रही है। बावजूद इसके राज्य में अब भी 1,94 लाख बच्चे कुपोषित हैं। राज्य में आई ताजा पोषण ट्रेकर रिपोर्ट के अनुसार सबसे अधिक 12976 कुपोषित बच्चे उदयपुर में लिस्टेड हुए हैं। सबसे कम कुपोषित बच्चे 2246

Fig5. 1.94 Lakh Malnourished Children in Rajasthan, Highest in Udaipur

Nutritional Impacts


Hindi News • राजस्थान न्यूज • bad condition of Anganwadi Centers in Udaipur rajasthan

उदयपुर: नौनिहालों की बाड़ियों के बदहाल होते आंगन, कई केंद्रों पर बच्चों के लिए नहीं पहुंच रहा पोषाहार

कई आंगनबाड़ी केंद्रों पर बिजली-पानी तक की व्यवस्था नहीं हैं तो कई किराए के भवनों में संचालित हो रहे हैं। 45 डिग्री तापमान के बीच इन आंगनबाड़ी केन्द्रों पर बच्चों के लिए पोषाहार तक नहीं पहुंच रहा है।

Fig6. Udaipur: Dilapidated Anganwadi Centers, No Nutrition Reaching Children at Several Centers

Worsening Malnutrition: Extreme weather events, such as heatwaves and floods, disrupt food supplies and reduce access to nutritious food. These disruptions worsen malnutrition among young children, who are already at risk of stunting, wasting, and being underweight. Pregnant women, particularly those from low-income families, face food insecurity during such events, which increases the risk of delivering underweight babies.

Impact on Anemia: Anemia already prevalent among young children and pregnant women in Udaipur, worsens due to inadequate access to iron-rich foods during extreme events. Anemia increases vulnerability to infections and compromises the health of both mothers and children.

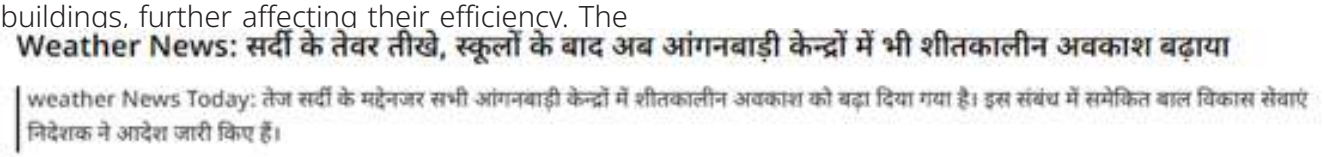
The article highlights the poor conditions of Anganwadi centers in Udaipur, where lack of infrastructure and extreme heat (45°C) are making it difficult for children to receive proper nutrition. Many centers are operating without electricity and water, and some function in rented buildings, further affecting their efficiency. The

3.4.2 Safety and Protection

During extreme heat events, children are at heightened risk of heat-related illnesses, particularly in poorly ventilated environments such as overcrowded homes or Anganwadi centers lacking cooling systems. For instance, in colonies like university road, Old city, Govardhan vilas, Savina and Machhla Magra, where temperatures can soar, children often experience dehydration, heat exhaustion, and heat strokes, leading to severe health complications. Additionally, during urban flooding, the safety of children is further compromised as they may be displaced from their homes, leading to exposure to hazardous conditions. Floodwaters can carry debris and pollutants, creating unsafe environments that threaten their well-being.

Further reports highlight that the cold wave has led to an extension of winter holidays not only in schools but also in Anganwadi centers. The government has issued official orders to protect children from the extreme cold, ensuring their health and safety during the harsh weather conditions.

The article discusses the extreme heatwave in Udaipur, where temperatures have hit 45°C, the highest recorded in the last seven years. The intense heat has negatively affected tourism, leaving many popular tourist spots empty. Residents and children are struggling with the harsh weather conditions, leading to a decline in outdoor activities. This highlights the impact on children and their safety in extreme harsh weather conditions.


Weather News: सर्दी के तेवर तीखे, स्कूलों के बाद अब आंगनबाड़ी केन्द्रों में भी शीतकालीन अवकाश बढ़ाया

weather News Today: तेज सर्दी के मद्देनजर सभी आंगनबाड़ी केन्द्रों में शीतकालीन अवकाश को बढ़ा दिया गया है। इस संबंध में समेकित बाल विकास सेवाएं निदेशक ने आदेश जारी किए हैं।

Fig7. Weather News: Intense cold continues, after schools, Anganwadi centers also extend winter vacation

3.4.3 Education Loss

Disruption of Early Childhood Education: During extreme heat events, the Integrated Child Development Services (ICDS) often directs the closure of AWCs for pre-school activities, sometimes extending for a week or more. In Udaipur city, where over 80% of AWCs lack electricity and have small, poorly ventilated spaces, the AWCs become unbearably hot, putting both children and caregivers at risk. Prolonged exposure to such high temperatures heightens the chances of heat-related illnesses, necessitating the closure of these AWCs. This disruption impacts early childhood education, causing children to miss key developmental learning opportunities, potentially hindering cognitive growth. Without access to a safe, cool, and child-friendly environment, their ability to focus and engage in learning activities is significantly impaired.

In flood-prone areas like Ayad, Nela Talab, and Roop Sagar, AWCs are often forced to close during heavy rains and urban flooding. This not only disrupts the regular delivery of early childhood education but also deprives children of a stable, safe learning environment. Young children miss out on critical developmental activities, leading to delays in cognitive, social, and motor skills development. For many, these gaps in foundational learning during such formative years can result in longer-term challenges, including difficulty transitioning to formal schooling.

Lack of Safe Play Areas: Extreme weather events such as floods and heatwaves significantly impact children's access to safe outdoor play areas. In Udaipur, many parks and playgrounds are ill-equipped to handle these environmental changes, leading to various issues that disrupt children's opportunities for physical activity and play-based learning, both essential for their overall development. During heavy rains, parks in low-lying colonies like Ayad, Alipura, Pulaan, Sardarpura and Mallah Talai often experience severe waterlogging, creating hazardous conditions that render these areas unusable for extended periods. This not only prevents physical activity but also increases the risk of slips, falls, and injuries. Furthermore, the stagnant water attracts insects, creating an environment conducive to mosquito breeding and raising the risk of vector-borne diseases like dengue and malaria, which particularly affect vulnerable populations, including young children. The lack of green corridors and safe pathways exacerbates these challenges, limiting children's access to healthy recreational spaces and further hindering their physical and social development.

3.4.4 WASH

Moreover, urban floods exacerbate WASH-related issues, severely limiting children's access to clean water and sanitation facilities. The flooding can contaminate water sources, leading to outbreaks of waterborne diseases such as diarrhea and cholera, which disproportionately affect young children with developing immune systems. For instance, areas like Mallah talai, Sajjan nagar, Sector 09, MIA, Ayad and Neemach Mata (Dewali) often face waterlogging, making it difficult for families to access safe drinking water and proper

sanitation. Inadequate hygiene practices in the aftermath of flooding can also lead to increased risks of infections and illnesses. Furthermore, the loss of functional WASH facilities in schools and community centers limits opportunities for safe water and sanitation, impacting children's health and educational experiences. The cumulative effects of extreme heat and flooding create a cycle of vulnerability that hinders the physical and emotional development of young children in Udaipur.

3.4.5 Loss of Cultural Identity due to In-Migration

Displacement and Migration: A significant number of low-income families with children migrate to Udaipur from nearby villages and districts. Extreme weather events, often force families—especially those living in low-lying and vulnerable areas—to seek safer locations. This displacement disrupts the cultural and social fabric of communities, resulting in a loss of cultural identity for young children. Pregnant women, who rely on community support systems, may experience social isolation, further affecting their mental health during this vulnerable period.

Breakdown of Community Support Networks: Migration disrupts traditional support systems for childcare and cultural practices related to childbirth and child-rearing. The loss of social and cultural cohesion can increase stress for pregnant women and negatively impact children's sense of belonging and identity.

3.4.6 Impact on Family Livelihoods and Economic Loss

Loss of Income and Employment: Families reliant on daily wages or informal work face economic hardship during and after extreme weather events, directly affecting their ability to provide for young children and pregnant women. Loss of income during floods or heatwaves leads to reduced spending on healthcare, nutrition, and education, increasing vulnerability for these groups.

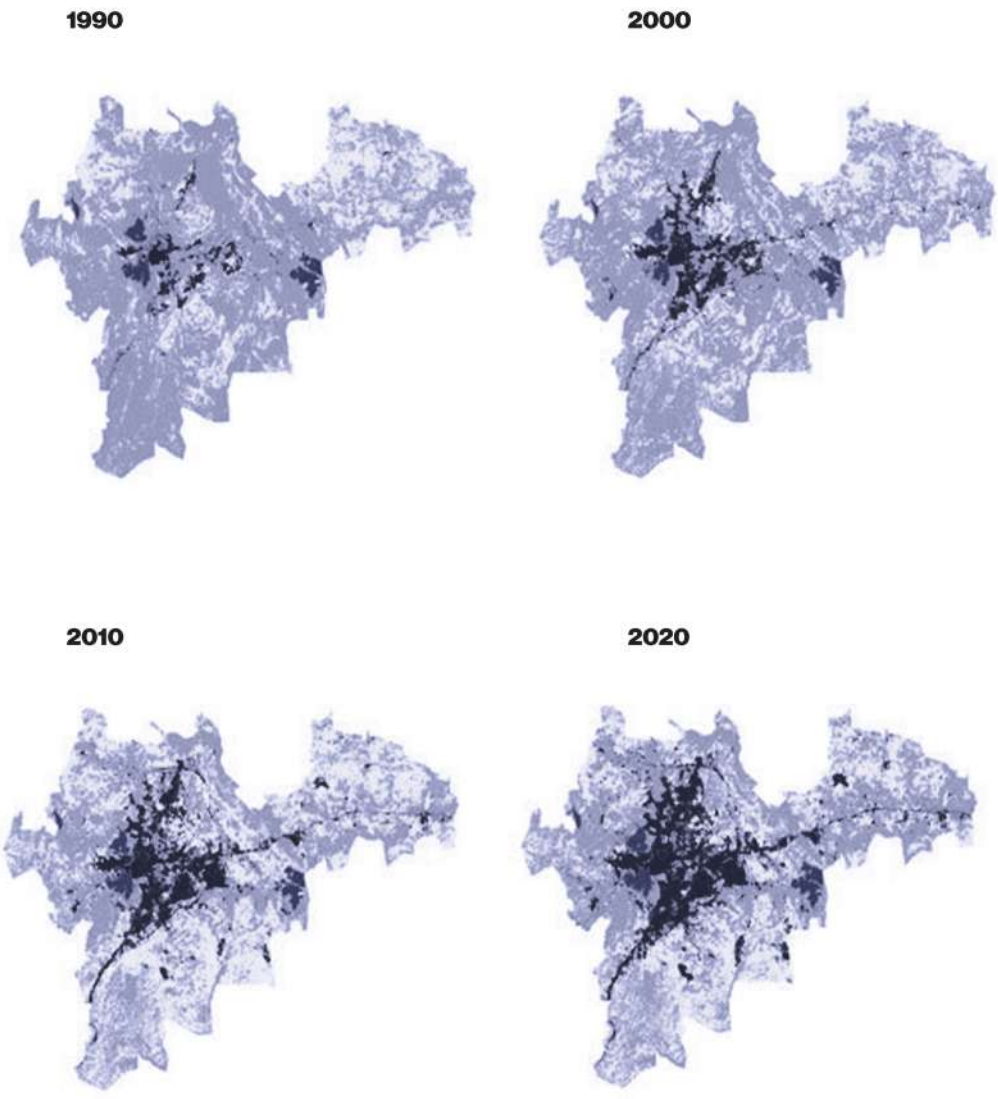
Increased Health Expenditures: Health-related costs rise significantly due to climate-related illnesses. For poor families, increased healthcare expenditures due to vector-borne, waterborne, and heat-related illnesses result in reduced ability to afford other basic needs for pregnant women and children.

3.4.7 Children at construction sites

In Udaipur, vulnerable areas like Navratna Complex, Bhuwana, and Govardhan Vilas see many young children from low-income families at construction sites due to economic necessity. These children face numerous challenges related to health & nutrition, protection, WASH (Water, Sanitation, and Hygiene), and preschool education, particularly during extreme heat and urban flooding. The health risks are particularly concerning, as children are vulnerable to heat-related illnesses like dehydration and heat exhaustion due to high temperatures at construction sites. Additionally, the hazardous nature of these environments exposes them to accidents and injuries, while poor air quality from dust and pollutants can lead to respiratory issues.

