Bernard van Leer FOUNDATION

URBAN95 DATASMART

National Institute of Urban Affairs

Smart City MISSION TRANSFORM-NATION

Ministry of Housing and Urban Affairs
Government of India

आत्मनिर्भर भारत

स्वच्छ भारत
एक कदम स्वच्छता की ओर

Nurturing Neighbourhoods Challenge

Round 2 Technical Workshop Series
Workshop 2

Using innovative ways of data collection to design pilot projects

-By, DataSmart Urban95

Thursday, 8th July 2021
3:00pm Onwards

#NurturingNeighbourhoodsChallenge

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AGENDA

15:00 – 15:05	**Opening remarks** Mr. Rahul Kapoor, Director, Smart Cities Mission, MoHUA
15:05 – 15:20	**How might we target infants and toddlers at highest risk of air pollution, for outreach and intervention?** Ms. Jeenal Sawla, DAMU, Smart Cities Mission, MoHUA QnA
15:20 – 15:35	**How might we assess anganwadi play areas on sound, smell and touch to improve sensory stimuli for infants and toddlers?** Mr. Naman Sharma, DAMU, Smart Cities Mission, MoHUA QnA
15:35– 15:50	**How might we count young children in street situations to make them visible in policy decisions?** Mr. Mayank Saravagi, DAMU, Smart Cities Mission, MoHUA QnA
15:50 – 16:05	**How might we leverage mobile applications to audit accessibility for infants toddlers and their caregivers?** Mr. Udit Sarkar, DAMU, Smart Cities Mission, MoHUA QnA
16:05 – 16:15	**Interaction with cities**

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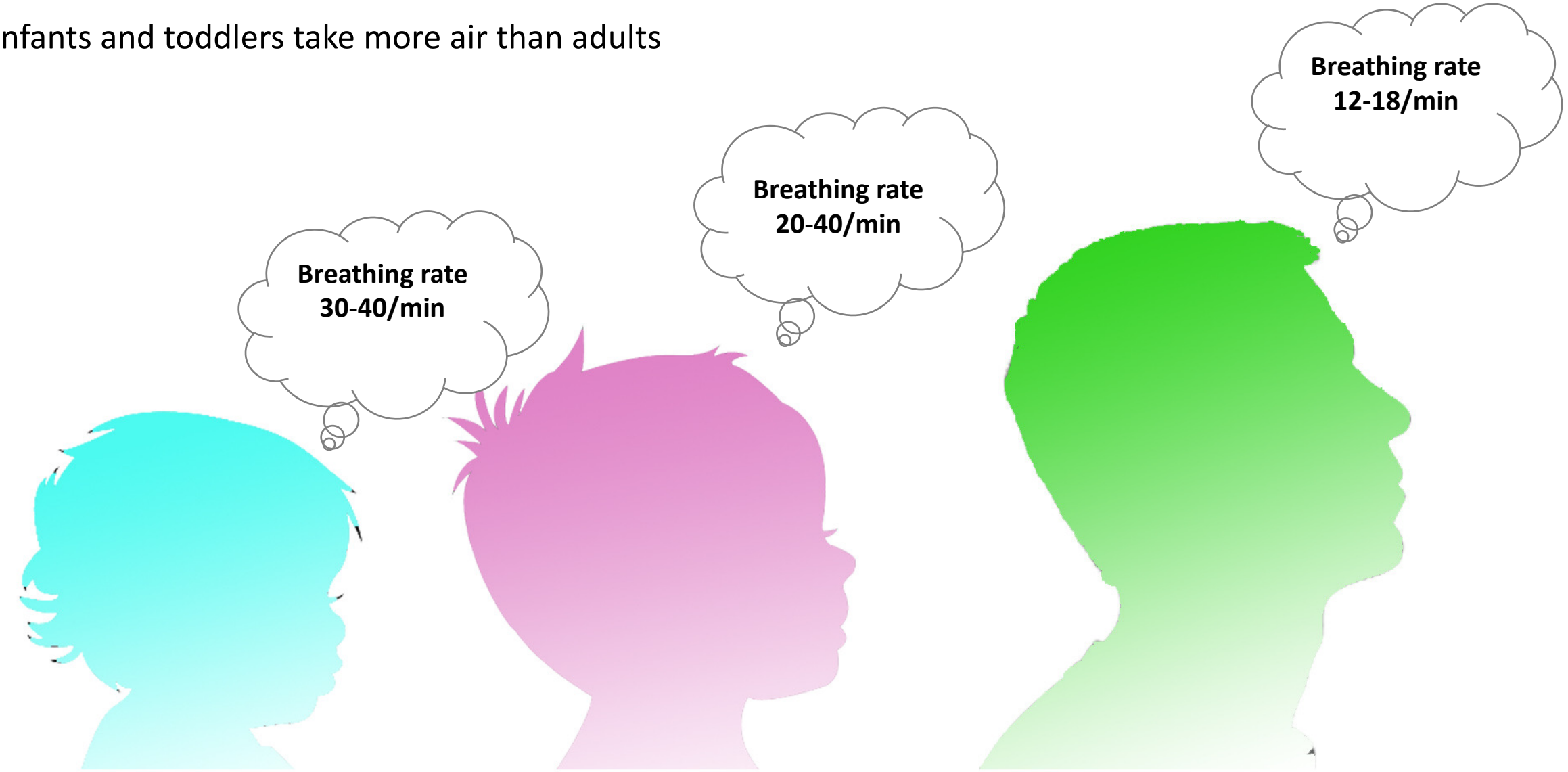
How might we target infants and toddlers in Delhi at highest risk of air pollution, for outreach and intervention ?

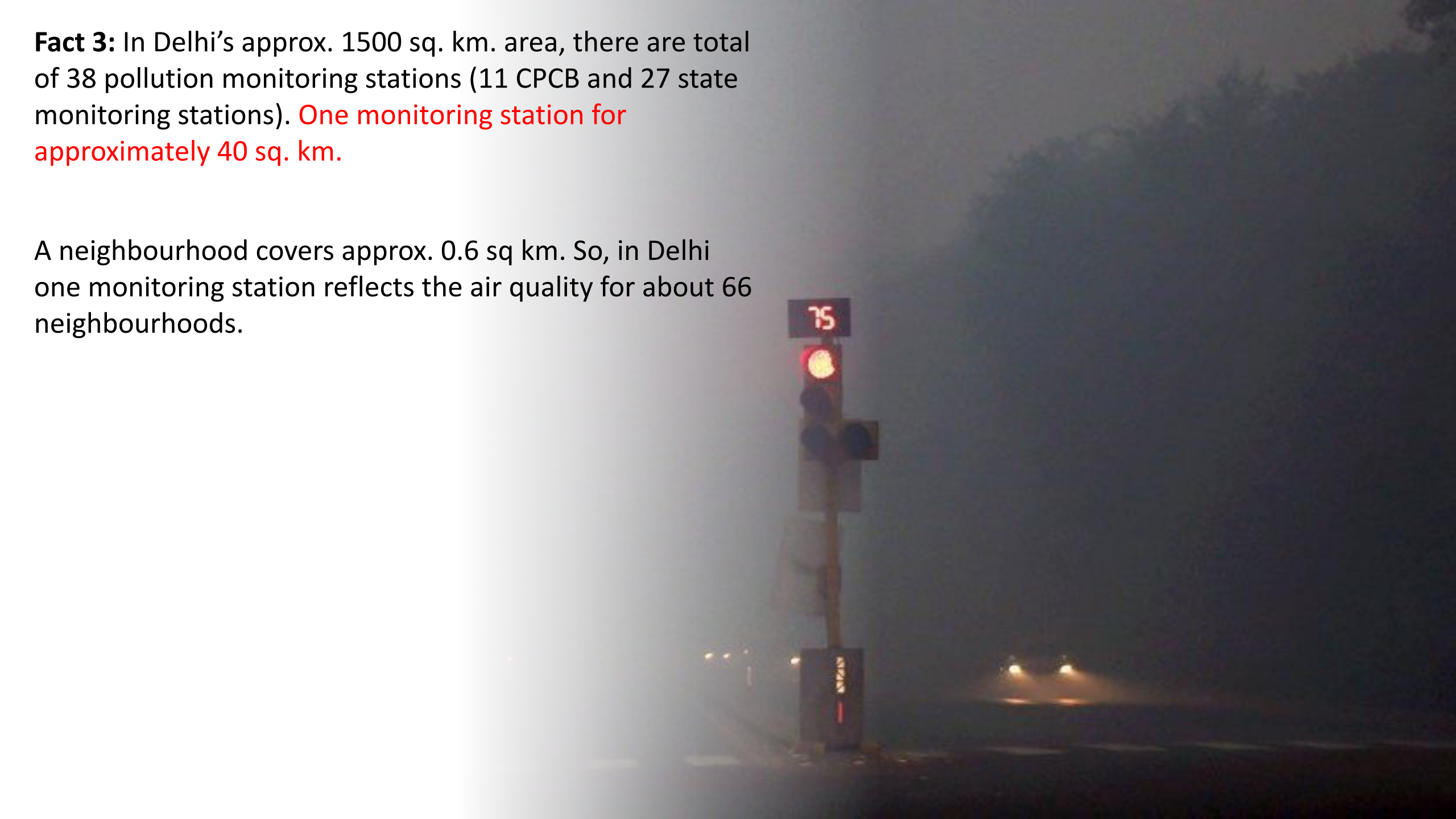
Fact 1: Infants and toddlers take more air than adults



Fact 2: Nitric oxide, Sulphuric Oxide, Ozone and PM 2.5 are the low-lying pollutants and affects toddlers the most.

Fact 3: In Delhi's approx. 1500 sq. km. area, there are total of 38 pollution monitoring stations (11 CPCB and 27 state monitoring stations). One monitoring station for approximately 40 sq. km.

A neighbourhood covers approx. 0.6 sq km. So, in Delhi one monitoring station reflects the air quality for about 66 neighbourhoods.



