revive

TEAM

revive

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IS THERE AN APPROACHING

WATER CRISIS ?

1.6 billion people face economic water shortage

(Source: UN Water)

INR 20,00,000 crores worth investments is required to bridge expected water supply deficit by **2030**

(Source: NITI Aayog)

In India, between 1950-2017:
285 flooding events reported
850 million people affected
19 million homeless

(Source: Indian Institute of Tropical Meteorology, Pune)

Out of 445 rivers monitored, **275** are polluted, a number that has risen steeply from 121 in five years
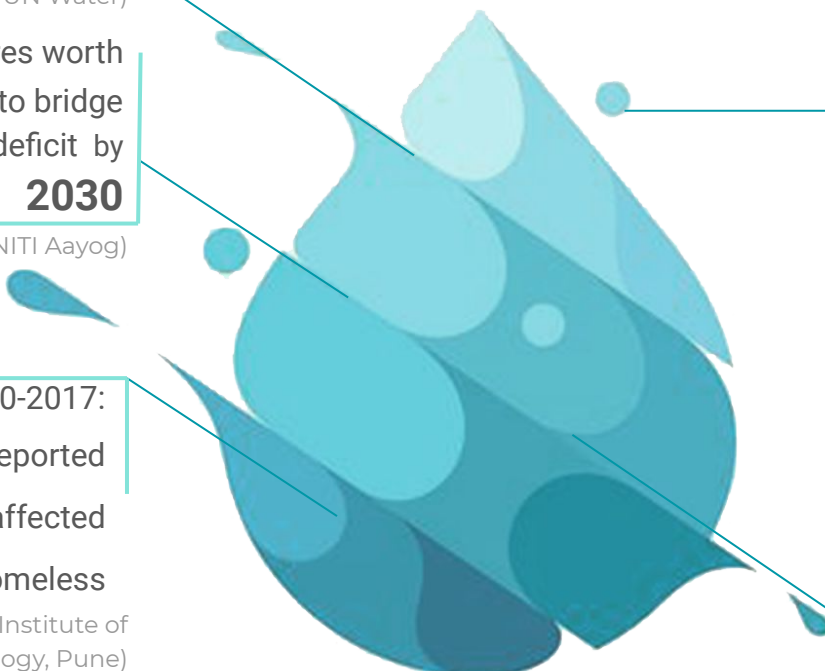
(Source: 2014-15 report, CPCB)

**47%** of urban households have individual water connections
40% - 50% of water is reportedly lost in the distribution system
48% of urban water supply is satisfied using ground water
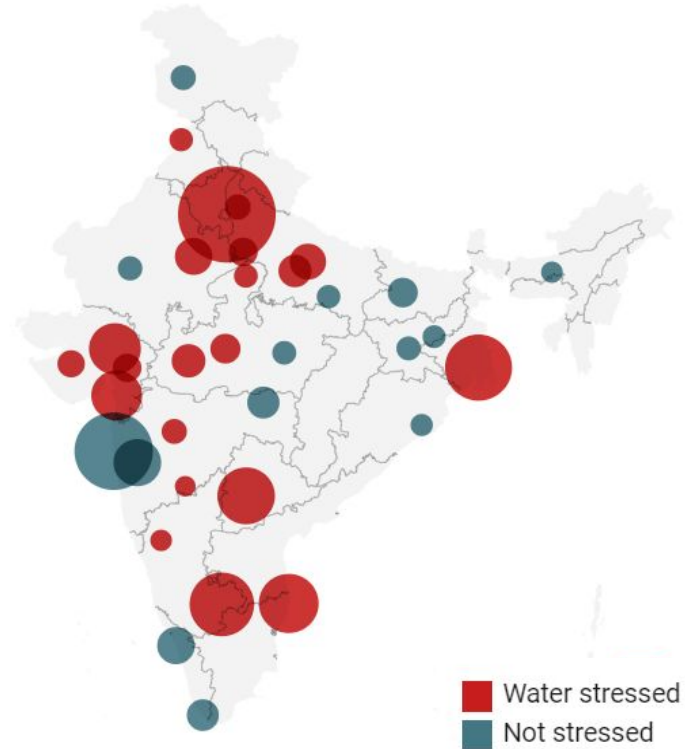
(Source: NSS; Dasgupta, 2018))

- Ranked 120 among 122 countries with 70% of water resources polluted (Source: Global Water Quality Index)