Growth and Evolution of Udaipur

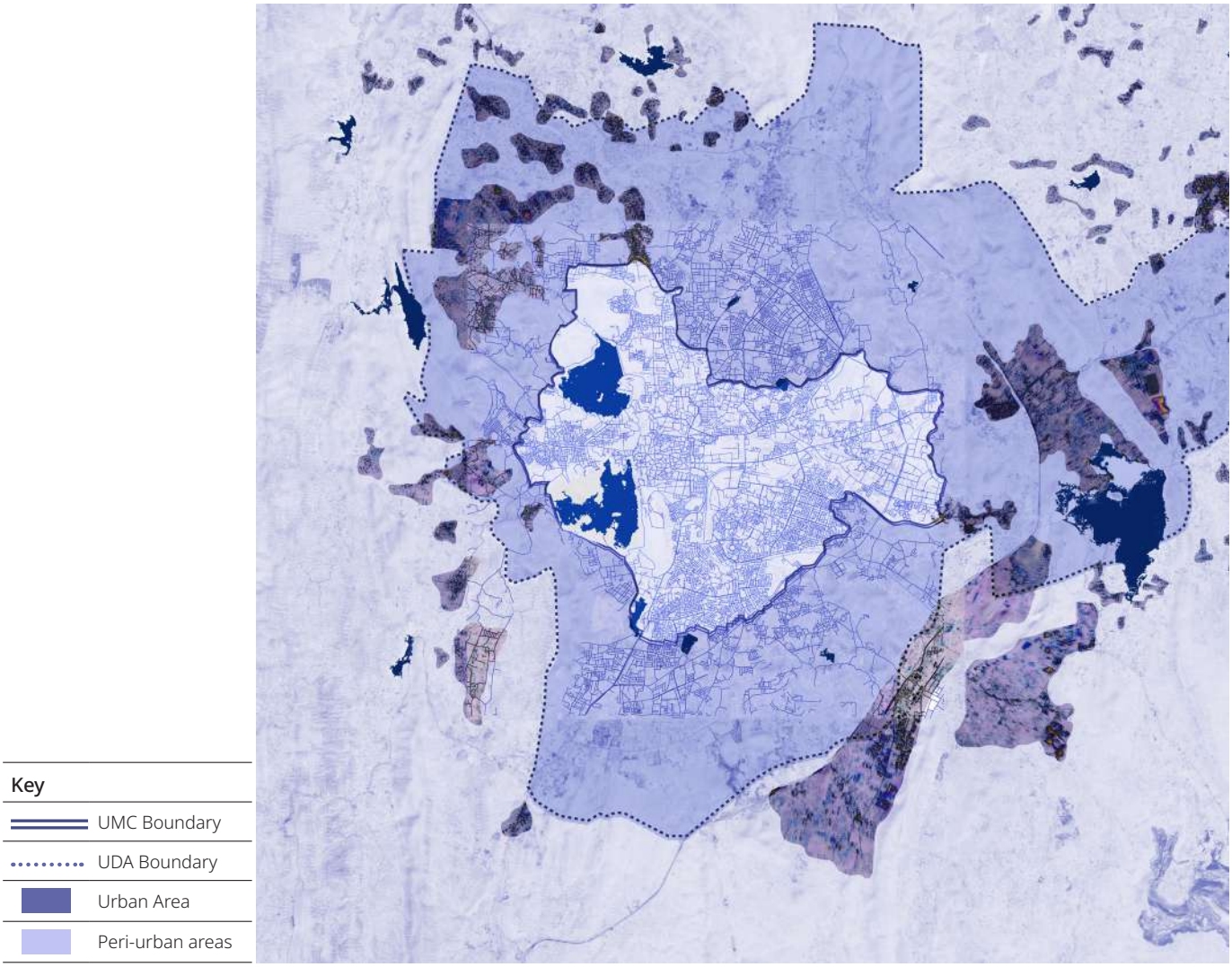
The figures shown below highlight how recent growth in built-up areas has expanded beyond municipal boundaries, extending into the jurisdictions of regional development authorities i.e. Udaipur Urban Development Authority (UDA). While these authorities are tasked with managing planned growth using tools like Town Planning Schemes, the pace of development often outstrips their capacity to provide adequate planned services.



Map 6. Growth and evolution of Udaipur in last three decades

This mismatch results in heightened vulnerabilities for resident communities, who are frequently forced to bear the cost of self-provisioning. These challenges are further exacerbated during extreme climatic events such as heatwave, drought-like conditions, and flooding.

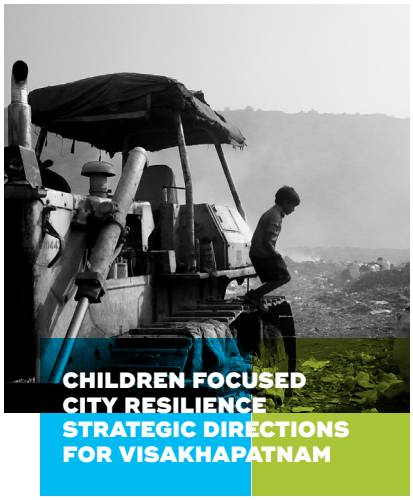
The figure illustrates the decades-long expansion of Udaipur, mapping the current built-up area (BUA) in relation to administrative boundaries. This spatial visualization reveals the extent of growth beyond the Udaipur Municipal Corporation (UMC) boundary. It provides critical insights into the exposure of communities and urban assets to flooding risks.



Map 7. Peri-urban areas and growth of Udaipur city

3.5 Case Studies

3.5.1 Children focused City Resilience Strategic Directions for Visakhapatnam[1]



This report, developed by the Gorakhpur Environmental Action Group (GEAG)[1] in collaboration with UNICEF, outlines strategies to enhance urban resilience in Visakhapatnam, with a focus on children. It addresses climate change impacts, urban vulnerabilities, and disaster risks affecting marginalized populations, particularly urban poor children.

Strengths and Successes -

- Clear connections are drawn between climate risks and sectoral challenges.
- actionable recommendations for strengthening disaster risk reduction frameworks, enhancing institutional capacity, and fostering community resilience.
- A significant achievement is the emphasis on women and children as vulnerable groups, providing actionable insights for these demographics.
- The inclusion of a Composite Vulnerability Index (CVI) enables targeted interventions.
- Sector-specific impacts on health, education, nutrition, WASH, and child protection are well-documented.
- The study uses historic climate data (1992-2021) and future projections (2021-2050) under RCP 4.5 and RCP 8.5 scenarios, offering a balanced perspective.

Gaps and Challenges

- Although urbanization is highlighted as a contributing factor to vulnerability, the interplay between urban and rural challenges is not deeply explored.
- minimal mention of leveraging technology, such as GIS, IoT, or early warning systems, to enhance climate resilience and adaptive capacity.

1 *Mani, N., Teja, J. C., Katyal, S., Singh, B. K., & Pandey, K. (2017). Children focused city resilience strategic directions for Visakhapatnam. Gorakhpur Environmental Action Group. https://geagindia.org/uploads/publication_files/576428831.pdf*

3.5.2 Bihar: Climate Change Risk Assessment (Geospatial impacts and Vulnerability analysis with focus on Women and Children)[1]



The document focuses on Bihar's climate risk assessment with particular attention to children and women as the most vulnerable groups. It comprehensively evaluates the historical and projected climate scenarios, their impacts on key sectors, and recommendations for resilience-building.

Strengths and Successes -

- The report uses a multi-dimensional approach to assess vulnerabilities across biophysical, socio-economic, and sectoral parameters.
- Sector-specific impacts on health, education, nutrition, WASH, and child protection are well-documented.
- The study uses historic climate data (1992-2021) and future projections (2021-2050) under RCP 4.5 and RCP 8.5 scenarios, offering a balanced perspective.
- Detailed district-level analysis highlights specific areas for targeted interventions, particularly flood-prone and drought-affected regions.

Gaps and Challenges

- There is gap in the immplementation framework and it lacks detailed guidance on how to operationalize them, particularly in resource-constrained regions like Bihar.
- provides limited evidence of consultations with grassroots organizations, local governments, and vulnerable communities during the study.
- financial mechanisms or strategies for funding climate adaptation and resilience projects, especially for vulnerable sectors.
- The need for stronger integration between climate, health, education, and WASH sectors is noted, but the report does not provide specific strategies for achieving this.
- District level vulnerabilities are detailed but city level assessment is lacking specifically in rapidly urbanizing areas like Patna for a more granular analysis to address the unique contextual risks in hihgly densepopulated regions.
- no explicit discussion on how the success of proposed interventions will be measured or monitored over time.

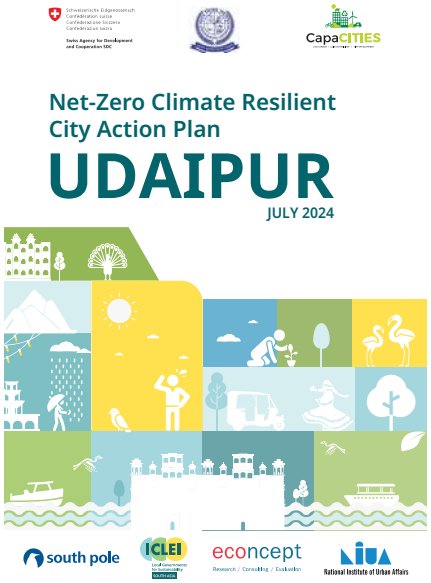
1 *Gorakhpur Environmental Action Group. (2022). Bihar: Climate change risk assessment. https://geagindia.org/uploads/publication_files/1810402800.pdf*

4 Climate Risk and Vulnerability Profile

4.1 Climate Trends

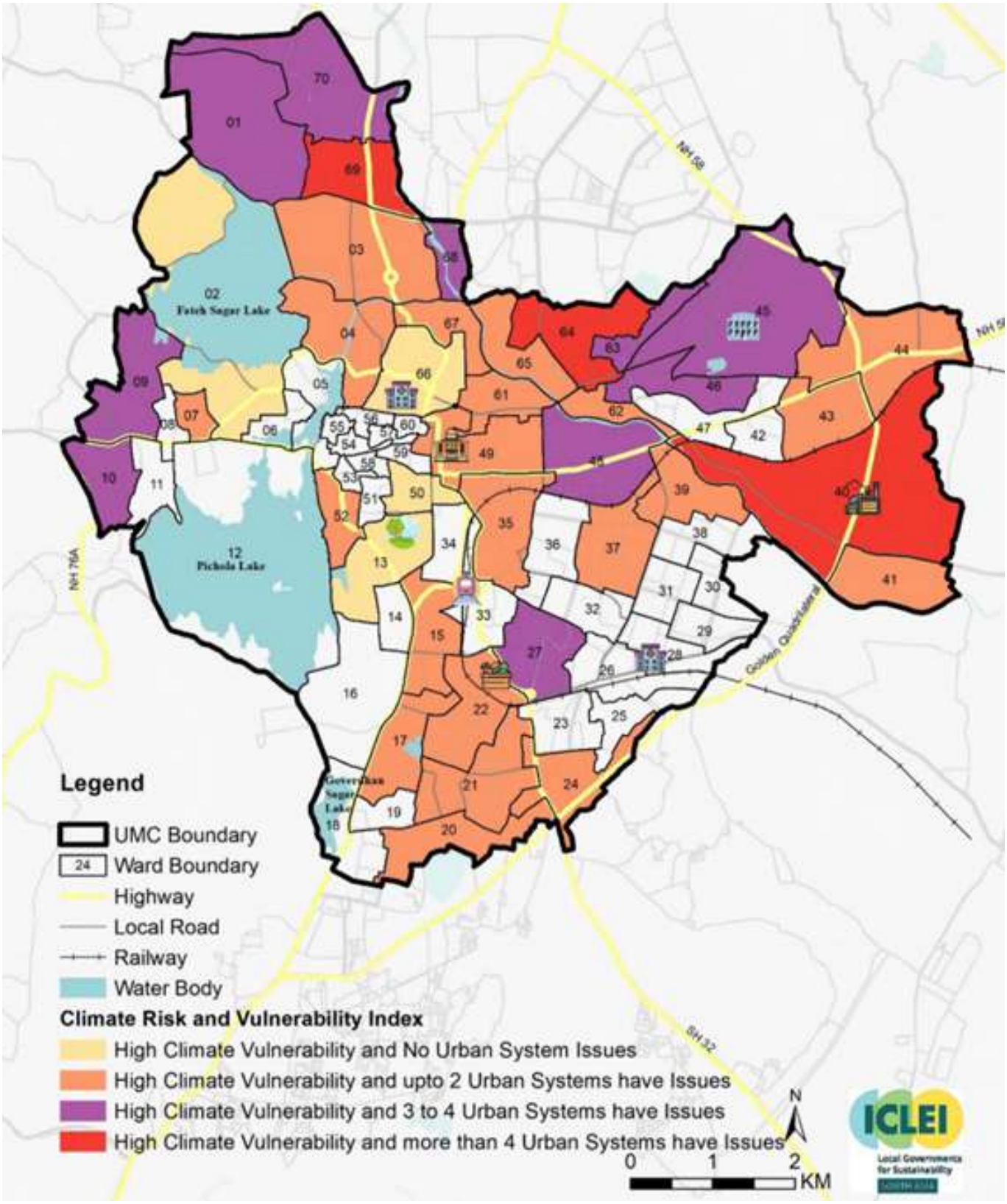
To assess Udaipur's climate risks, historic climate data from 1970 to 2020 was analyzed, focusing on temperature and rainfall trends. According to this analysis, Udaipur has experienced a significant rise in both maximum and minimum temperatures over the past decades, with more frequent and prolonged heatwaves. Future climate projections for Udaipur are derived from the State Action Plan on Climate Change (SAPCC), Rajasthan, 2021. These projections are based on Representative Concentration Pathways (RCPs) for future emissions scenarios up to 2070. Experts have provided additional insights through stakeholder consultations conducted during the preparation of **Udaipur's Climate Resilient City Action Plan (CRCAP)**[1], ensuring localized knowledge is integrated into the projections.

Based on the trend analysis and future projections, Udaipur is expected to witness an increase in extreme heat events and variability in monsoon rainfall, with more frequent heavy downpours leading to urban flooding. By 2050, maximum temperatures are expected to rise by 2-3°C, and intense rainfall events may become more common, further straining urban infrastructure and increasing the risk of floods in low-lying areas. This information, supported by local expertise and climate modeling, forms the foundation for Udaipur's climate scenario statements, which guide adaptation and mitigation strategies in the city's long-term resilience planning.



As highlighted in the comprehensive Climate Risk and Vulnerability Assessment, Udaipur is highly susceptible to climate hazards such as extreme heat and urban flooding. The study analyzed historical weather data, projected future climate scenarios, and vulnerability data gathered from local departments, complemented by spatial analyses and stakeholder consultations. Key findings include a significant upward trend in Udaipur's mean annual maximum temperature, with an increase of 0.60°C over the past century. Additionally, a declining trend in annual rainfall was observed, with a decrease of 11.5mm per decade between 1901 and 2016.