Methodology

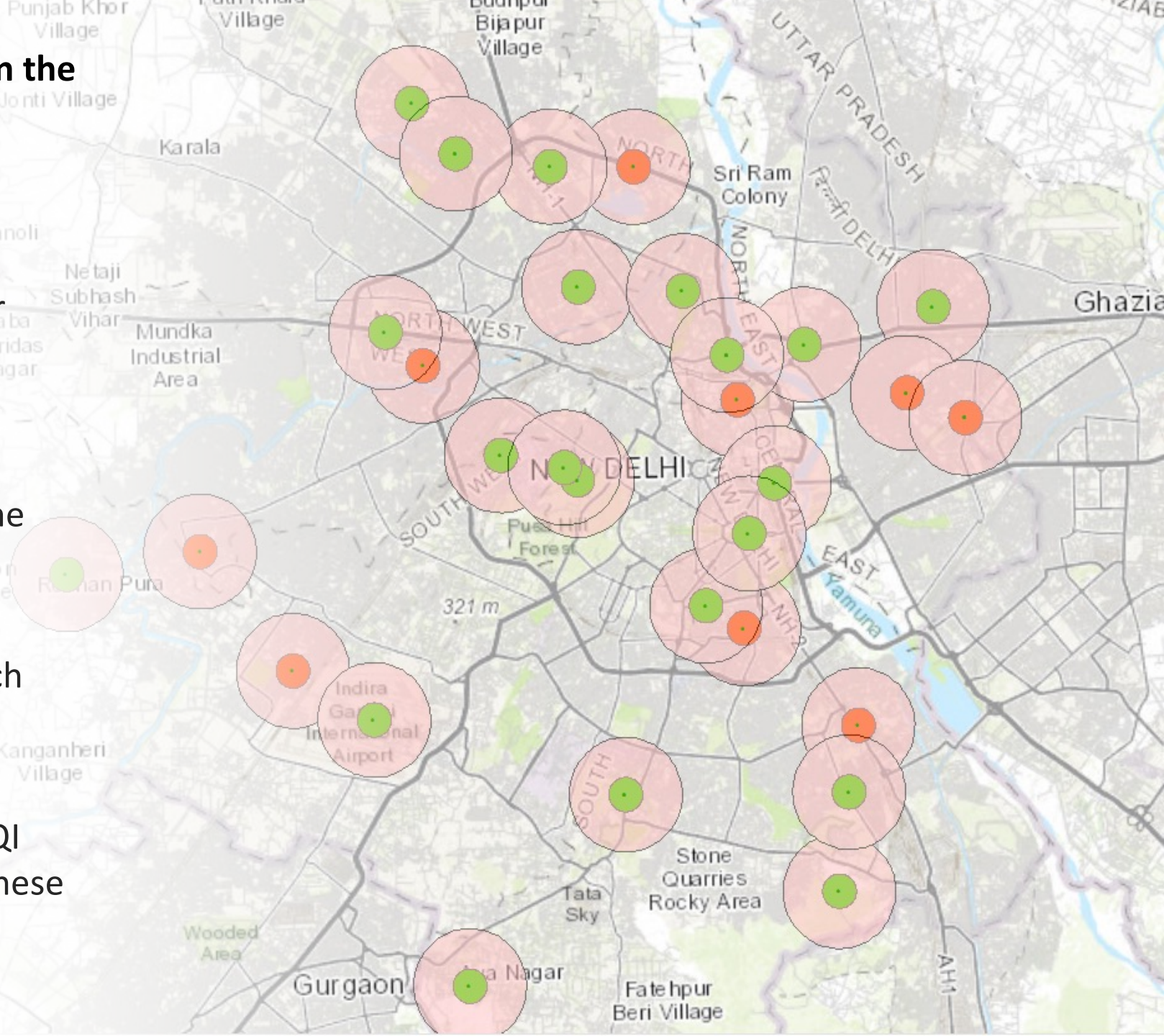
STEP 1: Identify poor air quality zones in the city using existing monitoring stations.

STEP 2: Zoom into neighborhoods with high density of infants and toddlers.

STEP 3: Monitor air quality at 95 cm height in high-risk neighborhoods using mobile air quality monitors.

STEP 1: Identify poor air quality zones in the city.

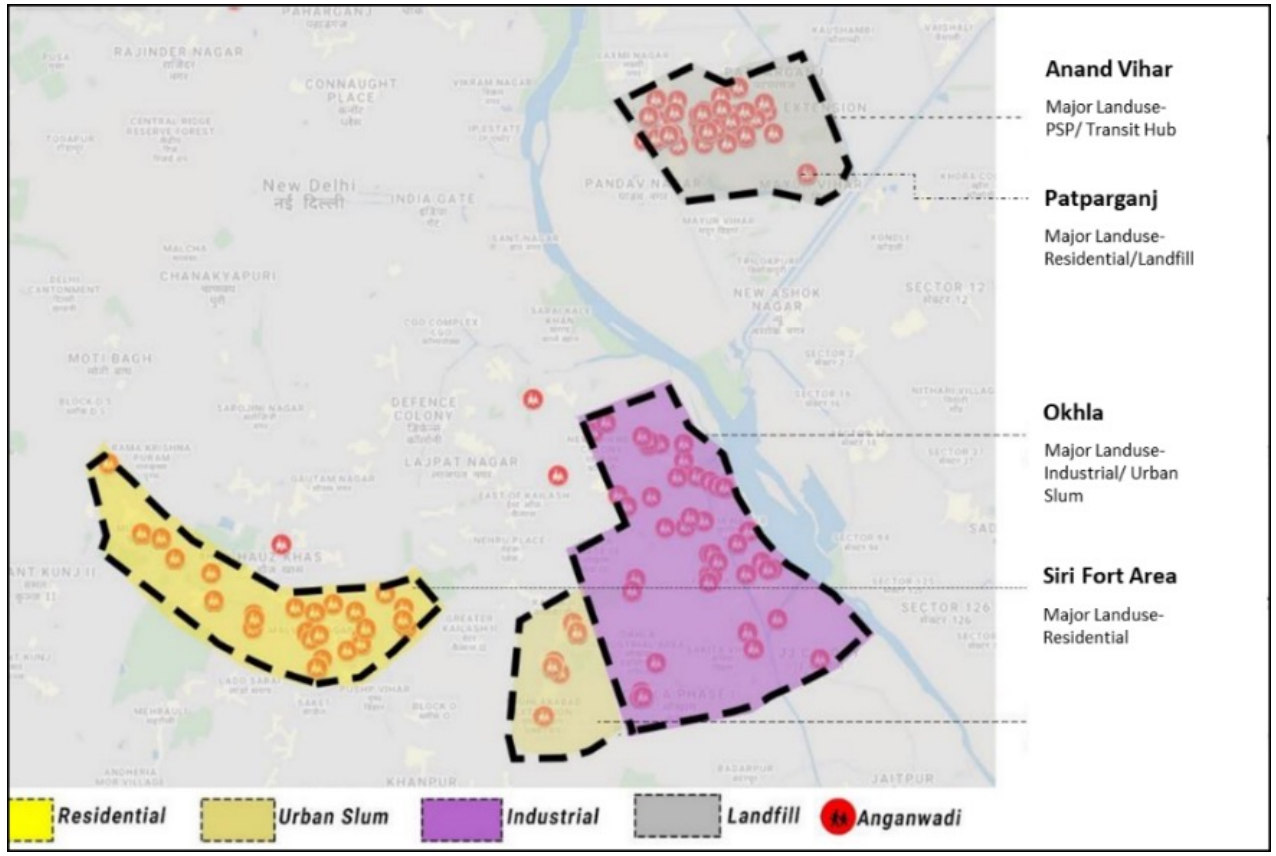
- Geolocate CPCB or any other monitoring stations that measure air quality in the city.
- Draw 600 m radius circles to denote approximate zones covered under the monitoring station.
- Record monthly average AQI for each station, over the past 24 months.
- Identify zones that are above 100 AQI threshold for most of the months. These may be denoted a high-risk zones.



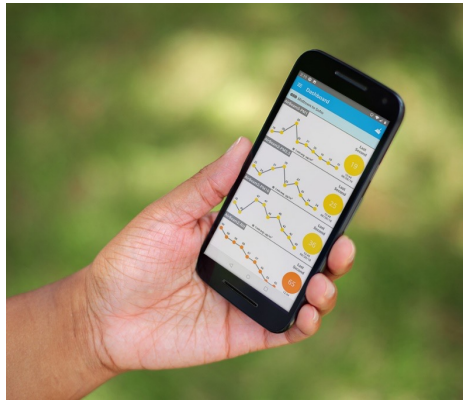
STEP 2: Zoom into neighbourhoods with high density of infants and toddlers.

- If the city does not maintain neighbourhood level locational data on 0-6 years population, then density of anganwadis geo-located on the city's map serves as a good proxy for areas frequently visited by young children and/or where they might live.

- City-wise anganwadi data can be sourced from the Integrated Child Development Scheme website.