- As population increases, **water supply is not keeping up**
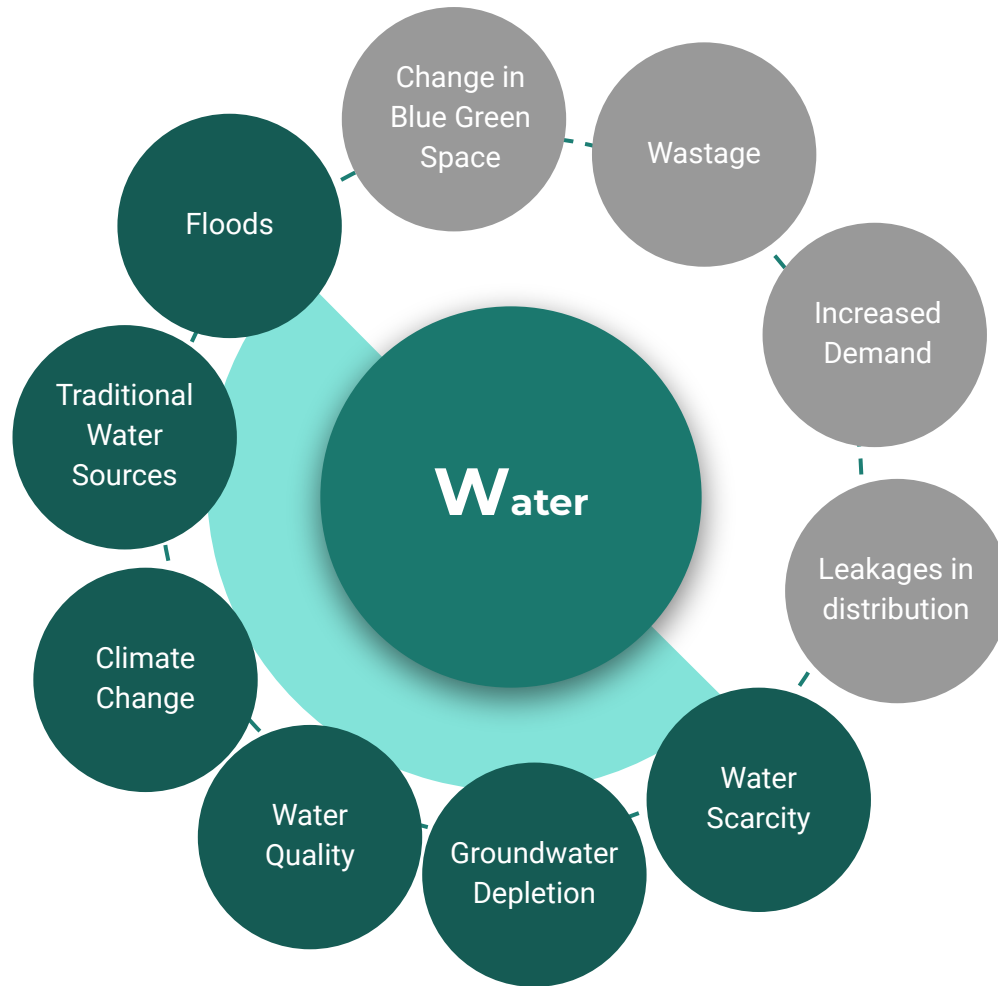

Population (Million)
Per capita water availability (m3/year)
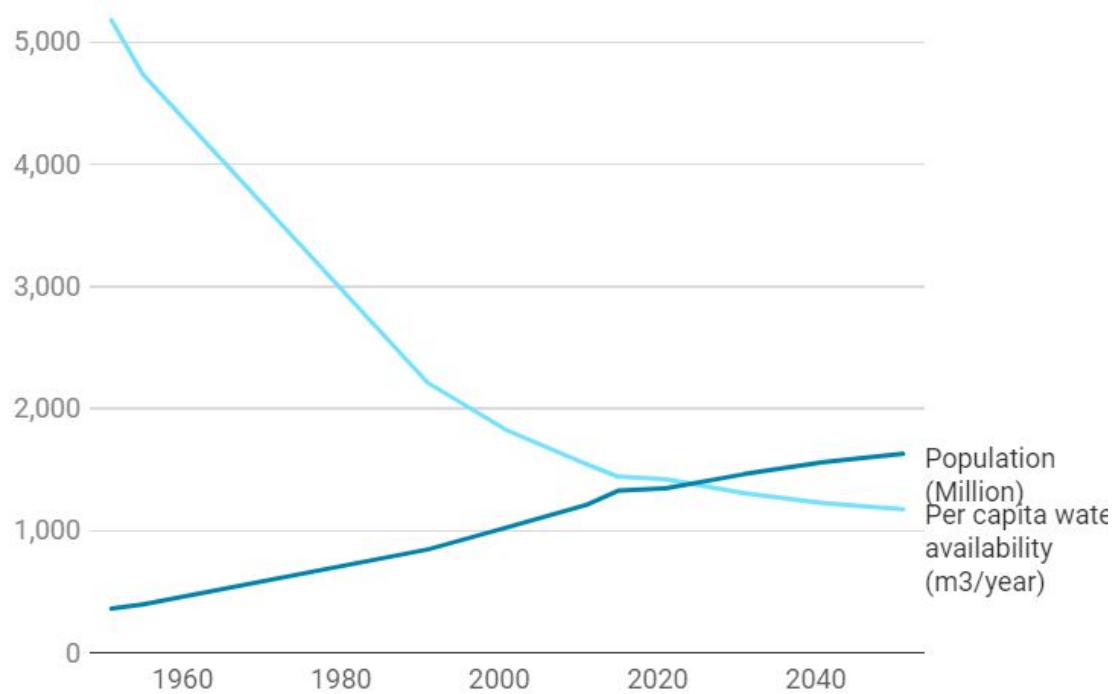
By 2030, nearly **160 million Indians** will be living in cities that are **water-stressed**