1 Udaipur Municipal Corporation. (2024). Net-Zero Climate Resilient Udaipur City Action Plan. This action plan was developed with support from the Swiss Agency for Development and Cooperation (SDC) under the CapaCITIES project.



Map 8. Comprehensive vulnerability hot spot map of Udaipur (CRCAP Udaipur, 2024)

Climate Trends	Data	Source and Methodology
 Temperature	Between 1970 and 2020, Udaipur's maximum, average, and minimum temperatures rose by 0.5 to 1°C. The number of hot days increased by 10 to 15 annually, and hot nights by 15 to 20. Meanwhile, cold days reduced by 2 to 4 days, and cold nights by 6 to 10 nights.	Based on IMD data and Rajasthan's SAPCC (2021), highlight Udaipur's growing vulnerability to heat stress, necessitating urgent climate resilience measures.
 Land Surface Temperature	Land Surface Temperature (LST) in Udaipur ranges from 30°C to 46°C during the day and 27°C to 30°C at night. Maximum daytime LST rose from 44°C in 2015 to 46°C in 2021, while minimum nighttime LST increased from 27°C to 30°C over the same period. Currently, 57% of Udaipur's total area falls under hotspot zones, with LST exceeding the median of 37°C, affecting 64% of the population in 2021.	Temporal analysis using pixel-based statistical techniques was conducted on satellite imagery from 2015, 2018, and 2021, identifying consistent LST hotspots with temperatures above 37°C.
 Heat Index Analysis (Feels like temperature)	Udaipur experiences heat conditions ranging from 'extreme caution' to 'extreme danger' during peak summer months, with the majority of days classified under the 'danger' category. Hotspot areas constitute 35% of the city, where feels-like temperatures exceed 43°C, impacting approximately 46% of the population. Particularly high heat index values are recorded in areas such as Madri Industrial Area, Hiran Magri, and densely populated neighborhoods, where temperatures can reach up to 50°C.	The heat index was calculated by correlating air temperature with humidity, in line with the "National Guidelines for Preparation of Action Plan – Prevention and Management of Heat Wave" by NDMA. Areas with heat index values exceeding 43°C are considered hotspots, and serve as thresholds for issuing heatwave warnings.

Climate Trends	Data	Source and Methodology
 Heat Wave Events and Trend	The 1980s and 1990s saw a rise in both the frequency and intensity of heat waves, with temperatures often exceeding 40°C and reaching over 45°C in the late 1990s. In the 2000s, maximum temperatures frequently hit 42°C to 44°C during peak summer months. The decade from 2010 to 2020 witnessed a significant increase in heat wave events, with temperatures consistently crossing 45°C; notably, 2016 recorded extreme heat above 46°C.	The heat wave events and trend data for Udaipur from 1950 to 2020 were compiled using historical temperature records from the India Meteorological Department (IMD) and Climate Data Online (CDO). A historical analysis was conducted to identify trends in maximum temperatures, focusing on summer months and examining heat wave frequency and intensity across decades.
 Rainfall	For Udaipur, Rajasthan, evidence-based rainfall trend analysis shows an increase in annual precipitation ranging from 80 mm to 180 mm between 1970 and 2020. Extreme rainfall events have become more frequent, with the city experiencing an additional 2 to 3 extreme rainfall events during this period. This trend is projected to continue under varying climate scenarios, likely resulting in increased urban flooding risks due to Udaipur's geographical basin-like topography, which exacerbates water accumulation during heavy rains. These projections align with broader patterns observed across Rajasthan, where the semi-arid region is seeing greater rainfall variability.	Data sourced from IMD and long-term climate studies highlight the urgency for urban resilience measures to manage future extreme weather events.

Table 7. The climate trends for Udaipur, Rajasthan (CRCAP Udaipur, 2024)

4.2 Future Climate Projections

To understand climate vulnerability and recommend effective resilience strategies, it is crucial to assess future climate projections. The analysis of Regional Climate Modelling (RCM) for Udaipur, using the A1B scenario for the near-term period (2021-2050), reveals significant changes in both rainfall and temperature patterns by 2050. Key findings include:

4.2.1 Rainfall Projections

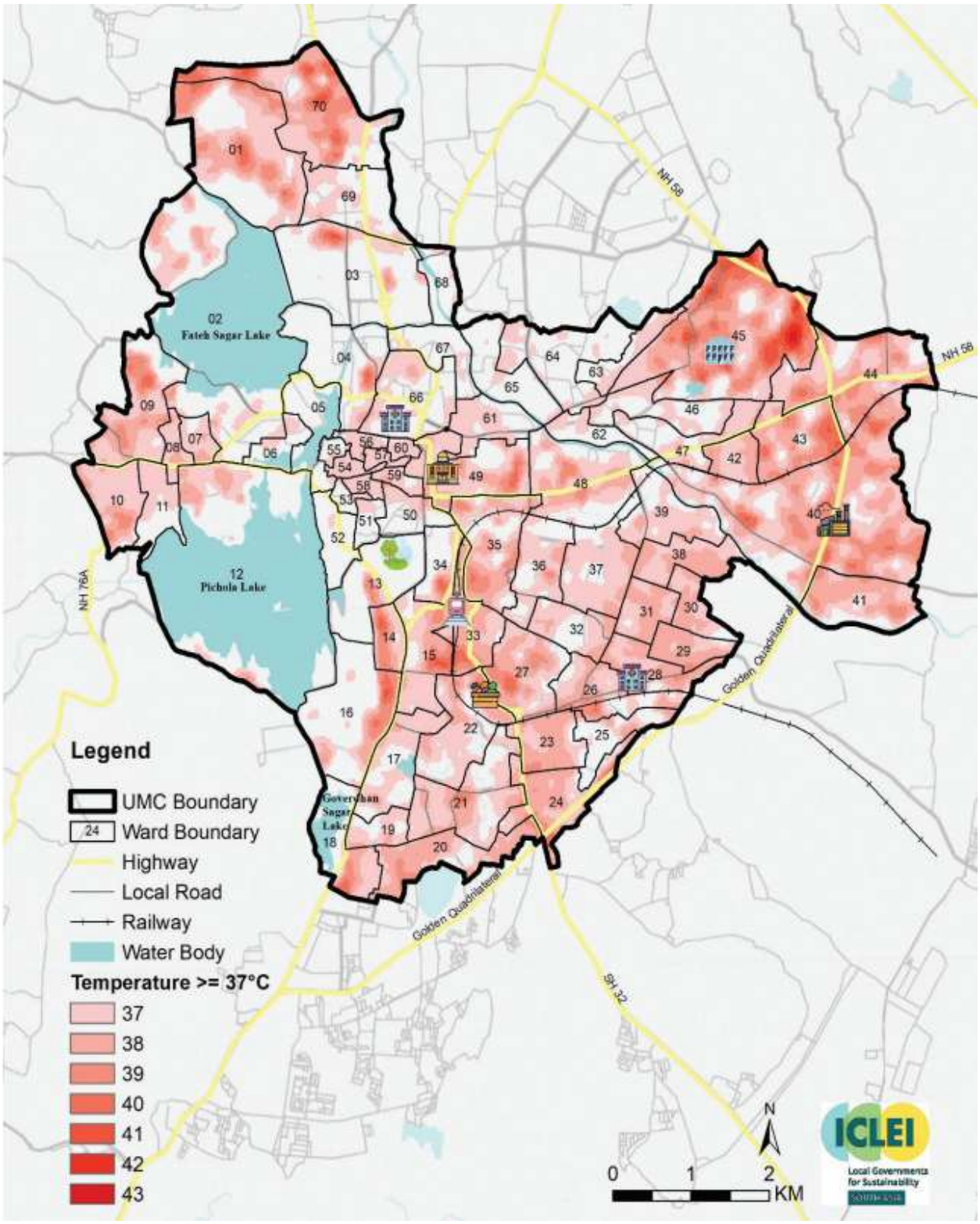
- Rainfall is projected to increase by 6-10% by 2050.
- Monsoon rainfall is expected to rise by 40-60 mm by 2050, with most of the increase occurring during the monsoon season.
- A slight decrease in rainfall is projected for the winter and post-monsoon seasons by 2050.
- Extreme rainfall events are likely to become more frequent and intense, with projections indicating a 20 mm increase in maximum 1-day rainfall and a 30 mm increase in maximum 5-day rainfall by 2050.

4.2.2 Temperature Projections

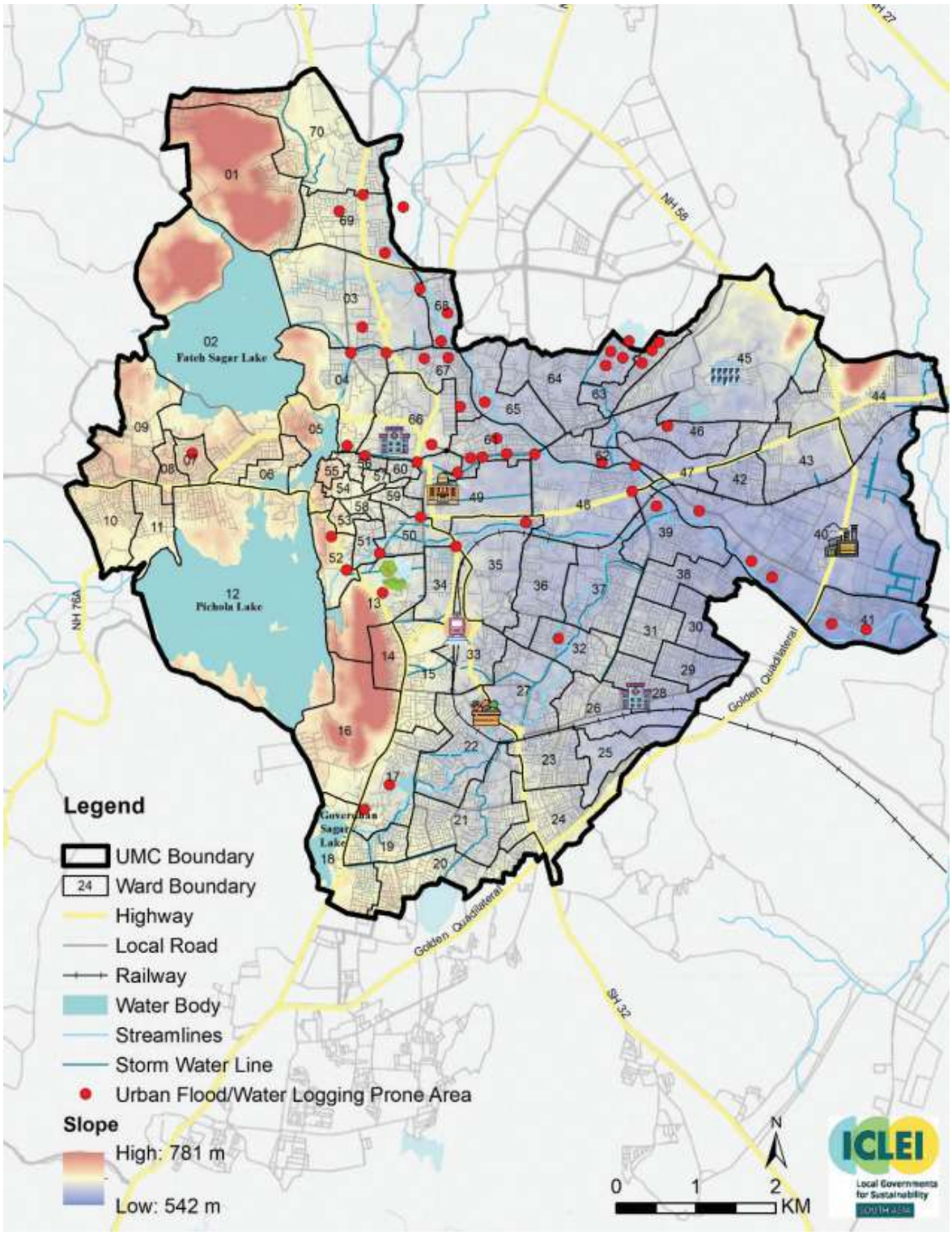
- Udaipur is expected to experience a warming trend, with annual maximum temperatures increasing by 1.75-1.85°C by 2050.
- Annual minimum temperatures are projected to rise by 2.1-2.20°C by 2050.
- During the post-monsoon season, the mean maximum temperature could increase by 2.0°C, while in winter, it may rise by 2.25°C by 2050.
- The annual mean minimum temperature during the post-monsoon season is projected to increase by 2.8°C, and by 1.5°-2.45°C during the monsoon and summer seasons by 2050.
- The occurrence of hot days and warm nights is expected to increase.
- There is a high likelihood of mild to severe drought in Udaipur.
- Humidity levels are projected to increase by 7%, potentially exacerbating the impacts of heatwaves as temperatures rise.

The assessment above suggests that Udaipur is likely to face certain climate hazards, which are outlined below:

- **Future Climate Scenario 1:** Rise in temperature, heat wave events and number of hot days and nights may increase in future.
- **Future Climate Scenario 2:** An overall increase in precipitation, particularly short-duration, high-intensity rainfall events.