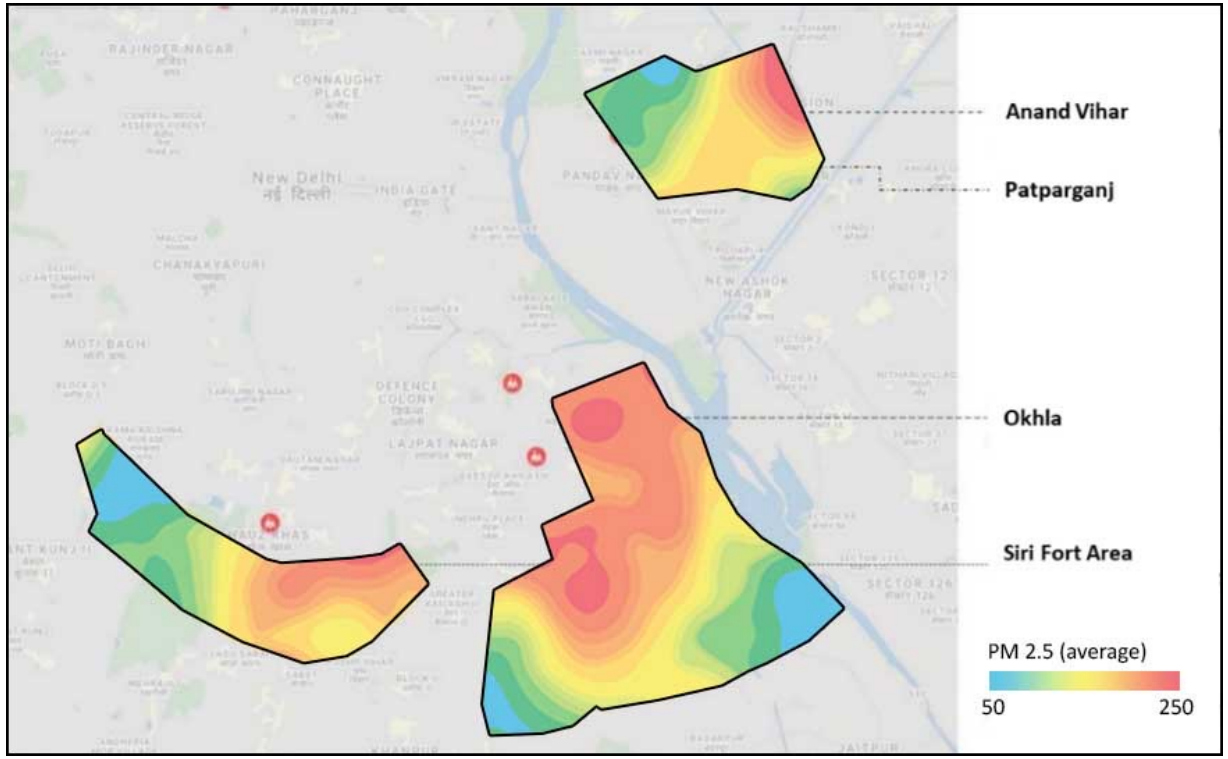
STEP 3: Monitor air quality at 95 cm height in high-risk neighborhoods using mobile air quality monitors.



- Select a neighbourhood and use a portable air quality device to record data at 95 cm from the ground.

- It will only be possible if the mobile air quality device supports collecting low level pollution concentrators (PM2.5, NO2. SO2).

- The data from CPCB and urbanemmission.info is used to demonstrate the result.



How might we assess the anganwadi play areas on sound, smell, and touch, to improve their sensory stimuli for infants and toddlers?

Sensory experiences help build neural connections in a child's brain that are important for improved memory, language development, cognitive growth, fine and gross motor skills, problem solving skills, and social interaction.

Methodology

	Sound	Smell	Touch
MEASURE	+ Sound level + Sound source	+ Hedonic tone + Odor source	+ Texture
RATE	+ Sound level class + Source type	+ Hedonic tone class + Odor character	+ Texture type
VISUALIZE	Soundscape	Smellscape	Texture Map
ANALYZE	+ Exposure to high noise levels + Noisy zones	+ Exposure to unpleasant odors + Foul odor zones	+ Variety of textures + Unsafe and injurious textures

INTERVENTIONS

Plan corrective actions for zones that do not meet minimum quality thresholds so as to improve sensory experiences.

1. Sound

Sound Level Classification

Sound level (dBA)	Sound-level class	Common examples
10	Hearing threshold	Breathing
50 - 60	Normal speech	Conversation at home
60 - 70	Annoying	Freeway traffic at 15m, vacuum cleaner
70 - 80	Possible hearing damage	Average factory, train at 15m
80 - 90	Chronic hearing damage (>8 hour exposure)	Busy urban street, diesel truck
90 - 120	Severe hearing damage (human pain threshold)	Rock concert, jet take-off (160 meters), siren
> 120	Acute hearing damage (eardrum rupture)	Toy cap pistol, firecracker (very close to ears)

Source-based Sound Type Classification

Sound-type class	Common examples of source
Natural	Chirping of birds, flowing water, human conversations
Transport	Aircraft, road, rail
Occupational	Construction machinery, assembly lines
Festive	Religious processions, public gatherings and announcements

2. Smell

7-point hedonic scale for odour

Hedonic tone	Class description
-3	Extremely unpleasant
-2	Moderate unpleasant
-1	Slightly unpleasant
0	Neutral
1	Slightly pleasant
2	Moderate pleasant
3	Extremely pleasant

Odour categories and descriptors

Primary odor character	Odor descriptors
Flora	Vanilla, Roses, Perfumy, Lavender, Coconut, Eucalyptus, Cinnamon, Almond, Marigolds
Fruity	Apple, Cherry, Citrus, Cloves, Grapes, Maple, Mint, Orange, Melon
Vegetables	Onion, Tomato, Garlic, Green pepper, Cucumber, Corn, Celery
Earthy	Ashes, Burnt wood, Chalk, Coffee, Grassy, Mold, Mushroom, Peat, Pine, Swamp, Stale
Offensive	Vomit, Urine, Spoiled milk, Sewer, Septic, Raw meat, Rotten eggs, Putrid, Manure, Fecal
Fishy	Amine, Dead fish, Perming solution
Chemical	Vinyl, Varnish, Tar/asphalt, Sulphur, Rubber, Resins, Paint, Oil, Petroleum, Mothballs, Grease, Kerosene, Car exhaust, Burnt plastic
Medicinal	Alcohol, Ammonia, Camphor, Chlorine, Disinfectant, Menthol, Soap, Vinegar

3. Touch

Texture type classification

Type of texture	Common examples
Slippery	Wet tiles, Soap, Oil, Wet grass
Grainy	Sand, Grains, Flour
Smooth	Polished stones or marbles, Paper, Table top, Polished metal
Rough	Tree bark, Concrete, Brick, Chipboard
Bumpy	Rocks, Coconut, Asphalt, Pineapple, Rope