(Source: Water on an urban planet, McDonald and others (2014); UN Population division)

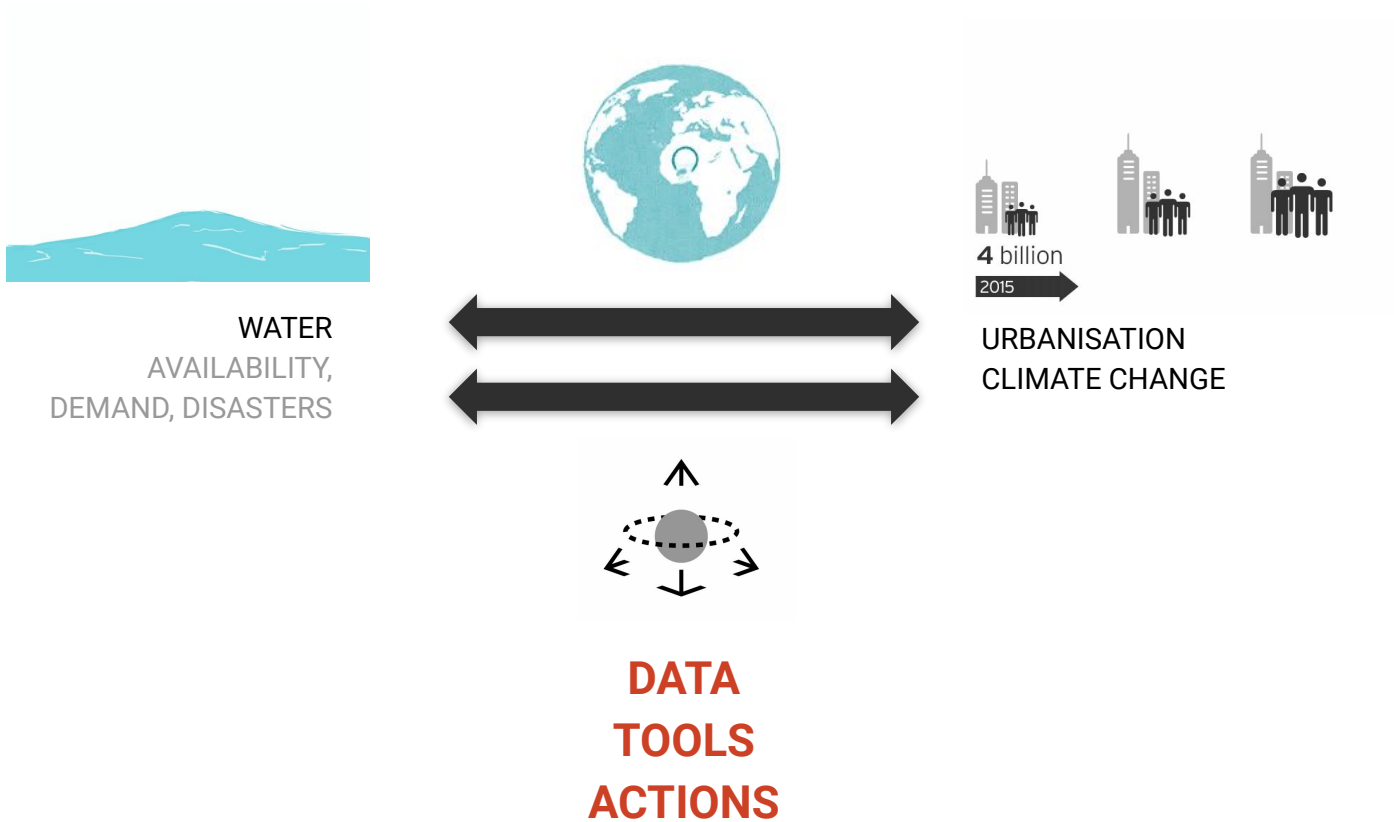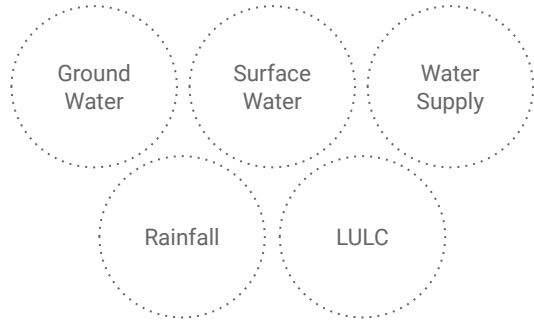Water stressed
Not stressed

but

•

WHAT IS CAUSING THIS ?