Map 9. Land surface temperature hotspot areas (ICLEI South Asia 2024)



Map 10. Flood prone area assessment (ICLEI South Asia 2024)

4.2.3 City level Plan and Policies related to Environment and Climate Change

List of urban Strategies and Frameworks for Environmental Sustainability and Climate Adaptation in Udaipur, Rajasthan

Name of the Plan	Year	Remarks
Low-carbon Comprehensive Mobility Plan	2013	Prepared under Promoting Low Carbon Transport in India project under UNEP DTU Partnership
City Development Plan	2014	Prepared under Capacity Building for Urban Development project
City Sanitation Plan	2014	Under National Urban Sanitation Policy
Solar City Master Plan	2016	Prepared by Integrated Research and Action for Development
Smart City Proposal	2016	Prepared by Udaipur Municipal Corporation
Low-carbon IPT Action Plan	2018	Prepared under SDC funded CapaCITIES project Ph I
Faecal Sludge & Septage Management Action Plan	2018	Prepared under SDC funded CapaCITIES project Ph I
Parking Plan and Management Strategies	2018	Prepared under Shakti Sustainable Energy Foundation funded project
Pedestrianization Plan	2018	Prepared under Shakti Sustainable Energy Foundation funded project
Climate Resilient City Action Plan	2019	Prepared under SDC funded CapaCITIES project Ph I
Clean Air Action Plan	2019	Prepared under SDC funded CapaCITIES project Ph II
Green Mobility Zone Programme	2019	Prepared under SDC funded CapaCITIES project Ph II
Child Safety Guidelines	2023	Prepared under Urban95 Phase II Program
Net-Zero Climate Resilient City Action Plan	2024	Prepared under SDC funded CapaCITIES project Ph II

Table 8. Policies/Plans in Udaipur, Rajasthan

4.3 Current exposure and vulnerability of the city

A comprehensive climate risk and vulnerability assessment for Udaipur has identified the city as highly vulnerable to climate hazards, particularly extreme heat and urban flooding. This analysis incorporated historical weather data, future climate projections, and vulnerability data sourced from local departments. Additionally, spatial analyses and extensive stakeholder discussions were conducted to ensure a thorough understanding of Udaipur's climate risks. These findings highlight the critical need for targeted adaptation and mitigation strategies to safeguard the city's infrastructure and vulnerable populations.

Udaipur is increasingly exposed to climate risks, primarily extreme heat and urban flooding, driven by rising temperatures and erratic rainfall patterns. Recent projections indicate that the city will experience more frequent and intense heatwaves, with maximum temperatures rising by 2-3°C by 2050. Over half of Udaipur's area is already considered heat hotspots, where Land Surface Temperatures exceed 37°C, affecting nearly 64% of the population, especially children, the elderly, and outdoor workers like street vendors. Additionally, Udaipur's saucer-like topography makes it highly susceptible to urban flooding during monsoons, with low-lying areas, particularly near the Ayad River, experiencing frequent waterlogging.

Projections suggest that rainfall patterns will become more erratic, with intense rainfall events leading to flash floods, affecting public infrastructure and vulnerable communities in flood-prone zones.

The most vulnerable populations include slum dwellers, who often live in poorly drained areas, and informal workers who depend on the city's outdoor spaces. Approximately 17% of Udaipur's population lives in flood-prone areas, with children and elderly residents at heightened risk. As rainfall variability increases, water scarcity may also become a pressing issue, impacting the city's water supply systems and disproportionately affecting low-income groups. These combined factors—extreme heat, urban flooding, and water scarcity—highlight Udaipur's growing vulnerability to climate change, necessitating urgent mitigation and adaptation strategies to protect its population and infrastructure.

UMC has formed a 'climate core team' and a 'stakeholder committee' to ensure effective planning and implementation of climate strategies.

The Udaipur Municipal Corporation (UMC) is committed to a climate-resilient future through strategic initiatives, including a Climate Resilient City Action Plan (CRCAP) to reduce energy use and emissions. Key achievements include a 2 TPD bio-methanation plant, a zero-waste pilot, an E-rickshaw program, and four Ambient Air Quality Monitoring Stations.

Urban Infrastructure Services	Vulnerability due to Urban Heat		Vulnerability due to Urban Flood	
	Vulnerable Wards	Vulnerable Population	Vulnerable Wards	Vulnerable Population
Water Supply	9, 40, 44, 45	6% of total	3, 48, 69	4% of total
Wastewater Management	1, 10, 21, 27, 35, 40, 48, 70	11% of total	17, 35, 40, 42, 65, 68, 69	9% of total
Solid Waste Management	1, 15, 20, 21, 22, 24, 27, 35, 37, 40, 41, 43, 44, 45, 70	21% of total	35, 39, 40, 46, 48, 64, 69	10% of total
Storm Water Management	-	-	2-5, 7, 8 12, 13 16-18, 32-41, 45-53, 55-57, 59-70	17% of total
Transportation	75% of the total public transport stops & 46 traffic junctions are vulnerable to urban heat and 33% public transport stops & 40 traffic junctions are to urban flood.			
Emergency Services	59% of all the hospitals and 3 out of 5 fire stations are vulnerable to urban flood.			
Air Pollution	86% of the total population in the city is vulnerable to air pollution			
Comprehensive Vulnerability	Climate Resilient Vulnerability Assessment found ward number 40, 64 and 69 as the most vulnerable w.r.t. all 11 issues, including high LST, urban flood, high PM10 concentration, water supply, water quality, wastewater, storm water, solid waste management, road, water and vector borne disease and air borne diseases.			

Table 9. Urban Infrastructure Services: Vulnerabilities to Urban Heat and Flooding in Udaipur

4.3.1 Rainfall Variability

While Udaipur benefits from a monsoon-driven climate, rainfall patterns have become increasingly erratic. Climate projections predict more variability, with the potential for both more intense rainfall events and longer dry spells. This imbalance could lead to flash floods during the monsoon season and water scarcity issues during dry periods.

4.3.2 Vulnerability to Urban Heat

An urban heat impact analysis for Udaipur has revealed a significant and growing threat from extreme temperatures. Approximately 57% of the city is classified as heat hotspots, where land surface temperatures (LST) exceed 37°C, affecting around 64% of the population—an estimated 356,016 people as of 2021. Key hotspots include the Madri industrial area, educational institutions such as MLSU, MPAUT, RCA, and VBRI, transportation hubs,

4.4 Climate Vulnerability Assessment

	Vulnerable Population	Vulnerable Children (0-6 Years)	Vulnerable wards/Area	Fragility Statement
Extreme Heat	64% of the total population in the city (356,016 people, 52% male and 48% female) 15,922 people live in slums and 2,117 street side vendors (i.e. 76% of the total vendors in the city) work in the vulnerable areas.	37,845 Young children (10.63% of 64% of the total population)	91% of city Area	Rising extreme heat conditions lead to thermal discomfort, reduced productivity, increased heat strokes, and heat-related illnesses. These conditions can negatively impact the economy, particularly affecting vulnerable populations. Additionally, higher demand for water and energy for cooling in buildings is expected.
Urban Flood	17% of the total population in the city (Total 0.95 million people – 52% male and 48% female)	8,512 Young children (10.63% of 17% of the total population)	13% of city area Ward No: 2-5, 7, 8, 12, 13, 16-18, 32-41, 45-53, 55-57, 59-70	Increase in extreme rainfall events, coupled with limited and/or compromised storm water network capacity leads to waterlogging and flooding issues in the city, impacting not only urban infrastructure and property, but also livelihoods and public health. The health and livelihood of vulnerable population groups are especially impacted; urban poor are highly vulnerable due to poor living conditions and limited means.

Table 10. Climate vulnerability Assessment in Udaipur, Rajasthan

	Vulnerable Population	Vulnerable Children (0-6 Years)	Vulnerable wards/Area	Fragility Statement
Air Pollution	Vulnerability: Average annual PM10 concentration in Udaipur is 138 µg/m3, respectively. Kids, Elders, Street side vendors, slum dwellers in poor housing conditions, transport operators, traffic police, small shop keepers, construction labourers, etc. are at high risk due to increase in air pollution. Public transport: 47 Public Transport stops (78% of total stops). Traffic junctions: 46 major traffic junctions with heavy traffic are in the vulnerable areas (64% of the total heavy traffic junctions19 in the city). Vulnerable people: Around 14,700 people who are using UCTSL buses		Vulnerable area: 90% of city area (57.88 sq. km) Vulnerable wards: 3, 4, 20, 24, 40, 43	Rising air pollution poses severe health risks for young children, leading to respiratory issues, reduced lung development, and increased vulnerability to infections. Prolonged exposure can impair cognitive development and overall well-being. Vulnerable children are especially at risk, with heightened demand for healthcare services and long-term health interventions.

To implement these metrics, the study proposes a minimal data architecture that builds on existing systems rather than creating new parallel structures. Key elements include:

(i) designating a coordination point within Udaipur Municipal Corporation (for example, a climate or child focused cell) to compile loss and damage data for young children and pregnant women;

(ii) agreeing a standard template for incident and slow onset reporting that ICDS, Health, PHED, Education, UDA, and UMC populate at agreed intervals; and

(iii) developing a simple ward level dashboard that aggregates core indicators by the five child focused domains.

These arrangements can be refined with stakeholders in the subsequent volume, including options for digitalisation.

4.5 Risk and Vulnerability Profile

Urban heat impact analysis is conducted for the month of May since it is the hottest month of the year. Spatial analysis of day and night temperatures have been used for the Land Surface Temperature (LST) trend assessment. (Source: CRCAP Udaipur 2024)

Urban Services Vulnerability		
Services	**Vulnerability**	**Vulnerable Population**
 Water Supply	Vulnerability due to Urban Heat	Around 6% population are living in these vulnerable wards and can be impacted due to extreme heat event
	Vulnerability due to Urban Flood	22,182 Population (4% of the total population), Vendors- 293 (10.5% of the total vendors in the city)
 Wastewater Management	Vulnerability due to Urban Heat	59,879 (11% of the total population) 2,635 slum population (17% of the slum population) 443 vendors (16% of the vendor in the city)
	Vulnerability due to Urban Flood	52,128 (9% of the total population) 1,592 slum population (10% of the slum population) 275 vendors (10.88% of the vendor in the city and 70)

Urban Services Vulnerability		
Vulnerable Children (0-6 Years)	Vulnerable wards/Area	Fragility Statement
3004 young children	Ward No: 9, 40, 44 and 45	Rising ambient temperatures, particularly during extreme heat events, increase water demand, which poses significant risks to young children. Limited water availability in summer months leads to over-extraction of groundwater, further straining water resources. Children in areas facing both extreme heat and drinking water shortages are especially vulnerable, facing heightened risks of dehydration, poor hygiene, and waterborne illnesses.
2358 young children	Ward No: 3, 48 and 69	Heavy rainfall and urban flooding can severely disrupt urban water supply systems, particularly in areas with compromised infrastructure, posing serious risks to young children. Contaminated water supplies increase the likelihood of waterborne diseases, while service interruptions limit access to clean drinking water, exacerbating health risks such as dehydration and diarrhea. Young children, with their heightened vulnerability, are particularly at risk during these disruptions.
6365 young children 280 young children	Ward No: 17, 35, 40, 41, 65, 68 and 69	Extreme heat accelerates the decomposition of inadequately treated sewage and faucal sludge, leading to unsafe disposal in natural drains, particularly in newly developed urban areas. This poses severe health risks to young children, especially those in low-lying and underserved communities. Increased exposure to harmful pathogens can result in heightened cases of gastrointestinal and respiratory illnesses, with young children being particularly vulnerable due to their developing immune systems.
5541 young children 169 young children	Ward No: 1, 10, 21, 27, 35, 40, 48 and 70	Urban flooding overwhelms compromised sewage systems, leading to the overflow of untreated waste, which contaminates surface and groundwater. This poses serious health risks to young children, increasing their exposure to waterborne diseases such as diarrhea and infections. Floodwaters can also disrupt sewage treatment operations, further degrading water quality and heightening the vulnerability of young children, particularly those in low-lying areas.

Urban Services Vulnerability		
Services	**Vulnerability**	**Vulnerable Population**
 Solid Waste management	Vulnerability due to Urban Heat and urban flooding	115,095 (21% of total population) 3,710 slum population (23% of total slum population) 765 vendors (27% of vendors)
 Transportation	Vulnerability due to Urban Heat	Around 14,700 people who are using UCTSL buse
	Vulnerability due to Urban Flood	Around 14,700 people who are using UCTSL buses
 Emergency Services	Vulnerability due to Urban Flood	Hospitals at risk: 59% of all hospitals (27 hospitals). Fire stations at risk: 3 out of 5 fire stations (Ashok Nagar, Chetak Circle, Madri)

Urban Services Vulnerability		
Vulnerable Children (0-6 Years)	**Vulnerable wards/Area**	**Fragility Statement**
12,235 young children 394 young children -	Ward No: 35, 39, 40, 46, 48, 64 and 69	Extreme heat accelerates waste decomposition, raising the risk of landfill fires and harmful pollutants in nearby areas. This poses serious health risks to young children, particularly those exposed to toxic fumes from open dumpsites. Urban flooding exacerbates drainage blockages, causing increased leachate flow from open dumpsites, contaminating land, surface water, and groundwater. This poses severe health risks to young children, exposing them to waterborne diseases and harmful toxins from polluted environments.
-	47 Public Transport stops (78% of total stops); 46 major traffic junctions with heavy traffic are in the vulnerable areas (64% of the total heavy traffic junctions19 in the city)	Extreme heat poses serious health risks to young children using public transport, as they are especially vulnerable to heat stress while waiting at stations or traveling as pedestrians and cyclists. The discomfort caused by rising temperatures increases the demand for climate-controlled public transport, potentially leading to greater reliance on personal vehicles, further limiting safe, accessible travel options for children.
-	Ward No: 63, 64, 67, 69 20 Public Transport stops (33% of total stops). 40 major traffic junctions with heavy traffic are in prompt to urban flood areas (56% of the total heavy traffic junctions20 in the city).	Urban flooding from extreme rainfall significantly impacts public transport, worsening road infrastructure and creating waterlogged conditions that hinder connectivity and mobility. Young children, who rely on public transport for travel to school and healthcare, are particularly vulnerable during these disruptions, facing increased travel times, safety risks, and limited access to essential services.
	Ward No: 2, 40, 46,48, 50, 52, 56, 59, 61, 62, 66 & 67	During heavy rainfall and flooding in Udaipur, access to emergency services, including hospitals and fire services, is severely restricted, putting young children at heightened risk. Vulnerable urban poor communities, where children are already at risk of health emergencies, face even greater challenges in receiving timely medical care and emergency response due to inundated roads and limited mobility. This exacerbates health risks for young children during critical situations.