Example

Generating a **Soundscape**

1. Defining the subject area on the map

Example

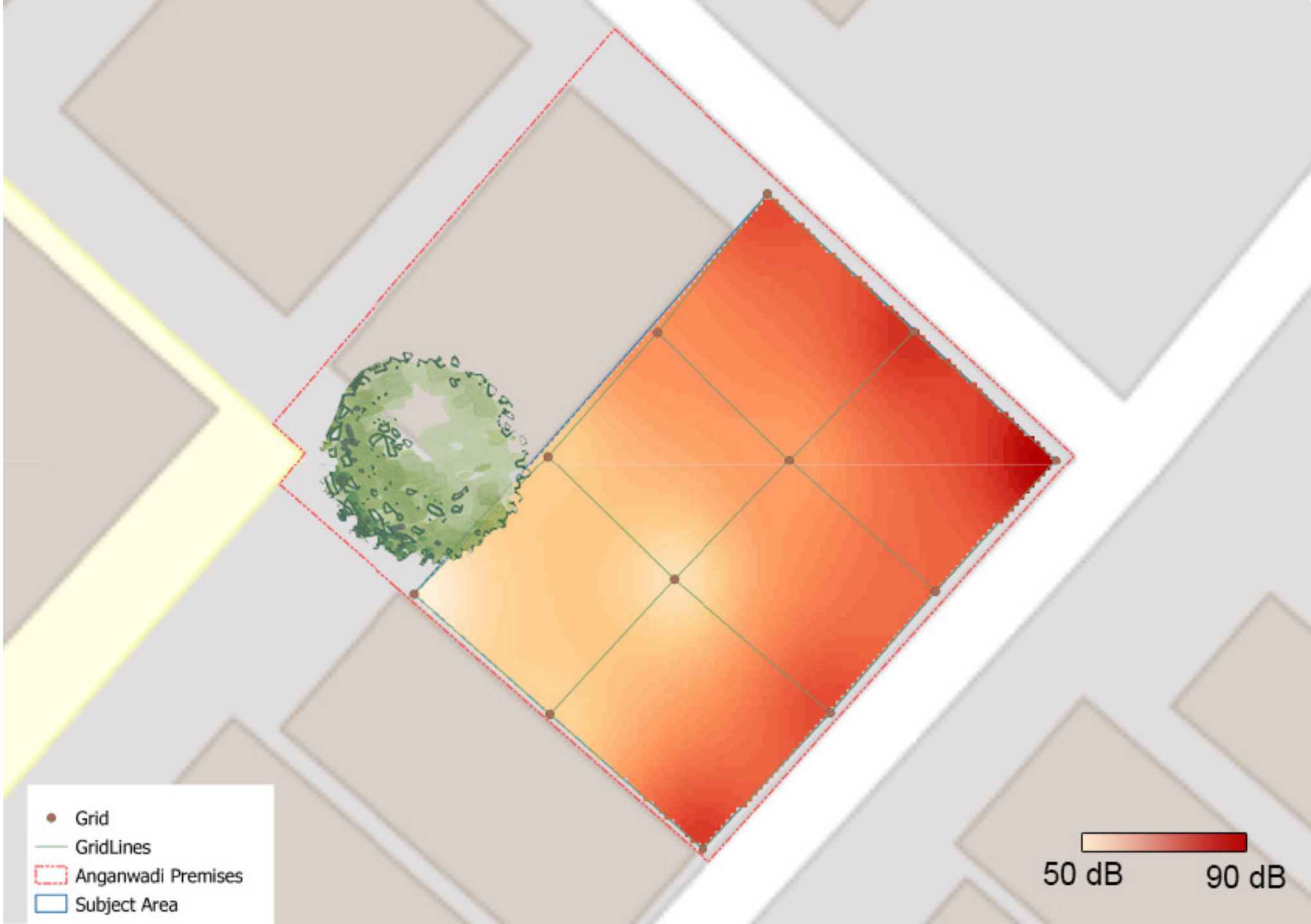
Generating a **Soundscape**

2. Plotting grid points and recording sound level and sources at each point

Example

Generating a **Soundscape**

3. Plotting average sound levels on the map & generating heatmap in the subject area



Example

Generating a **Soundscape**

4. Identify sound-level classes for each grid point

Example

Generating a **Soundscape**

5. Plotting predominant sound sources and sound-type class on the map to create sound-type map

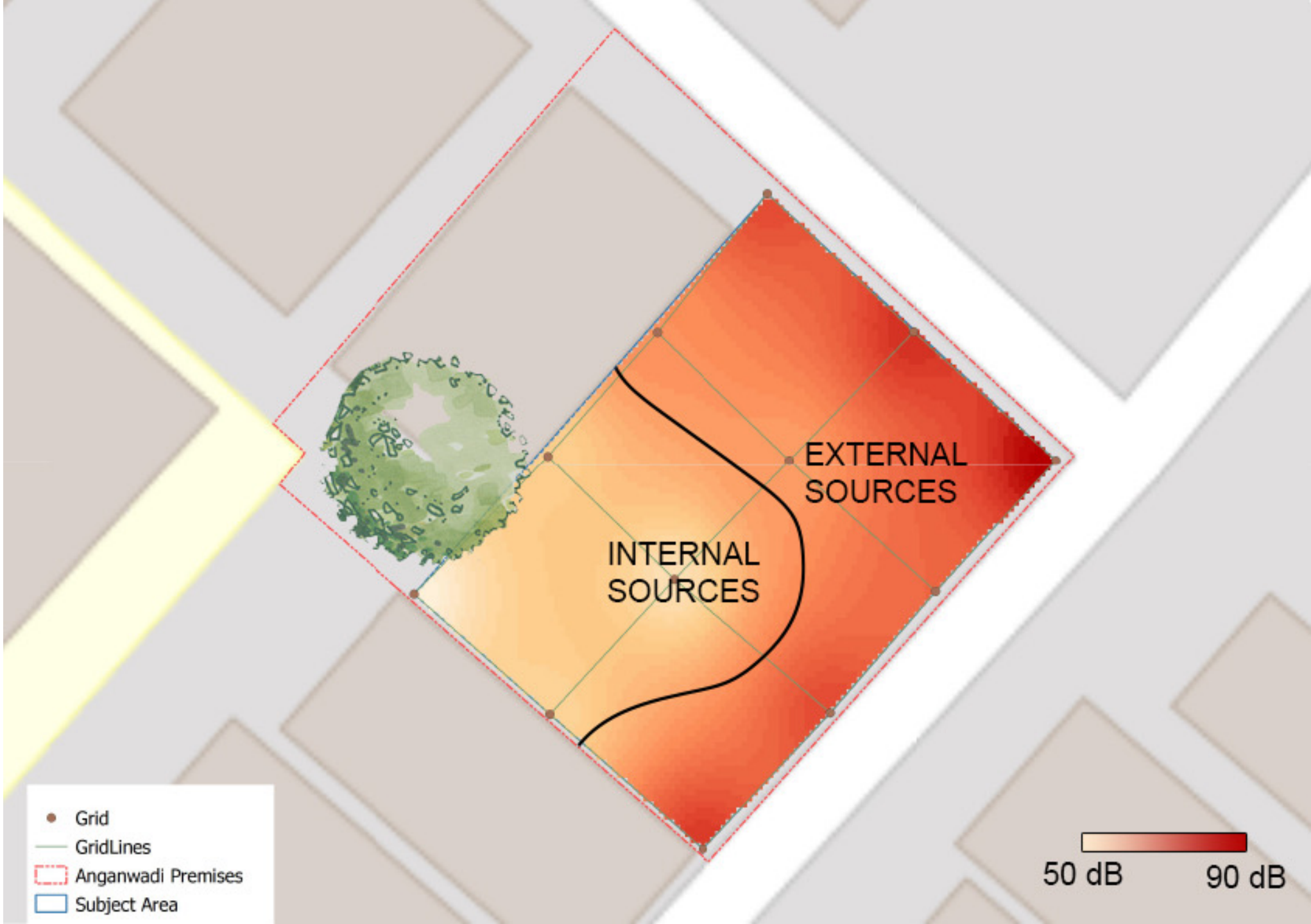
Example

Generating a **Soundscape**

6. Superimposing sound level heatmap and sound-type map to create **soundscape**

Example

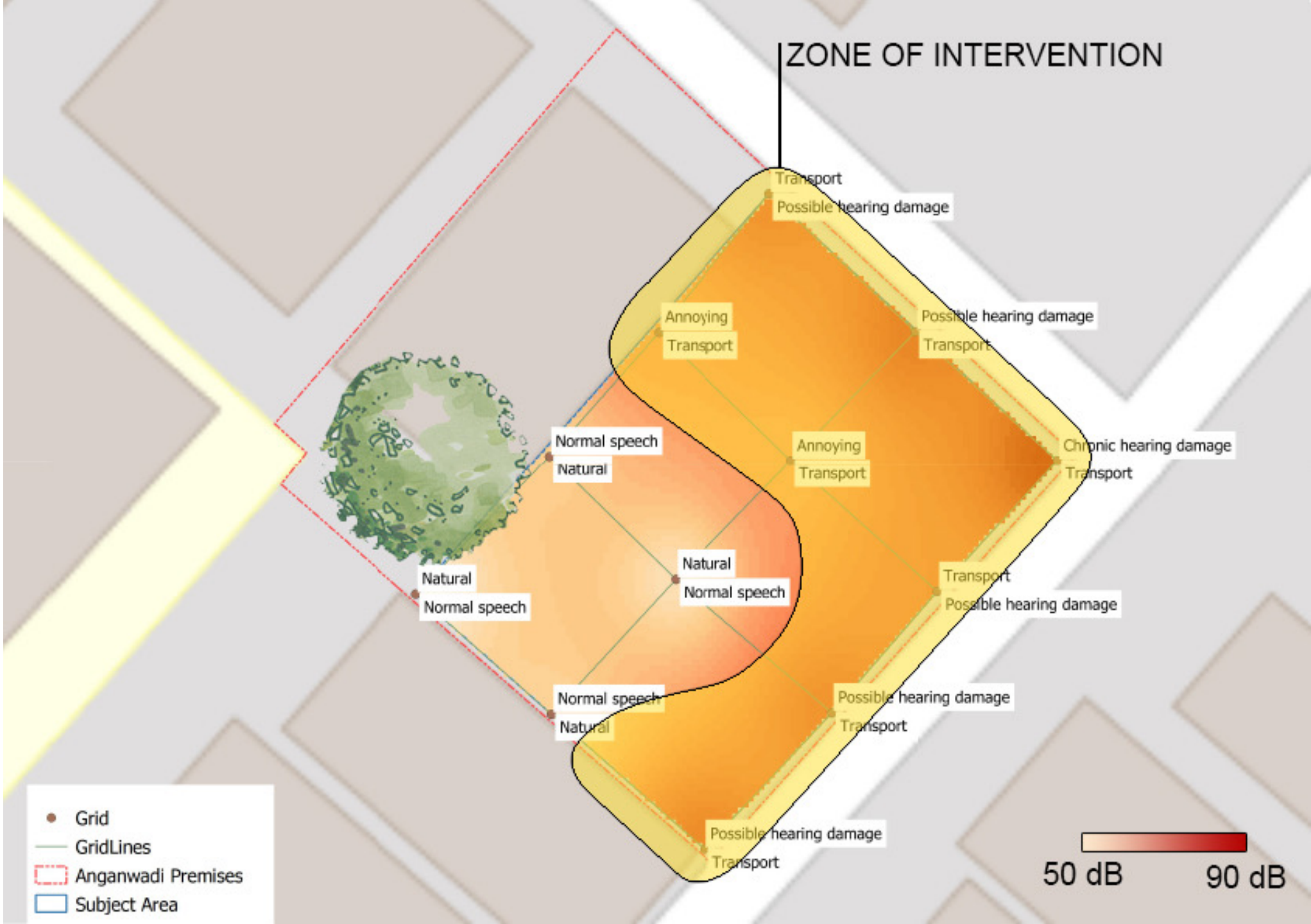
Generating a **Soundscape**



7. Identifying zones influenced by internal and external sources of sound

Example

Generating a **Soundscape**



8. Demarcating the zone of intervention on the soundscape

How might we count young children in street situations (CiSS) to make them visible in policy decisions?

Getty Images

As per census 2011, 0.94 million homeless people resided in urban India out of which 0.11 million were children in the age group 0-6 years.

In Delhi, 46 percent (20,370) of children slept in open/public spaces, and only 4 percent (2,037) slept in shelters. There were hardly 30 centers across the city with a capacity of around 2,500-3,000 children. This was far below the desired number of shelters[1].