Urban Services Vulnerability		
Services	**Vulnerability**	**Vulnerable Population**
AW Centers (ECCD Specific)	Vulnerability due to Urban Heat	AWC at risk: 74% (111 AWCs) of all 150 AWCs
	Vulnerability due to Urban Flood	AWC at risk: 24.66% (37 AWCs) of all 150 AWCs
Parks and play grounds	Vulnerability due to Urban Heat	Total Parks in the city: 247 (200 UMC; 44 UDA and 03 PWD owned)
	Vulnerability due to Urban Flood	

Cyclones

In 2021 and 2023, Udaipur faced significant challenges for young children as Cyclones "Tauktae and Biporjoy" brought heavy rainfall and thunderstorms for total three days. During the Tauktae, all lakes overflowed, causing water to flow into the Ayad River, which severely impacted the nearby colonies situated downstream. These communities were unprepared for flooding, leading to extensive water inundation and further compounding the challenges faced by vulnerable children, particularly in urban poor areas.

The flooding disrupted access to essential services such as healthcare, nutrition, and safe shelter. Many families were forced to evacuate their homes, exposing young children to unsafe conditions and heightening their risk of injury and waterborne diseases.

Additionally, the psychological impact of the storm, including anxiety and fear from experiencing severe weather events, can lead to long-term emotional distress in children. The flooding rendered many play areas unsafe, limiting opportunities for outdoor play and social interaction, which are crucial for their physical and emotional development. Overall, the impacts of Cyclones "Tauktae and Biporjoy" highlighted the heightened vulnerabilities faced by young children during extreme weather events, emphasizing the need for improved resilience and support systems.

Urban Services Vulnerability		
Vulnerable Children (0-6 Years)	**Vulnerable wards/Area**	**Fragility Statement**
4881 young children (Total Enrollments)	91% of city Area	Extreme heat severely affects AWCs without electricity and cooling, increasing risks of heat stress for young children. The lack of green pathways or shaded areas worsens exposure, limiting safe outdoor activities. Vulnerable children, especially in urban poor communities, face heightened health risks and service disruption.
1663 Young children (Total Enrollments)	13% of city area Ward No: 2-5, 7, 8, 12, 13, 16-18, 32-41, 45-53, 55-57, 59-70	Heavy rainfall and flooding in Udaipur disrupt access to AWCs, limiting essential services like nutrition, healthcare, and early childhood education for young children. Vulnerable urban poor communities, particularly those with young children, face significant challenges in reaching these centers during floods, increasing the risk of malnutrition, health complications, and developmental delays due to a lack of consistent services.
Extreme heat in Udaipur limits young children's access to parks and playgrounds, reducing opportunities for outdoor play and physical activity. Prolonged exposure to high temperatures increases the risk of heat-related illnesses, discouraging families from using these spaces. This particularly affects vulnerable children from urban poor areas, where parks may lack shaded areas and cooling infrastructure, further restricting safe outdoor activities and impacting their physical and social development.		
Urban flooding and heavy rainfall in Udaipur not only limit young children's access to parks and playgrounds due to waterlogging and damage but also create breeding grounds for insects, increasing the risk of diseases like malaria and dengue. These conditions make outdoor spaces unsafe for play, especially for children in vulnerable urban poor areas with inadequate drainage and pest control. Prolonged closures and health risks from insect infestations further restrict children's physical activity and social interaction, negatively impacting their overall development.		

Table 11. Climate Vulnerability Assessment for Udaipur (CRCAP 2024, Udaipur DEP 2020, and GEAG 2017)

Due to the mild effects of Cyclone Biporjoy, Anganwadi centers in Udaipur were closed. To handle the effects of Cyclone Biporjoy, a disaster management control room has been established in Udaipur at the district level. The administration has also issued a helpline number for assistance.



Biporjoy: चक्रवाती तूफान बिपरजॉय का हल्का असर, आंगनबाड़ी केंद्र 16-17 जून को रहेंगे बंद

Cyclone Biparjoy Effect: चक्रवाती तूफान बिपरजॉय से निपटने के लिए उदयपुर में आपदा प्रबंधन हेतु जिला स्तर कन्ट्रोल रूम बनाया गया है. प्रशासन ने इसके लिए दूरभाष नंबर भी जारी किया है.

Fig9. Anganwadi Centers to Remain Closed due to Mild Impact of Cyclone Biparjoy (ABP Live, 2023)

5 References

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6 Annexures

6.1 Summary of National and State disaster management policies relevant to child focused loss and damage

Global Loss and Damage Assessment Methodologies

Globally, five methodologies are widely used for the assessment of damages, losses, and recovery needs caused by disaster (DLRND)[1], namely-

1. **Damage and Loss Assessment (DaLA),**
2. **Post Disaster Need Assessment (PDNA),**
3. **Recovery Need Assessment (RNA),**
4. **Global Rapid Post-Disaster Damage Estimation (GRADE), and**
5. **Rapid Impact & Needs Assessment (RINA)**

National Loss and Damage Assessment Methodologies

In India, two methodologies are used to assess the damages and losses of natural disasters:

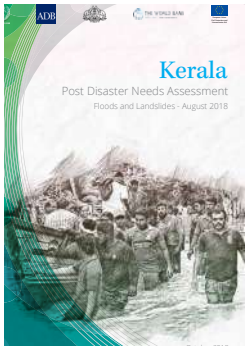
1. Damage and Loss Assessment (DaLA) and
2. Post Disaster Need Assessment (PDNA)

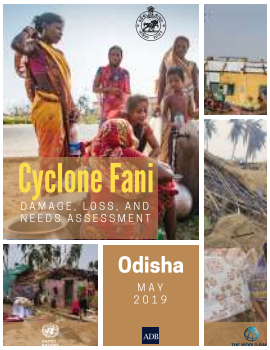
The National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Government of India has also developed the Post Disaster Needs Assessment (PDNA) Tools for India under the National Cyclone Risk Mitigation Project assisted by the World Bank. The objective of these tools is to establish a standardised mechanism based on scientific approach for conducting post disaster needs assessment for long term recovery and reconstruction. The newly developed tools are based on the existing damage assessment system in India and an internationally-accepted methodology which has been used worldwide and adopted by the United Nations Development Group (UNDG), the European Union (EU) and the World Bank (WB) which signed a joint declaration in 2008 on Post-Crisis Assessments and Recovery Planning. NIDM has completed the tools for calculating indirect loss, opportunity cost loss and its impact on the macro economy of the affected state.

1 Global Facility for Disaster Reduction and Recovery (GFDRR). (2018). Post-Disaster Needs Assessments: Guidelines Volume (2013) & Disaster Recovery Framework Guide (2018). World Bank.

The current tool is an improvisation on the international tool initially developed by UNECLAC (United Nation Economic Commission of Latin American Countries). It has been customised to the Indian context and procedures and has been made easy to use by the officials at the local levels. The PDNA is the most updated methodology that includes DaLA and RNA[2]. This (PDNA) methodology has been used only twice in India:

- the Kerala flood[3] and
- the FANI cyclone in Odisha[4]





During the Kerala flood, with the help of the government of Kerala, the United Nations, the World Bank, and the Asian Development Bank (ADB), a PDNA was conducted to assess the damages, losses, and need for reconstruction. The PDNA estimated the total damages to be around INR 10,557 crore and total losses to be around INR 16,163 crore[3].

With the joint effort of the Department of Economic Affairs, Ministry of Finance, Government of India, the United Nations, the World Bank, and Asian Development Bank (ADB), detailed damage, loss, and needs assessment (DLNA) was conducted in Odisha to support the recovery process after the FANI cyclone. The assessment report estimated the total damages to be worth INR 16,465 crore (USD 2,352 million) and total losses to be worth INR 7,712 crore (USD 1,102 million). The recovery needs were estimated at INR 29,315 crore (USD 4,188 million)[4].

For incurring expenditure from the Calamity Relief Fund (CRF) and the National Calamity Contingency Fund (NCCF), the Government of India, Ministry of Home Affairs, New Delhi, has outlined the existing approach that States, such as Kerala, use to develop the Relief Memorandum for availing assistance through the State Disaster Response Fund (SDRF) and the National Disaster Response Fund (NDRF).

2 World Bank. (2010). Damage, loss and needs assessment: Guidance notes.

3 Government of Kerala. (2018). Post Disaster Needs Assessment: Floods and Landslides – August 2018. Kerala State Disaster Management Authority

4 Government of Odisha. (2019). Cyclone Fani 2019 DLNA Report. Odisha State Disaster Management Authority.

Brief comparison of DaLa and PDNA methodology

Methodology	Year of Launch	Developed by
Damage and Loss Assessment (DaLA)[1] 	1972	UN-ECLAC (United Nations-Economic Commission for Latin America & Caribbean).
PDNA (Post Disaster Need Assessment)[2] 	2008	UNDP, EU, World Bank
PDNA (Post Disaster Need Assessment)[3] 	2019	National Institute of Disaster Management, under the Ministry of Home Affairs, Government of India

1 *ECLAC. (1972). Damage and Loss Assessment (DaLA)*

2 *UNDP (2008). Post Disaster Needs Assessment (PDNA)*

3 *NIDM (2019). Handbook: Post Disaster Needs Assessment India. Ministry of Home Affairs, GoI.*

Strength	Weaknesses	Used by (States/ Countries)
a. Includes direct and indirect losses. b. Assess disaster effects across most of the sectors of society & economy. c. Gives inputs for economic recovery and reconstruction.	a. Assess only the value of destroyed assets & change in production flows of goods and services but not overall macro-economic impact. b. No assessment of impacts at personal or household levels on income & costs of living. c. Does not include all the sectors of the economy.	Used by (States/ Countries) Managua (Earthquake), Gujarat (Earthquake), Indonesia, Thailand, India, Sri Lanka, Maldives (Indian Ocean Tsunami)
a. Detailed and globally accepted methodology. b. Covers every sector of the economy. Comprehensive & systematic methodology. c. In-depth analysis of Damages, Losses, and needs of the country.	a. Limited evidence of inclusion of the Private sector. b. Exclusion of marginalised & vulnerable people. c. Accountability issue. d. There is no specific assessment procedure to cater to the needs of smaller countries.	More than 60 countries have used it.
a. A systematic and comprehensive version of PDNA methodology. b. Include the needs of India specifically. c. Provide a long- term recovery & reconstruction plan. d. Indirect losses, opportunity costs, and macro economic impacts are included.	a. Some sectors are yet to be included. b. Unavailability of data for each sector. c. Private losses are not accounted for d. Underestimation of building back better cost. e. Local government, villagers, and communities have not been given sufficient importance in the study.	India (Kerala Flood and Odisha FANI Cyclone)

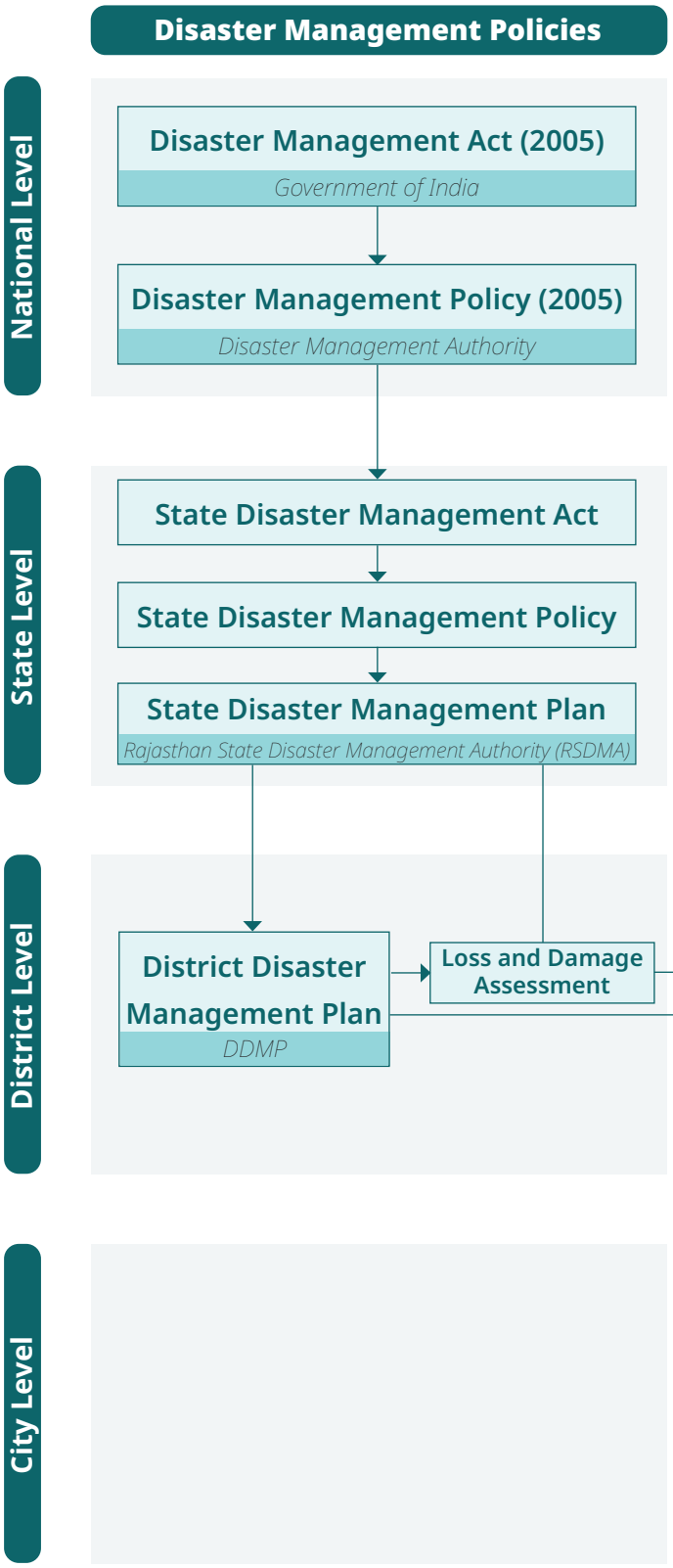
Loss and Damage Assessment Framework

The figure depicts a listing of the inter-relationship of statutory legislation leading to L&D assessment provision at the state and district level. This highlights the multilevel framework of disaster management and climate change policies at the national level and the state, district, and city levels with reference to Rajasthan, India. At the national level, key driver is the Disaster Management Act of 2005, with guidelines on flood, drought, and heatwave and an overall National Action Plan on Climate Change, NAPCC, in addition to health in the NAPCCHH.

At the state level of Rajasthan, it has enacted the State Disaster Management Act, policy, and plan, with concentration put on extreme heat exposure and flood, risk, and the State Action Plan on Climate Change (SAPCC) and health component to include SAPCCHH.

District level promotes more localized disaster preparedness through the formulation of district disaster management plans which includes focus on the assessment of loss and damage where Udaipur DIstrict will be detailed in further sections in this report.

At the city level, Udaipur larger resilience strategies in response to climate change impacts and towards sustainable urban resilience.



Guidelines/ Plans/ Initiatives	Climate Change Policies
Management of Floods 2008 *National Disaster Management Guidelines*	**National Action Plan on Climate Change** *NAPCC 2008*
Management of Drought 2010 *National Disaster Management Guidelines*	**National Action Plan on Climate Change and Human Health** *NAPCCHH 2018*
Management of Heatwave 2019 *National Disaster Management Guidelines*	
Rajasthan Heat Wave Action Plan *2024*	**State Action Plan on Climate Change** *SAPCC*
Rajasthan State Flood Action Plan *2024*	**State Action Plan on Climate Change and Human Health** *SAPCCHH*
Rajasthan Climate Change Project *Climate Resilience Heat Action Plan for Rural Settings 2017*	
Udaipur District Disaster Management Plan *RSDMA 2019*	**Udaipur District Environment Plan** *District Environment Committee, Udaipur 2020*
Udaipur Urban 95 City *Udaipur 2023*	**Net-Zero Climate Resilient City Action Plan** *Udaipur CRCAP 2024*
	Children focused vulnerability assessment and city resilience action strategy of Udaipur city *GEAG 2017*

National Disaster Management Act, 2005

Under the act, the following institutions, committees, plans and policies have been set-up at national, state and district level:

- Disaster Management Authority with clearly defined powers and functions
- Advisory committee for overall coordination, hand-holding and technical assistance
- Executive committee and sub-committee
- Formulation of disaster management plans
- Guidelines for minimum standards of relief
- National Institute of Disaster Management is responsible for planning and promoting training and research in the area of disaster management, documentation and development of information base relating to disaster management policies, prevention mechanisms and mitigation measures.
- National Disaster Response Force
- Disaster Response Fund and Disaster Mitigation Fund

Core focus of National Disaster Management Plan -

- Measures to be taken for the prevention of disasters, or the mitigation of their effects;
- Measures to be taken for the integration of mitigation measures in the development plans;
- Measures to be taken for preparedness and capacity building to effectively respond to any threatening disaster situations or disaster;
- Roles and responsibilities of different Ministries or Departments of the Government of India in respect of measures specified in clauses (a), (b) and (c).

Guidelines for minimum standards of relief at national level-

- The minimum requirements to be provided in the relief camps in relation to shelter, food, drinking water, medical cover and sanitation;
- The special provisions to be made for widows and orphans;
- Ex-gratia assistance on account of loss of life as also assistance on account of damage to houses and for restoration of means of livelihood;
- Similar other relief may be necessary.

Core focus of State Disaster Management Plan -

- The vulnerability of different parts of the State to different forms of disasters;
- The measures to be adopted for prevention and mitigation of disasters;
- The manner in which the mitigation measures shall be integrated with the development plans and projects;
- The capacity-building and preparedness measures to be taken;
- The roles and responsibilities of each Department of the Government of the State in relation to the measures specified in clauses (b), (c) and (d) above;
- The roles and responsibilities of different Departments of the Government of the State in responding to any threatening disaster situation or disaster.

Guidelines for minimum standard of relief by State Authority -

The State Authority shall lay down detailed guidelines for providing standards of relief to persons affected by disaster in the State, provided that such standards shall in no case be less than the minimum standards in the guidelines laid down by the National Authority in this regard.

Core focus of District Disaster Management Plan -

- The areas in the district vulnerable to different forms of disasters;
- The measures to be taken for the prevention and mitigation of disasters by the government departments at the district level and the local authorities within the district;
- The capacity-building and preparedness measures required to be taken by the Departments of the Government at the district level and the local authorities in the district to respond to any threatening disaster situation or disaster;
- The response plans and procedures, in the event of a disaster.

Responsibilities of National Ministries, and State level Departments -

- Take measures necessary for prevention of disasters, mitigation, preparedness and capacity-building in accordance with the guidelines laid down by the Authority;
- Integrate into its development plans and projects, the measures for prevention or mitigation of disasters in accordance with the guidelines laid down by the Authority;
- Respond effectively and promptly to any threatening disaster situation or disaster in accordance with the guidelines of the Authority or the directions of the Executive Committee in this behalf;
- Review the enactments administered by it, its policies, rules and regulations, with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness;
- Allocate funds for measures for prevention of disaster, mitigation, capacity-building and preparedness;
- Provide assistance to the National Authority and State Governments for -
    - Drawing up mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personnel in relation to disaster management;
    - Carrying out rescue and relief operations in the affected area;
    - Assessing the damage from any disaster; carrying out rehabilitation and reconstruction;
- Make available its resources to the National Executive Committee or a State Executive Committee for the purposes of responding promptly and effectively to any threatening disaster situation or disaster
- Local authorities: Subject to the directions of the District Authority, a local authority shall
    - Ensure that its officers and employees are trained for disaster management;
    - Ensure that resources relating to disaster management are so maintained as to be readily available for use in the event of any threatening disaster situation or disaster;
    - Ensure all construction projects under it or within its jurisdiction conform to the standards and specifications laid down for prevention of disasters and mitigation by the National Authority, State Authority and the District Authority;
    - Carry out relief, rehabilitation and reconstruction activities in the affected area in accordance with the State Plan and the District Plan.

National Policy on Disaster Management (NPDM), 2009

The objectives of the National Policy on Disaster Management are:

- Promoting a culture of prevention, preparedness and resilience at all levels through knowledge, innovation and education.
- Encouraging mitigation measures based on technology, traditional wisdom and environmental sustainability.
- Mainstreaming disaster management into the developmental planning process.
- Establishing institutional and techno-legal frameworks to create an enabling regulatory environment and a compliance regime.
- Ensuring efficient mechanism for identification, assessment and monitoring of disaster risks.
- Developing contemporary forecasting and early warning systems backed by responsive and fail-safe communication with information technology support.
- Ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society.
- Undertaking reconstruction as an opportunity to build disaster resilient structures for ensuring safer living.
- Promoting a productive and proactive partnership with the media.

Financial Arrangements -

- Information on the National and state disaster response and mitigation funds.
- Considering that the assistance provided by the Government for rescue, relief, rehabilitation and reconstruction needs cannot compensate for massive losses on account of disasters, new financial tools such as catastrophe risk financing, risk insurance, catastrophe bonds, micro-finance and insurance etc., will be promoted with innovative fiscal incentives to cover such losses of individuals, communities and the corporate sector.

Reconstruction and Recovery Approach –

- The approach to the reconstruction process has to be comprehensive so as to convert adversity into opportunity.
- Incorporating disaster resilient features to 'BBB' to be the guiding principle.
- The appropriate choice of technology and project impact assessment needs to be carried out to establish that the projects contemplated do not create any side effects on the physical, socio-cultural or economic environment of the communities in the affected areas or in their neighbourhood.

Linking Recovery with Safe Development –

- Plugging the gaps in the social and economic infrastructure and infirmities in the backward and forward linkages.
- Efforts will be made to support and enhance the viability of livelihood systems, education, health care facilities, care of the elderly, women and children, etc.
- Other aspects warranting attention will be roads, housing, drinking water sources, provision for sanitary facilities, availability of credit, supply of agricultural inputs, upgradation of technologies in the on-farm and off-farm activities, storage, processing, marketing, etc.
- Livelihood restoration: State governments will have to lay emphasis on the restoration of permanent livelihood of those affected by disasters and special attention to the needs of women-headed households, artisans, farmers and people belonging to marginalised and vulnerable sections.

Rajasthan State Disaster Management Act 2005

The Rajasthan State Disaster Management Act, 2005 provides the legislative framework for managing disasters in Rajasthan. It lays out guidelines for disaster prevention, preparedness, mitigation, response, and recovery. The Act's provisions aim to create a structured approach to deal with both natural and man-made disasters and ensure the safety and resilience of the state's population. This legislative framework ensures a coordinated approach to disaster management across Rajasthan, enhancing the state's preparedness and response capabilities while fostering community participation in building disaster resilience. Below are the key provisions of the Act.

Formation of Disaster Management Authorities

The Rajasthan State Disaster Management Authority (RSDMA) was established to oversee the coordination of disaster management activities in the state. Additional key organizations include the district-level District Disaster Management Authorities (DDMAs), headed by the District Collector, along with local authorities, municipal bodies, and other relevant agencies.

Function of State Government

The state government's role is to develop policies, guidelines, and disaster management plans. This includes overseeing preparedness, mitigation, and recovery efforts across departments. Functions include collecting and maintaining data on hazards, developing disaster management plans, conducting awareness programs, and ensuring that resources are in place for disaster response. The State Executive Committee (SEC) assists the RSDMA in policy formulation and implementation.

Roles of Local Authorities and Community Organizations

- Local authorities, in consultation with state agencies, are responsible for drafting and implementing disaster management plans for their jurisdictions.
- The Act emphasizes community involvement in disaster preparedness, capacity building, and relief operations. Non-governmental organizations (NGOs), community groups, and the private sector are also encouraged to participate in disaster response activities.

Response and Relief

The Relief Commissioner and District Collectors are empowered to organize and coordinate emergency relief efforts during a disaster. These efforts may involve managing evacuations, providing medical aid, setting up temporary shelters, and securing affected areas. Essential services and infrastructure restoration, such as transportation and communication, are prioritized during relief operations.

Areas at Risk of Disaster

The Act allows for the declaration of certain regions as disaster-prone areas, enabling targeted interventions like risk assessments, early warning systems, and infrastructure improvements in those zones.

Violations and Related Penalties

The Act provides for penalties for obstructing disaster management operations, spreading false information about disasters, or making fraudulent claims for relief and assistance.

Accounts, Audit, and Finance

The Rajasthan Disaster Management Fund is created under the Act to finance disaster-related activities. This includes relief operations, preparedness measures, and recovery projects.

Provisions for the proper use, auditing, and budgeting of funds are included, ensuring transparency and accountability in disaster management finance.

Rajasthan State Disaster Management Plan (SDMP) 2014

The Rajasthan State Disaster Management Plan (SDMP) 2014 aligns with the National Disaster Management Act, 2005 and serves as a comprehensive framework for disaster preparedness, response, recovery, and risk reduction in the state. The Rajasthan SDMP 2014 provides a robust framework for managing disasters with a focus on building resilience, enhancing preparedness, and improving risk governance. The plan integrates disaster risk reduction with development policies, emphasizing both immediate response and long-term recovery. Below is an overview of the plan's key features:

Vulnerability Snapshot

The SDMP highlights vulnerable populations in the state, disaggregated by various social factors such as Below Poverty Line (BPL) population, Persons with Disabilities (PwDs), the elderly and children (Census 2011), and registered pregnancies (NFHS 2019). It further analyzes the structural vulnerabilities related to housing, infrastructure, and services in high-risk areas, alongside economic and environmental vulnerabilities identified through the 2011 census.

Key Hazards

The plan identifies nine major hazards in Rajasthan: earthquakes, floods, droughts, extreme heat, epidemics, chemical disasters, and industrial accidents. The framework takes a proactive approach toward risk reduction by focusing on hazard-specific preparedness and mitigation measures.

Thematic Areas of Focus

The SDMP integrates key themes from the Sendai Framework for Disaster Risk Reduction and focuses on the following six thematic areas for disaster risk management:

1. Understanding Risk: Improving risk assessment and hazard mapping.
2. Inter-Agency Coordination: Ensuring coordination between government agencies, local authorities, and community organizations.
3. Investing in DRR – Structural Measures: Strengthening physical infrastructure like dams, buildings, and flood controls.
4. Investing in DRR – Non-Structural Measures: Emphasizing policies, awareness, and capacity building.
5. Capacity Building: Training government officials and local communities in disaster management.
6. Climate Change Risk Management: Integrating climate change adaptation strategies into disaster management plans.

Preparedness and Awareness

The plan emphasizes public awareness campaigns, regular mock drills, and community-level preparedness. Special focus is placed on technological solutions like early warning systems and disaster mapping. Training programs for government personnel, NGOs, and community volunteers are outlined to ensure prompt and coordinated responses during disasters.