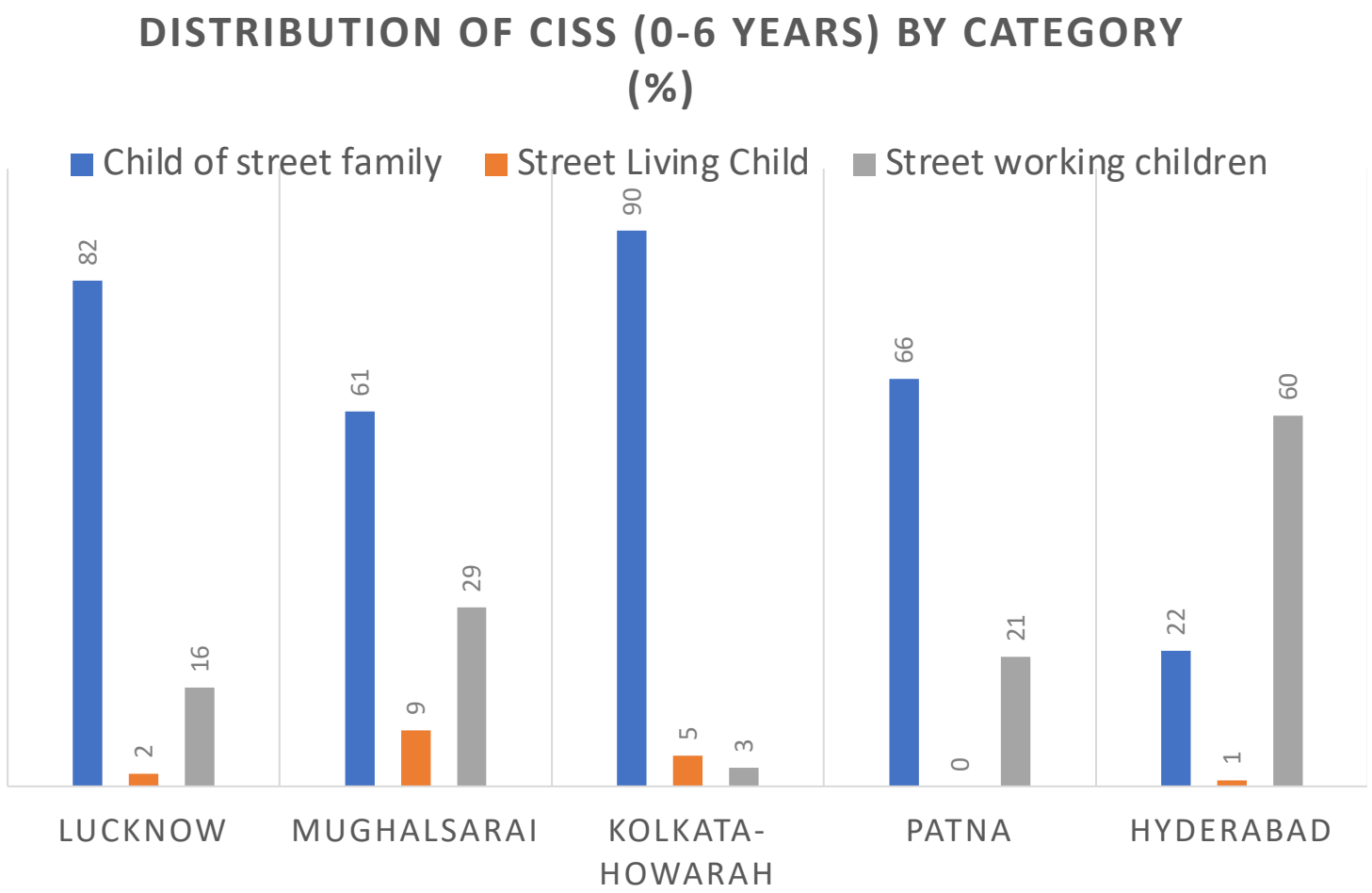
This gap analysis was only possible because of the availability of data.

Source: 1. Surviving the Streets: A Census of Street Children in Delhi, Save the Children. 2011

Children from street families

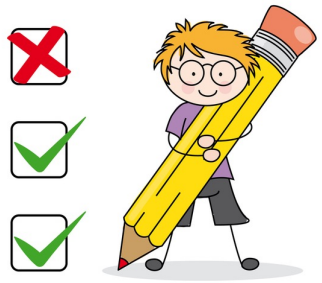
Street living children

Street-working children



Source: Life on the street in 5 cities, Save the Children. 2016

Methodology



Step 1. Creating questions for survey

Tailor questionnaire for 0-6 yrs :

- Street living children
- Street-working children
- Children from street families

Step 2. Conducting a survey

Location selection

Head count

The interaction, interviews, and the focus group discussion will happen with the caregivers

Step 3. Data collation and analysis

All data collected will be synchronized to the central database where it remains locked for editing.

Data analysis and visualization

Step 1. Creating questions for survey

Computer Assisted Personal Interviewing

Head count questionnaire

Computer Assisted Personal Interviewing questionnaire for CiSS (Interview Schedule - only for street children below 6 years)

I. GENERAL INFORMATION

1.1. GPS Coordinates: _____
1.2. Ward: _____
1.3. City: _____
1.4. District: _____
1.5. Location of Interview _____

(Footpath/Pavement: 1, In a shelter: 2, Under a bridge/ flyover: 3, Religious place: 4, Market: 5, Park: 6, Railway station: 7, Bus station: 8, Slums: 9, Tourist place: 10, Construction site: 11, others (specify)_____)

1.6. Respondent's Name: _____
1.7. Relationship status of the respondent for child less than 6-year-old: _____

(Self: 1, Father/Mother: 2, Older Brother/Sister: 3, Grand-father/Grand-mother: 4, Uncle/aunt: 5, Friend: 6, Employer: 7, Other unrelated people: 8, Refused to disclose: 9, No relation:10, others (specify)_____)

1.8. Sex: _____ (Male: 1, Female: 2)
1.9. Age (in Completed Years): _____
1.10. Investigator's Name_____
1.11. Signature ad Date of Survey: _____
1.12. Don't ask about child less than 3 years. Do you/ Does this child study, as of now? _____ (Yes: 1, No: 2)
1.13. Do you/ Does this child work? By 'work' I mean doing something for which there is money paid to you (or someone else on your behalf) or some kind of benefit is received in kind e.g. a place to sleep, food, etc.? _____ (Yes: 1, No: 2)
1.13.1. If answer is YES, kindly specify activity that you were engaged in (multiple choice allowed _____

(Do not work –looking after siblings, doing domestic work, social commitment etc.: 1, Working - and studying/ is a student: 2, Begging: 3, Rag Picking: 4, Sell flowers, newspaper/ magazines/ books, fruits & other items on road: 5, Cleaning cars & two wheeler: 6, Working in road side stall or repair shop: 7, Working in small hotel or tea stall: 8; Whatever available: 9; Sweeping in trains: 10; Filling water bottles and selling them: 11, Not working: 12, Don't want to say: 13, Other work on street (specify)_____, Other work, but not on the street (specify)_____)

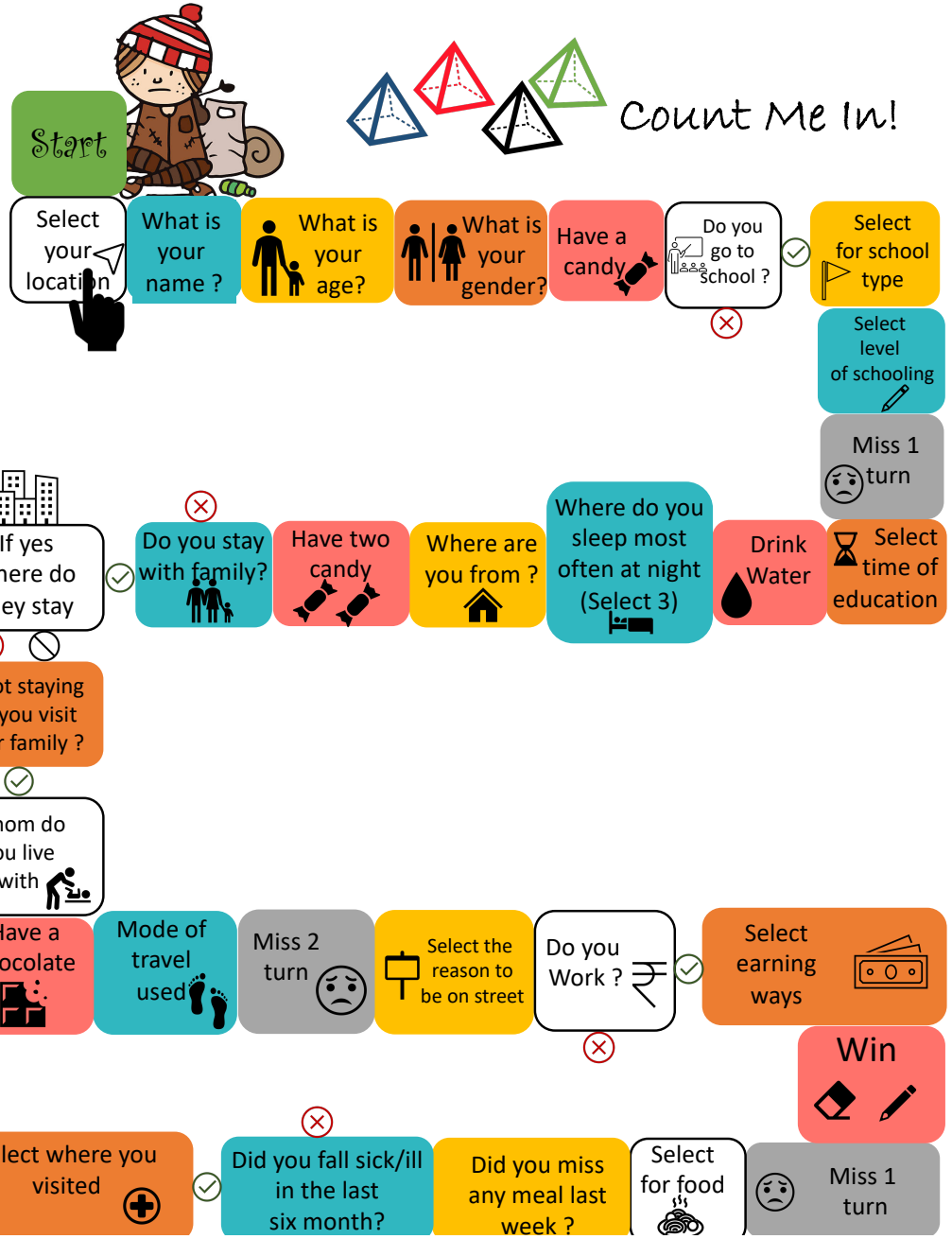
Develop a Code Matrix:

	Working	Not Working
Studying		
Not Studying		

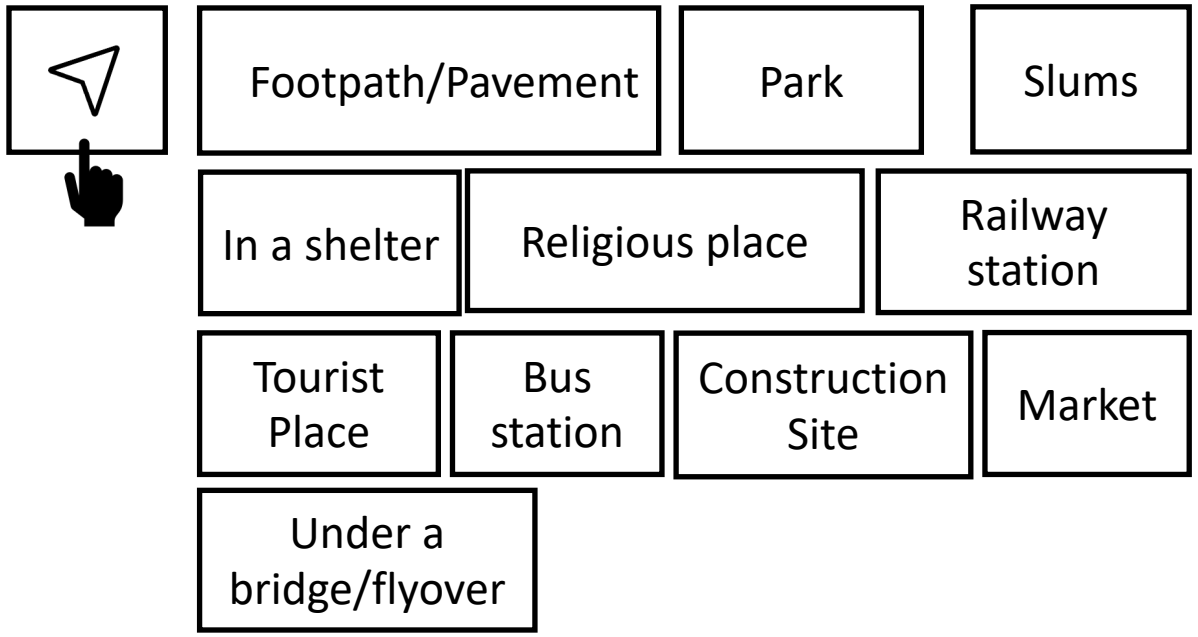
Sample Questions

- GPS Coordinates: _____
- Ward: _____
- City: _____
- District: _____
- Location of Interview _____*(Footpath/Pavement: 1, In a shelter: 2, Under a bridge/ flyover: 3, Religious place: 4, Market: 5, Park: 6, Railway station: 7, Bus station: 8, Slums: 9, Tourist place: 10, Construction site: 11, others (specify)_____)*
- Respondent's Name: _____
- Which 3 places you/ this child get to sleep most often at night? MAXIMUM OF 3 PLACES _____ *(On the street/ on the footpath/ roadside/ pavement:1, At/ near a traffic signal:2, At home in a slum/Cluster:3, Railway station/ platforms:4,Pukka home: 5, Katchi Abadi home/ squatter settlement/ any other temporary shelter:6, In a Night-shelter:7, Under a bridge/ flyover/ underpass:8, At/ near a place of worship/ religious place:9, At/ near a marketplace:10, Open place/ Park/ ground:11, Bus stop/ station:12, At/ near a Tourist place: 13, Other (please specify)_____ , Don't want to say: 15)*