Disaster Response and Relief

The SDMP outlines detailed procedures for disaster response, including search and rescue operations, health services, and the provision of temporary shelters. Relief efforts include the immediate restoration of essential services, distribution of emergency kits, and financial aid to affected populations. The 'Build Back Better' BBB principle is central to post-disaster recovery efforts, aiming to rebuild with resilience and sustainability.

Community and Stakeholder Involvement

The plan encourages active participation from local communities, NGOs, and businesses. Gender sensitivity and inclusion of vulnerable groups such as women, children, and PwDs are emphasized. The role of local disaster management committees in risk assessment, preparedness, and relief efforts is highlighted.

Loss and Damage Assessment

The SDMP provides a framework for assessing the social, economic, and environmental impacts of disasters, focusing on both immediate losses (lives, livelihoods, infrastructure) and long-term damage (environmental degradation, social dislocation). It recommends conducting a Post-Disaster Needs Assessment (PDNA) to guide recovery efforts, starting with immediate damage assessments for urgent response, followed by detailed evaluations to address long-term impacts on housing, agriculture, and infrastructure. The plan emphasizes rebuilding with the BBB approach to enhance future disaster resilience.

Relief and Compensation

The plan outlines relief mechanisms, including compensation for affected populations, and prioritizes vulnerable groups for the disbursement of relief funds. Relief measures such as financial assistance, the provision of relief kits, and the reconstruction of infrastructure are initiated based on the damage assessment.

Governance and Coordination

The Rajasthan State Disaster Management Authority (RSDMA) is the lead agency responsible for overseeing disaster management efforts in the state, in collaboration with district-level authorities and local governance bodies. Disaster Management Funds are earmarked to ensure a steady flow of financial resources for disaster preparedness, response, and recovery.

Udaipur District Disaster Management Plan (DDMP)



The Udaipur District Disaster Management Plan (DDMP) 2024-25 outlines a comprehensive approach to disaster preparedness, mitigation, response, and recovery. The plan focuses on reducing the loss of life and property due to disasters in the district, which is prone to hazards such as floods, droughts, earthquakes, landslides, and extreme heat. The Udaipur DDMP focuses on strengthening local capacity, improving disaster risk governance, and building resilience in the district through proactive disaster risk reduction measures. The plan aims to minimize the impacts of disasters and ensure a coordinated and efficient response to protect lives and livelihoods.

Institutional Arrangements

The Udaipur District Disaster Management Committee (DDMC), chaired by the District Collector, is responsible for overseeing all disaster management efforts. The DDMC coordinates between various government departments, NGOs, local authorities, and community organizations to ensure an integrated disaster response. Specific tasks, such as search and rescue operations, shelter management, health services, and sanitation, are delegated to designated task forces.

Hazard Vulnerability and Risk Assessment

Udaipur is vulnerable to multiple hazards, with particular susceptibility to floods due to its proximity to lakes and rivers, earthquakes (located in Seismic Zone II), and drought due to recurring water scarcity.

A detailed risk assessment is conducted for key areas in the district, including Girwa, Bargaon, Gogunda, and Kherwara blocks, which have been identified as high-risk zones for natural disasters. The plan incorporates a multi-hazard risk assessment to understand the district's vulnerabilities better.

Preparedness and Mitigation

The DDMP emphasizes preparedness through regular mock drills, public awareness programs, and capacity-building exercises for government officials, community leaders, and local volunteers. Mitigation measures focus on retrofitting vulnerable buildings, enforcing disaster-resilient building codes, and improving

early warning systems for floods and other hazards. The engagement of local communities in disaster preparedness activities, such as village-level disaster management plans and training programs, is a key focus of the plan.

Response Mechanism

During disasters, the District Emergency Operation Centre (DEOC) is activated to coordinate the response across various agencies. Task forces led by different government departments ensure timely rescue, relief, and rehabilitation. The plan details standard operating procedures for evacuation, search and rescue operations, and the provision of essential services like food, water, medical aid, and shelter during emergencies. The Incident Response System (IRS) is used to streamline roles and responsibilities, ensuring quick decision-making and resource mobilization.

Recovery and Rehabilitation

Post-disaster recovery efforts focus on restoring essential infrastructure, including roads, water supply, and healthcare facilities. The plan emphasizes long-term recovery through the "Build Back Better" strategy, ensuring reconstruction efforts result in more resilient infrastructure and communities. Rehabilitation of affected populations, including livelihood support and the restoration of community infrastructure, is a key priority.

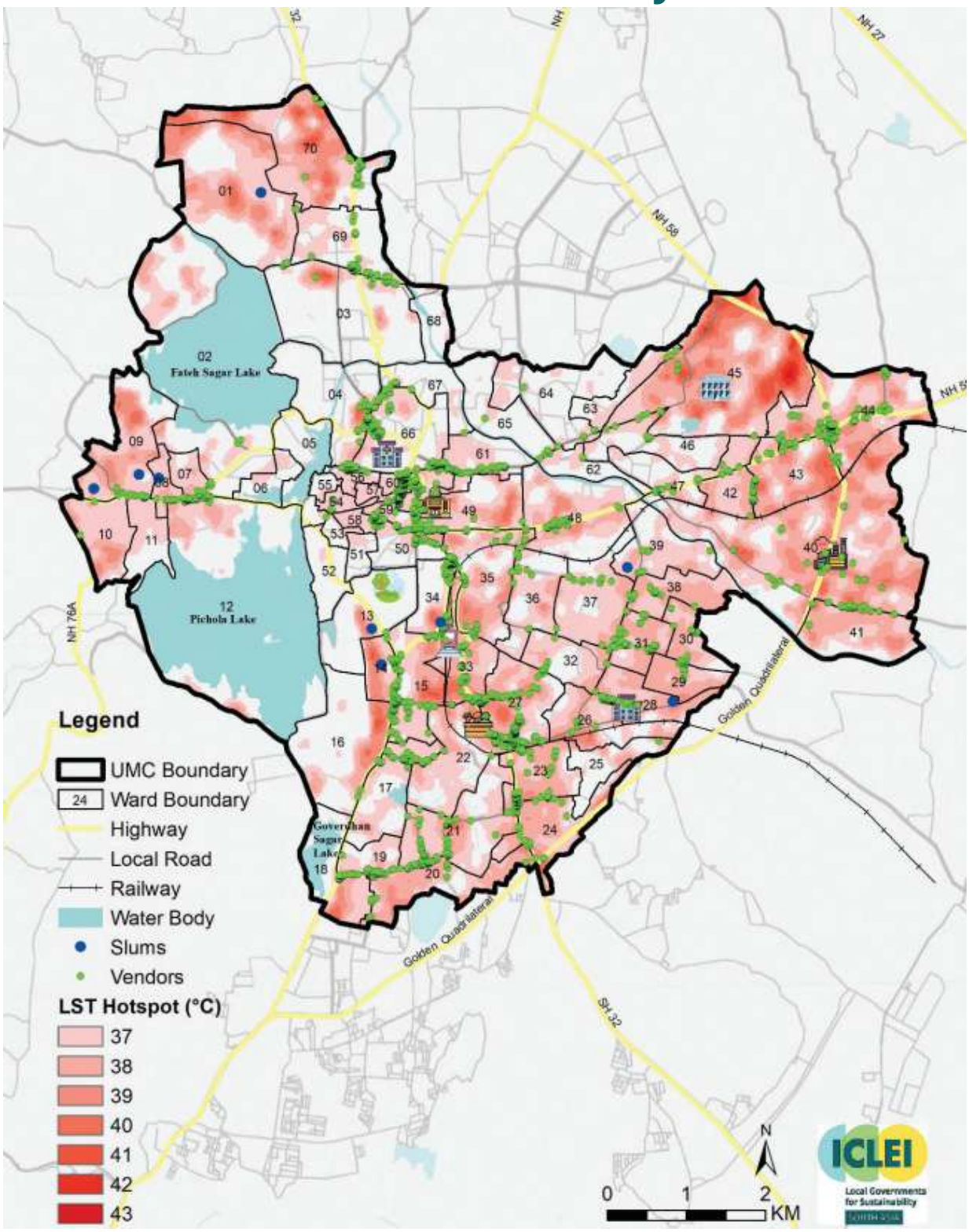
Public Awareness and Capacity Building

A strong focus is placed on raising public awareness about disaster risks through educational campaigns, school programs, and community training sessions. The DDMP promotes capacity building for local disaster response teams, and encourages the involvement of local governance institutions like Panchayati Raj Institutions (PRIs) in planning and preparedness activities. Regular training programs for government staff and community leaders ensure a state of readiness to handle disasters effectively.

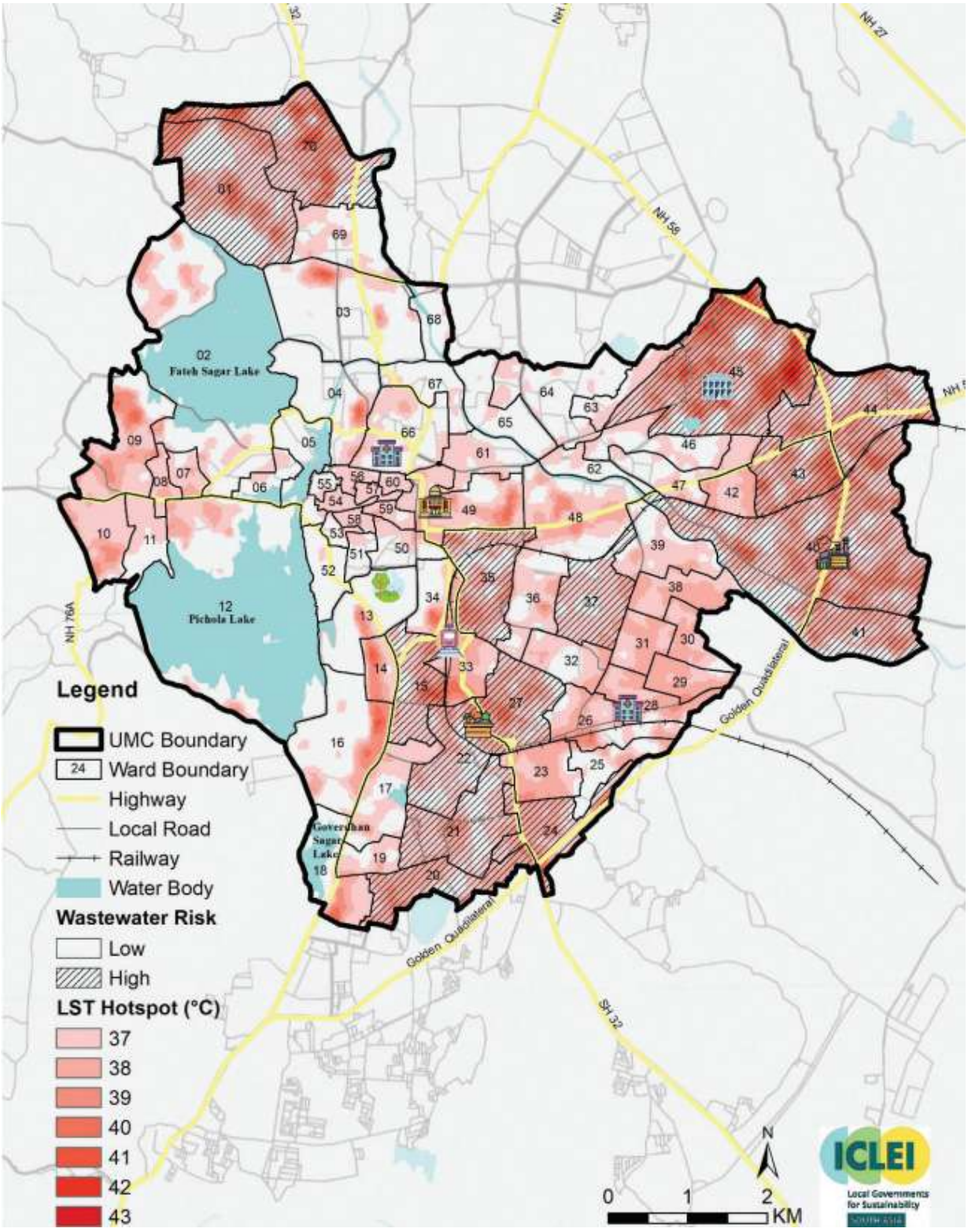
Focus on Climate-Related Hazards

The Udaipur DDMP highlights the district's vulnerability to climate-induced hazards like drought and extreme heat, which have worsened due to climate change. The plan emphasizes preparedness through targeted action plans, including public health advisories, community shelters, and water conservation measures to protect at-risk populations. Special focus is given to vulnerable groups such as children, pregnant women, the elderly, and the economically disadvantaged, ensuring they are equipped to handle these hazards. By integrating mitigation and adaptation strategies, the DDMP aims to build climate resilience and safeguard lives and livelihoods in Udaipur.