Step 2. Conducting a survey

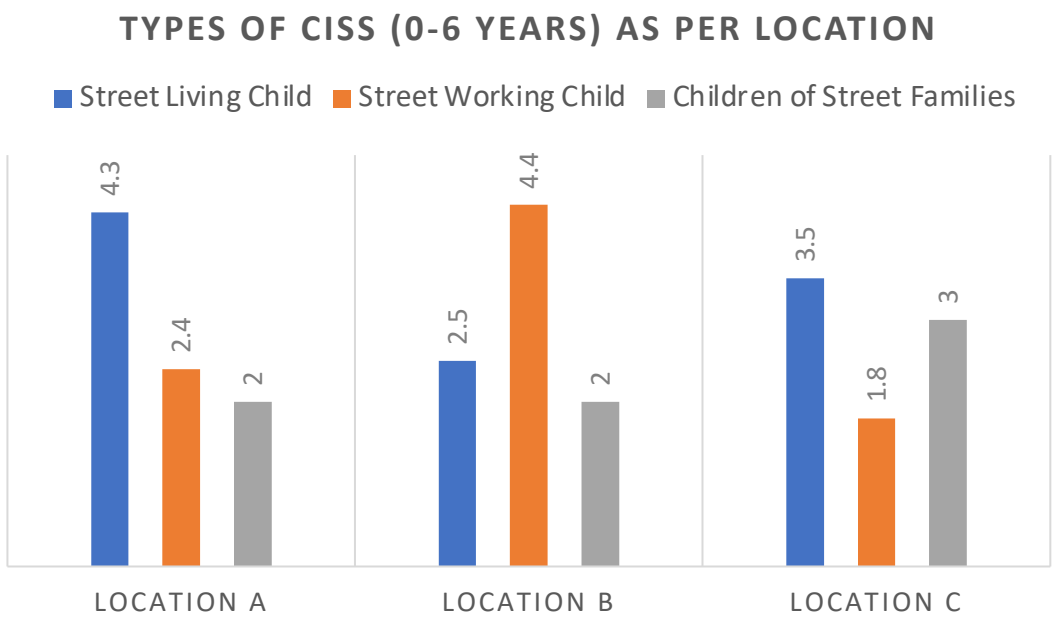


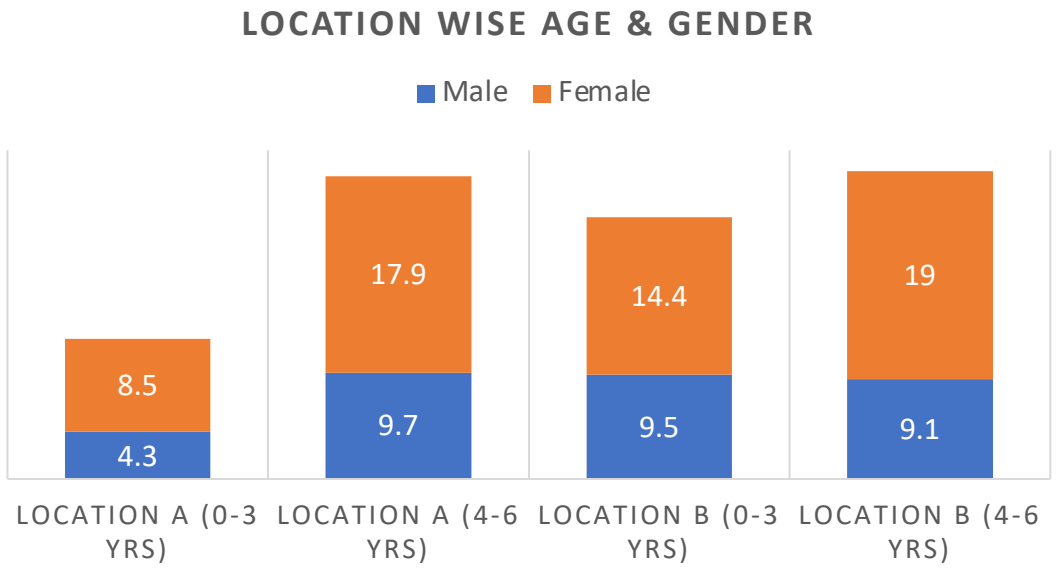
Cards

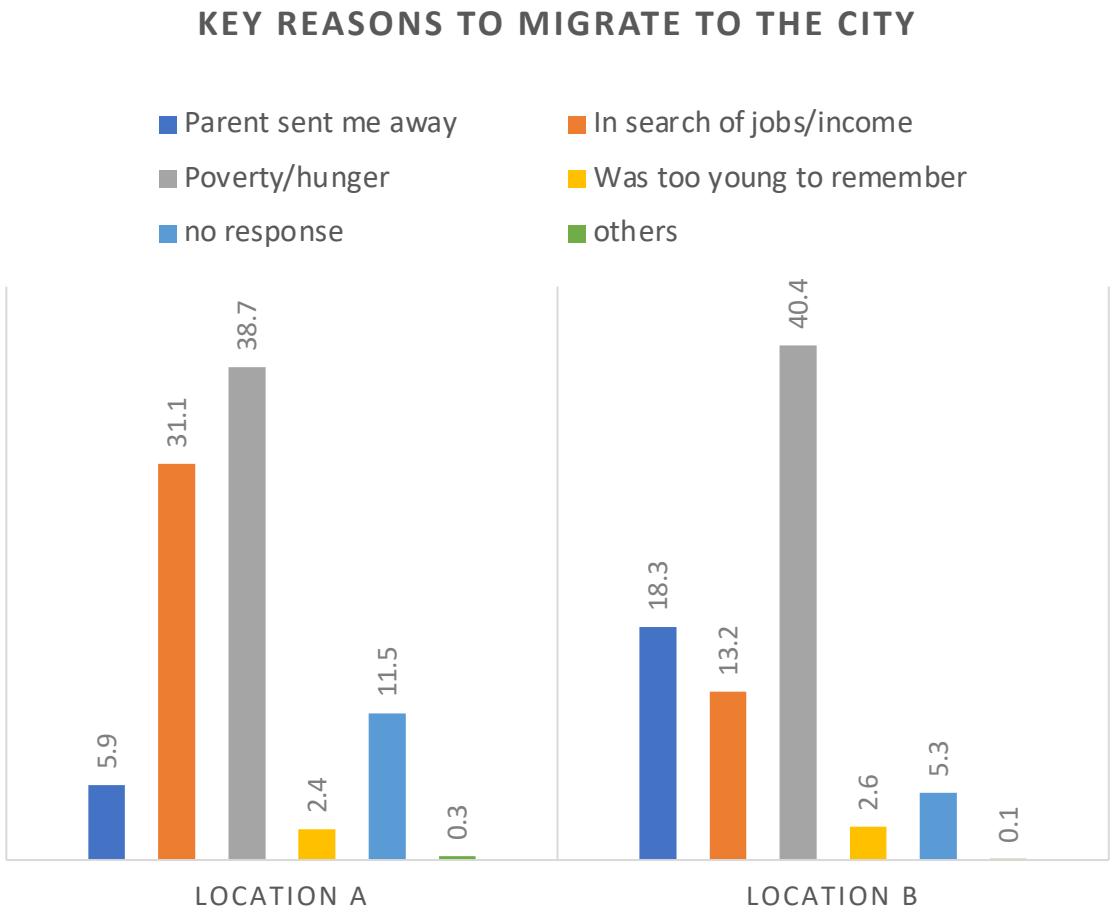


Interactive Physical Game Board

Step 3. Data collation and analysis





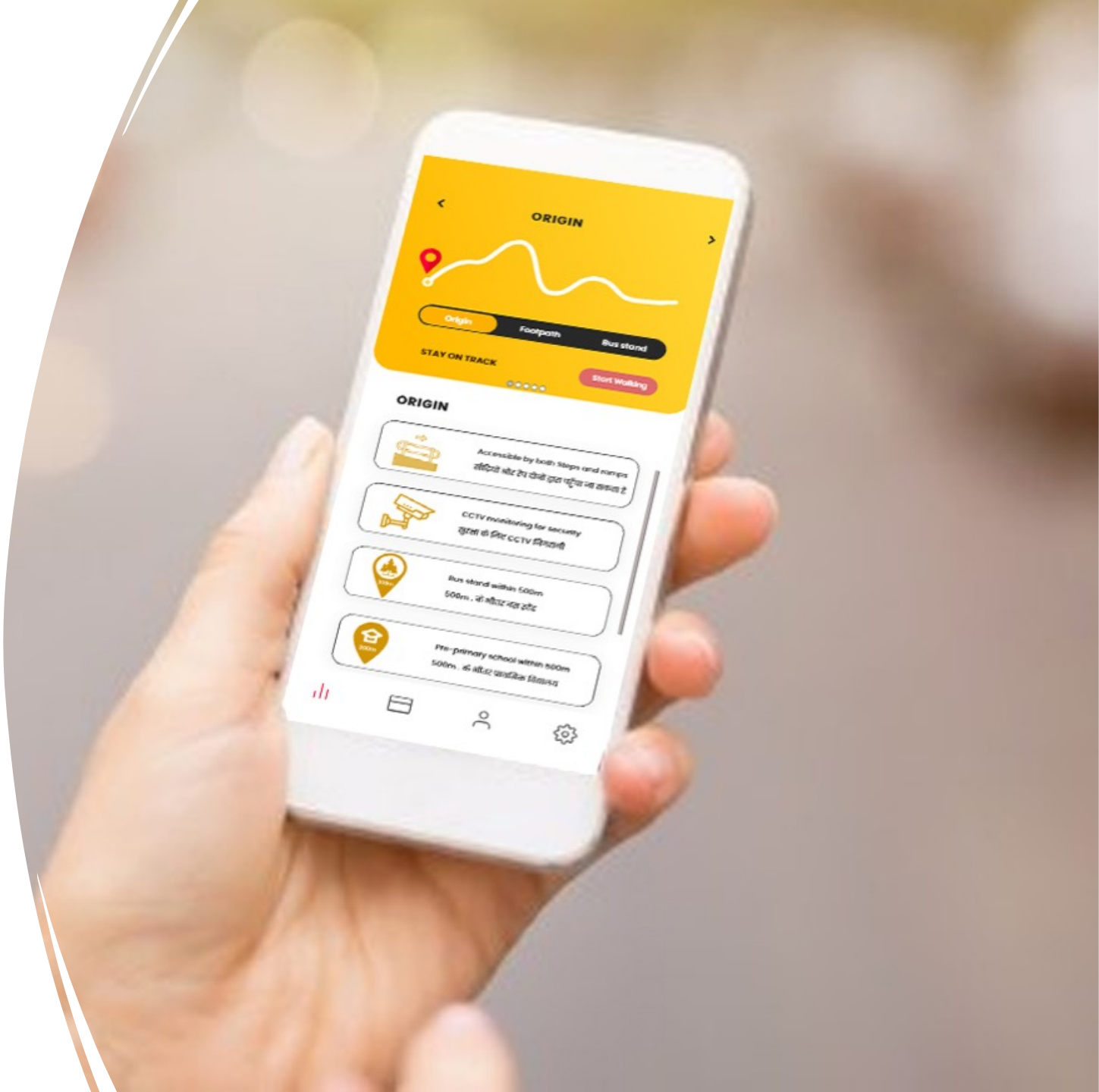


Examples of interventions:

- Data on kinds of toilet used, source of drinking water and crossing road safely will help to design specific interventions
- A programme focusing on re-uniting street children with their families can be adopted

PC: Life on street

How might we leverage mobile applications to audit accessibility for infants toddlers and their caregivers?



Infant, Toddlers and caregivers are affected by **poor public transport or poor mobility infrastructures.**

1. Encroached Footpath
2. Uneven/broken footpaths
3. Absence of kerb cuts
4. Absence of shaded walkway
5. Absence of proper bus stops
6. Absence of accessible ITC friendly buses

Methodology

It is to assess accessibility in a given area for infants and toddlers, following the parameters outlined below.

Step 1: Identifying parameters for accessibility

Step 2: Develop a web-based Accessibility Audit Toolkit based on the selected parameters

Step 3: Conduct audit using the web based toolkit

Step 4: Analyse the crowd source data

STEP 1: Identifying and prioritizing parameters for accessibility

Origin

- Accessibility by both Steps and Ramps
- CCTV monitoring for security
- Parks/markets within 300 metres
- School/ creche within 300 metres
- Shaded area

Footpath

- Public seating at intervals
- Smooth, hard and non slippery surface
- Un-obstructed footpath
- Walkway width- 1500mm
- Street lights at intervals
- CCTV monitoring for security
- Encroached Footpath
- Pedestrian amenities at intervals (kerbs, boulders, ramps, signages)
- Shaded walk zone
- Vibrant walkways
- Public amenities at interval (Toilet, Breast feeding booth or drinking water booth)

Bus stand

- Seats at the bus stand
- Priority seat signage with pictogram
- CCTV monitoring for security
- Have internal illumination
- Pedestrian amenities at intervals (kerbs, boulders, ramps)
- Kerb should match bus's low floor
- Walkway width- 1500mm
- Shaded area

Street

- Presence of footpath
- Presence of traffic calming measures
- Street lights at intervals
- Pedestrian amenities at intervals
- Presence of no-honking zones
- Equipped with timed traffic control signal.
- CCTV monitoring for security
- Safe crossings at Junctions
- Bus stop within 500 metres
- Shaded Walk zone

Destination

- Accessibility by both Steps and Ramps
- Public seating at intervals
- Smooth, hard and non slippery surface
- CCTV monitoring for security
- Presence of Public amenities (Toilet, Breast feeding booth or drinking water booth)
- Presence of shaded area

Inclusive · Safe · Accessible · Green · Playful

Step 2 & 3 : Develop a web-based Accessibility Audit Toolkit and conduct an audit

Features of the tool

1. Enable geolocating routes by clicking 'Start Walking Button'

2. Notify issues on trip by clicking on the button

3. Icons to enhance user interface

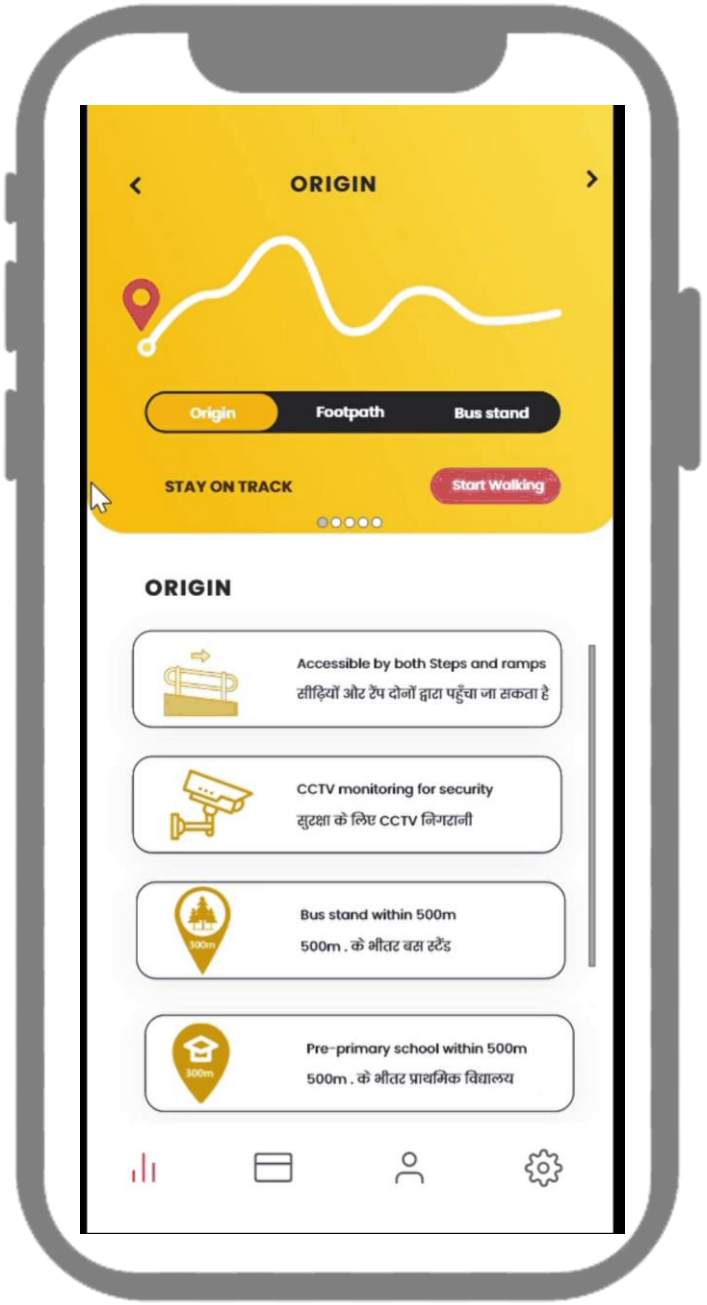
4. Integration of regional language to enhance greater accessibility

5. Upload photo- Photographs will validate the crowdsourced data

Tool Walkthrough

How to use the tool?

ITCN Tool

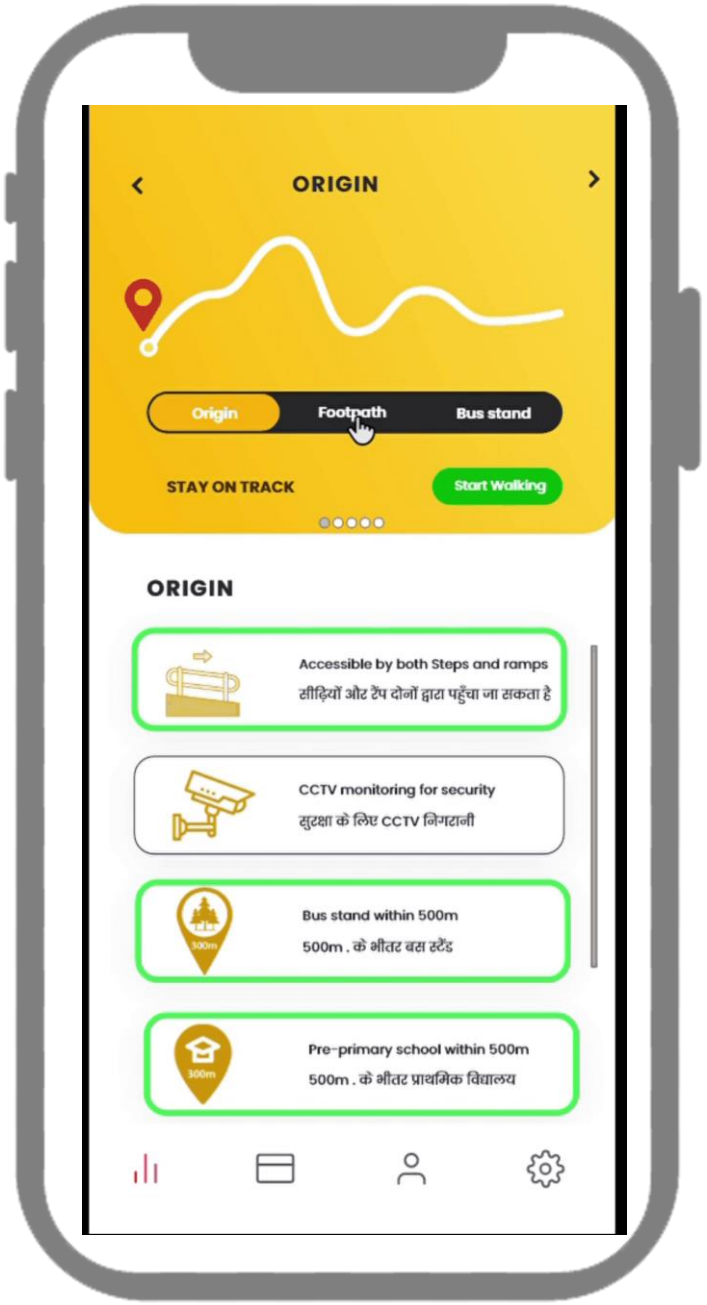


Observe and Record data

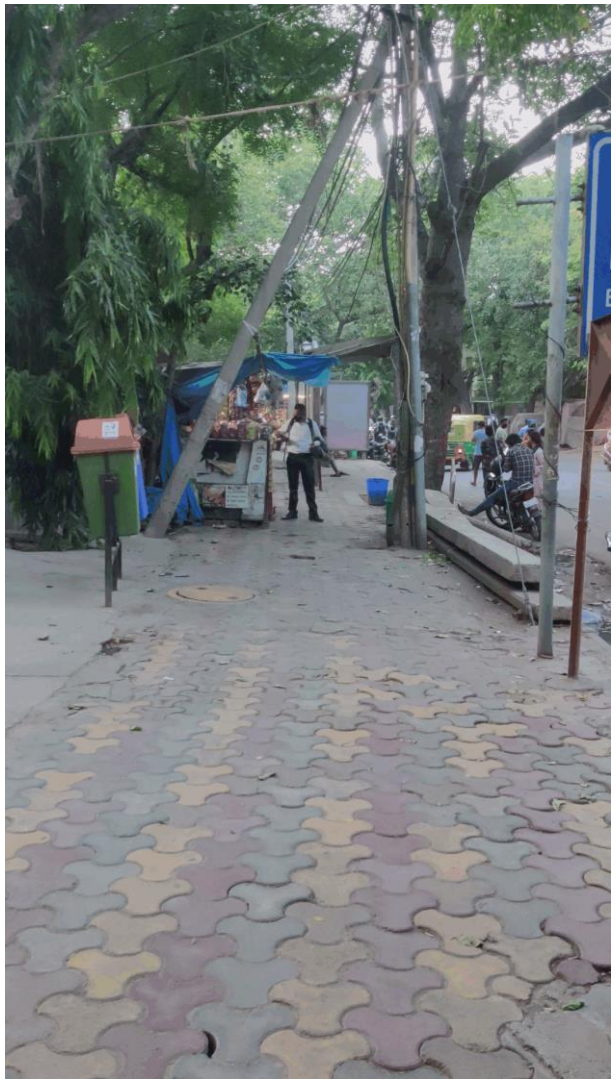
Tool Walkthrough

How to use the tool?

ITCN Tool



Observe and Record data



Tool Walkthrough

How to use the tool?

ITCN Tool

Observe and Record data

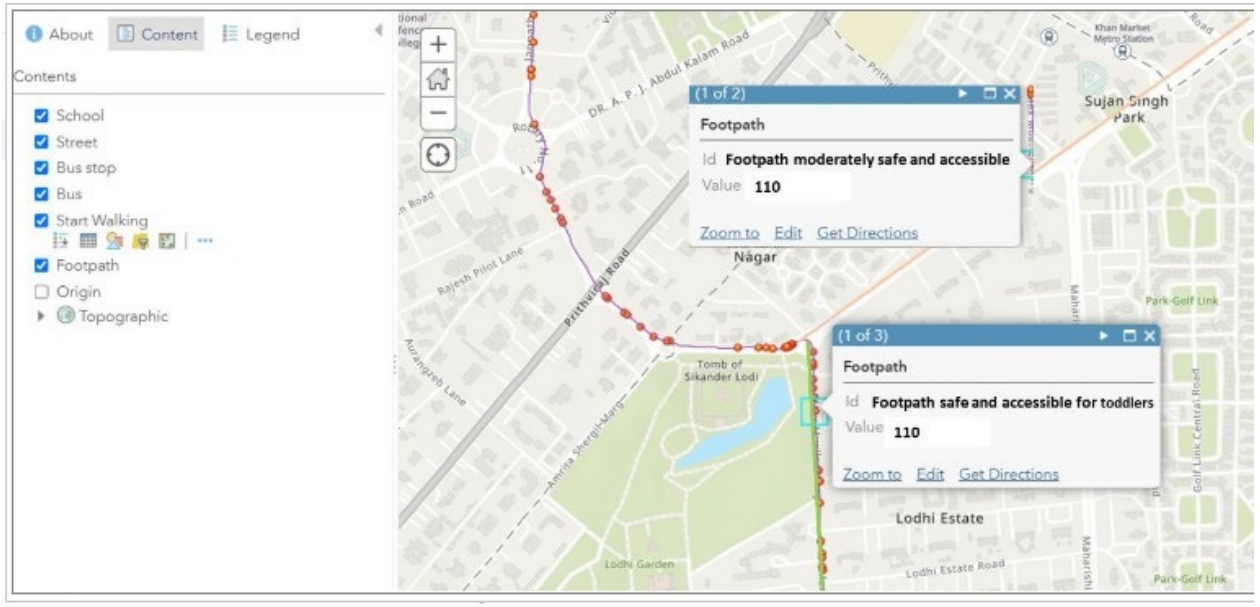
Tool Walkthrough

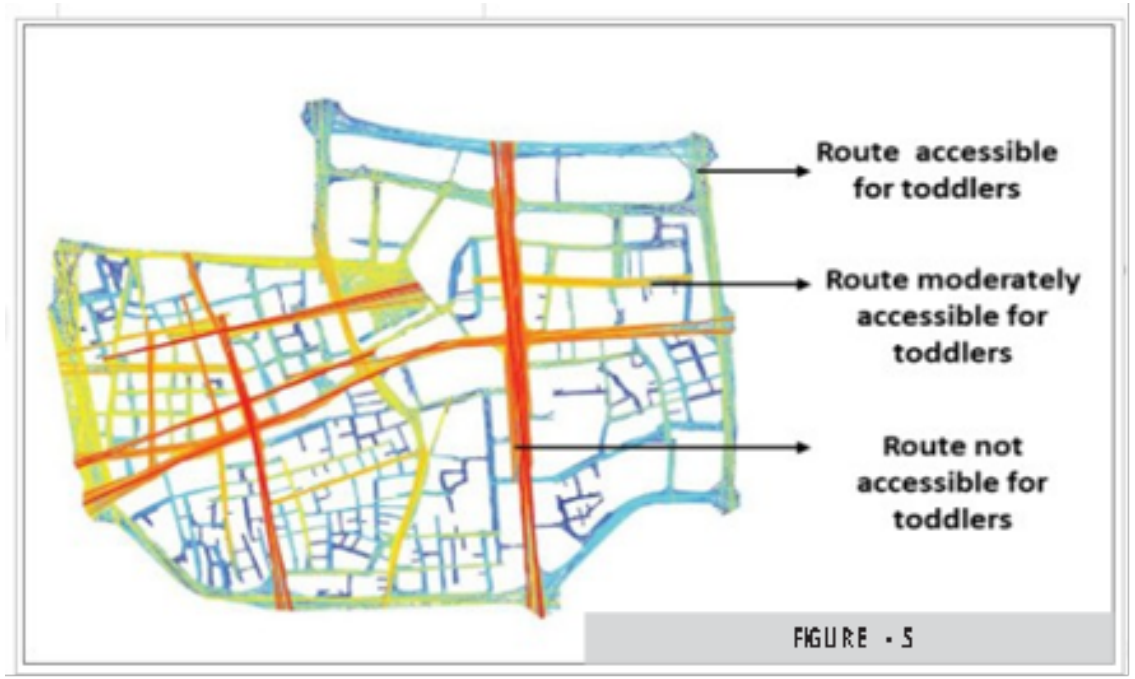
ITCN Tool

How to use the tool?

Observe and Record data

Step 4: Analyse the crowd source data





WHY do you need such a tool?

The spatial data and parameters' generated from trips can be used to identify the routes that are unsafe for toddlers and therefore need an immediate intervention of the relevant stakeholder in the city.


Cities
that work for
Children,
work for
Everyone.
Thank you