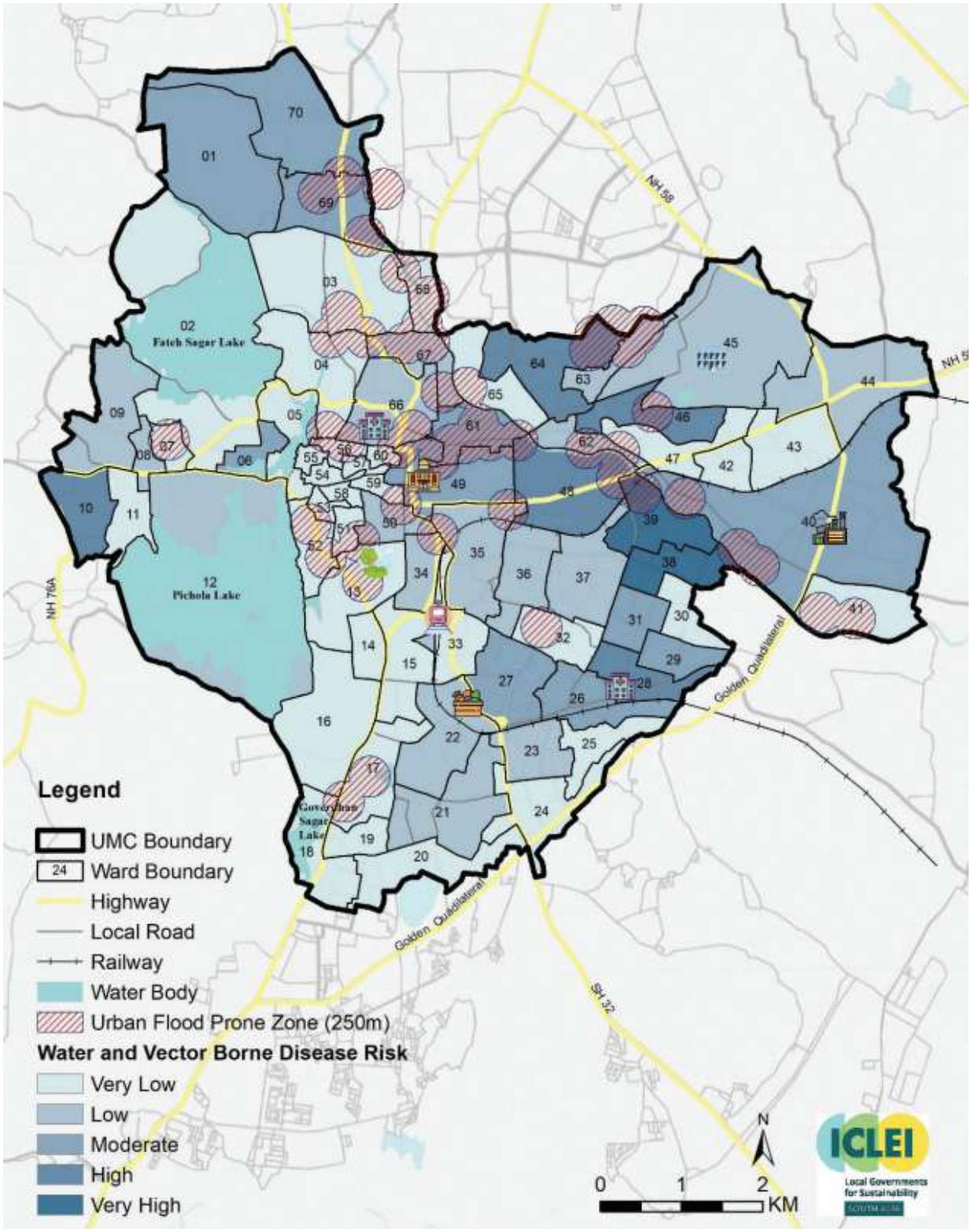
6.2 Climate Risk and Vulnerability Assessment Maps



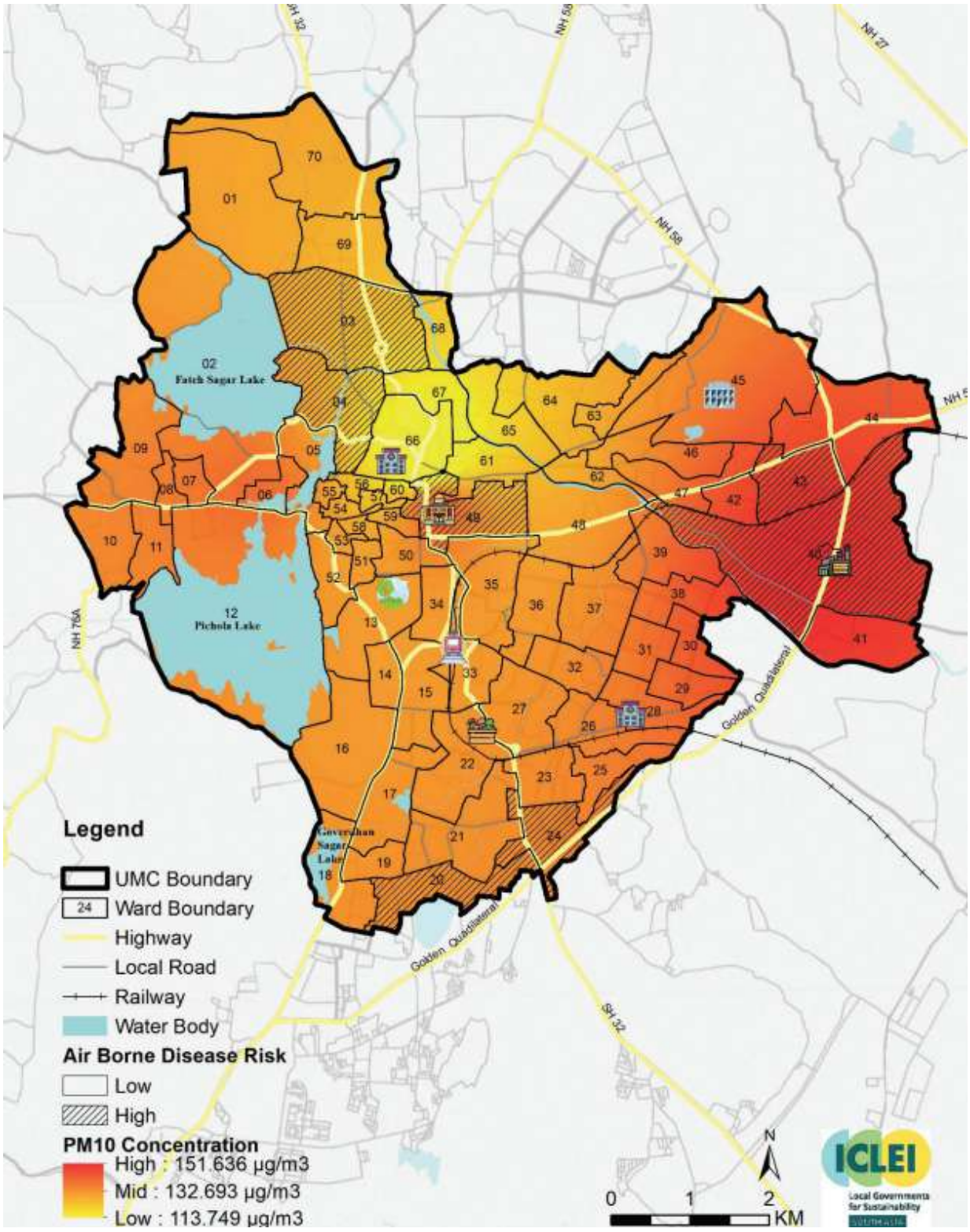
Map 11. Location of slums and vendors vulnerable to urban heat



Map 12. Wards exposed to urban heat and wastewater management related issues



Map 13. Flood prone area assessmen; Water and vector borne disease risk



Map 14. Areas with high air pollution and air borne disease risk

6.3 Ward wise Population

Ward No	Total Population	Young Children Population *(0-6 age)*
1.	7976	848
2.	7667	815
3.	6434	684
4.	8232	875
5.	7110	756
6.	8110	862
7.	7311	777
8.	7736	822
9.	8434	897
10.	7368	783
11.	6565	698
12.	8394	892
13.	8436	897
14.	8263	878
15.	8313	884
16.	8159	867
17.	7743	823
18.	7465	794
19.	7823	832
20.	8443	897
21.	8239	876
22.	8291	881
23.	8565	910
24.	8439	897

Ward No	Total Population	Young Children Population *(0-6 age)*
25.	9732	1035
26.	8233	875
27.	6773	720
28.	8426	896
29.	8508	904
30.	7088	753
31.	8022	853
32.	8040	855
33.	8468	900
34.	7797	829
35.	6426	683
36.	7762	825
37.	7316	778
38.	7352	782
39.	8386	891
40.	7468	794
41.	8015	852
42.	7864	836
43.	5868	624
44.	8145	866
45.	7664	815
46.	8916	948
47.	8071	858
48.	7910	841

Ward No	Total Population	Young Children Population *(0-6 age)*
49.	7663	815
50.	8482	902
51.	8678	922
52.	7864	836
53.	7361	782
54.	7958	846
55.	8887	945
56.	8227	875
57.	8027	853
58.	8393	892
59.	8371	890
60.	7451	792
61.	8399	893
62.	7585	806
63.	7301	776
64.	8246	877
65.	6770	720
66.	7734	822
67.	10327	1098
68.	7868	836
69.	7838	833
70.	7719	821

Table 12. Ward wise population (Source: UMC and ICDS)

6.4 AWC wise enrollment

AWC Name	Enrolment	Building Status
Meenapada	87	School Room
Nehru Bazar	117	School Room
Gachhiwada	91	Rented
Kunjarwadi	52	Rented
Kunjarwada	109	Rented
Jogiwara	79	School Room
Patho ki magri	123	Rented
Kumharo ka Bhatta	111	Rented
Lohar basti	83	Rented
Shabri colony	90	Rented
Ravto ki badi	109	Rented
Banjara Govaria	112	Rented
Bekni Ganeshnagar	157	Rented
Pahara 1	100	Rented
Pahara 2	97	Rented
Roop Sagar	112	Rented
Lali Saray	105	Rented
Sunderwas 1	102	Rented
Sunderwas 2	119	Rented
Dhebar Colony 1	111	Rented
Dhebar Colony 2	81	Rented
Khempura 1	121	School Room
Khempura 2	103	Rented
Gameti Mohalla	135	Rented
South Sunderwas	112	Rented
Math Madri	130	Rented
Shaktinagar	105	Rented
Pratapnagar	102	Rented
Kukkutshala	119	School Room
Sector 4	115	Rented
Sector 3	111	School Room
Nokha	81	Rented
Paneri Madri 1	121	Rented
Paneri Madri 2	103	Rented
Prabhatnagar	135	Rented
Rajiv Colony	112	Rented

AWC Name	Enrolment	Building Status
Chamanpura	130	School Room
Naiwara	105	Rented
Khatikwara	102	Rented
Mehta ji ki Khidki	119	Rented
Bhoiwara 1	115	Rented
Bhoiwara 2	111	Rented
Kamla nagar	103	Rented
Kailash colony	135	Rented
Ramdwara Chowk	81	Rented
Dholi Baori	121	Rented
Kheradiwara	103	Rented
Oda ka Pada	135	Rented
Kanji hata 1	112	Rented
Kanji hata 2	130	Rented
Naiyo ki talai	105	Rented
Moti Chohatta	102	Rented
Salvi Colony	119	Rented
Khadag ji Mini	115	Rented
Lotan Magri	111	Rented
Khanjipeer	81	Rented
Indra nagar	121	Rented
Silawatwari 1	103	Rented
Silawatwari 2	135	Rented
Mahawatwari 1	112	School Room
Mahawat wari 2	130	Rented
Bichhughati	121	Rented
Jaatwari	87	Rented
Imli ghat	117	Rented
Naga Nagri	52	Rented
Noor Nagri	109	Rented
Bhindar haweli	79	Rented
Panduwadi	123	School Room
Laalghat	111	Rented
Bhatiyani chohatta	83	Rented
Yadav Colony	90	Rented
Ambavgarh	112	Rented

AWC Name	Enrolment	Building Status
Sajjan nagar	105	Rented
Premnagar	102	Rented
Amal ka kanta	119	Rented
Data bheru	115	Rented
Mograwadi	111	Rented
Shivaji nagar	81	Rented
Kishanpol mini	121	School Room
Kishanpol 1	103	Rented
Kishan pol 2	135	Rented
Patel circle	112	Rented
Machla magra 1	105	School Room
Swaraj nagar 1	102	Rented
Swaraj nagar 2	119	Rented
Machla magra 2	115	Rented
ML Tejawat	123	Rented
Nimachmata A	96	Rented
Nai Basti	112	Rented
Indra colony	105	School Room
Ambedkar nagar	102	Rented
Sec 14	119	Rented
Sec 11	115	Rented
Kheda	121	Rented
Roshanji ki badi	87	Rented
Barkat colony	125	Govt Building
Govardhan vilas1	103	School Room
Sec 9	135	Rented
Varma colony	112	Rented
Vijaysingh pathik	111	Rented
VS kacchi basti	102	Rented
Sec 9-1	119	Rented
Roshan nagar	115	Rented
Awrimata	111	Rented
Gariyawas 1	98	Rented
Gariyawas 2	121	Rented
Tekri	103	School Room
Police line	135	Govt Quarter

AWC Name	Enrolment	Building Status
Homepura	83	Rented
Regar colony	90	Rented
Surajpol 1	109	Rented
Surajpol 2	112	Rented
Brahmpuri	157	Rented
Picholi	100	Rented
Ambaata harijan	97	Rented
Od basti	112	Rented
Neemachmata B	83	Rented
Neemach kheda	93	ICDS Building
Manoharpura	109	School Room
Hanuman colony	116	Rented
Pulaan 1	109	School Room
Pulaan 2	101	Rented
Pulaan mini	97	Rented
Sh. bhagatsingh 1	121	Rented
Sh. Bhagatsingh 2	111	School Room
Krishnapura	102	Rented
Alipura	119	Rented
Bhikharinath math	117	School Room
Ram Manohar	111	Rented
Sajjan nagar 1	104	Rented
Mastan colony	98	Rented
Bhilurana	109	School Room
Rata khet	112	Rented
Amar nagar	157	Rented
Champa colony	101	Rented
Eklavya colony	97	Rented
Bhil basti	112	Rented
Daitya magri	105	Rented
Dewali	102	Rented
Dewali 2	123	Rented
Farukh basti	105	Rented
Kalbelia basti	102	Rented
Mallah talai	119	Rented
Gandhinagar	115	Rented

Table 13. AWC wise Enrolment

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