•

WHY & **HOW** ?

THE DISCONNECT

WATER
AVAILABILITY,
DEMAND, DISASTERS

URBANISATION
CLIMATE CHANGE

4 billion
2015

DATA

TOOLS

ACTIONS

WATER RELATED ECOSYSTEMS

Ground Water

Surface Water

Water Supply

Rainfall

LULC

without the dashboard

Ground Water

Surface Water

Water Supply

Rainfall

LULC
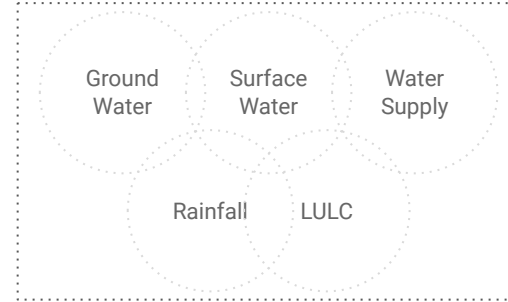
with the dashboard

PROBLEM

SOLUTION

Lack of integrated water sector data for informed decision making for water related urban resilience that includes the following water related ecosystems;

Integrated tool for Urban Water Management that would act as a dynamic decision support system assisting ULB in making informed choices regarding urbanisation, water management, improve efficiency, identify sites at risk, flood management, sensitise citizens etc.

Integrated Tool for Urban Water Management

PHASE **1** Data Aggregation Dashboard

PHASE **2** Predictive Modelling

- Monitor the water situation of the city in terms of efficiency and identify shortfalls

- Predictive Modelling for Flood Simulation, Alternate Water, Smart Water

Smart Water

Alternate Water

Flood Simulation

REVIVE
(Dynamic Decision Support System)
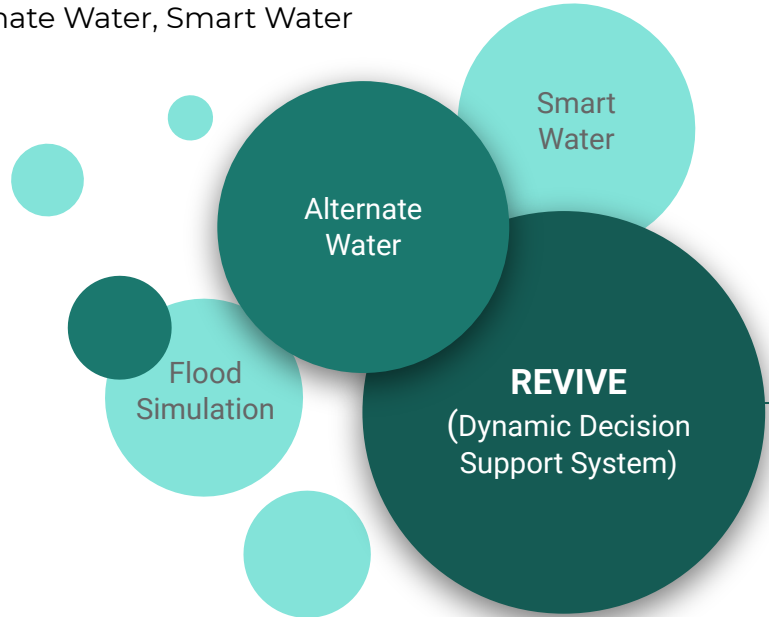
Parameters

Cross Sectoral Parameters
Services
Transport
Population
Water Stress Mapping

Climate
Rainfall | Rainfall Trend Analysis
Temperature | Evapotranspiration

Water Supply and Sanitation
Seasonal Water Supply Demand Trend
Wastewater data
Stormwater Drainage Mapping

Environment
Physical | Elevation and Topography
LULC
Natural Resource Mapping
Water | Water Resource Mapping
Ground Water Assessment
Alternate Water Mapping

Water related Disasters | Flood Mapping and Zonation
Other Disasters

01 02 03 04 05

Core   Supplementary   Additional
PARAMETERS

Factors considered for selection of **Potential Cities**

Ease of Work

Data availability

Water Infrastructure

Potential Impact
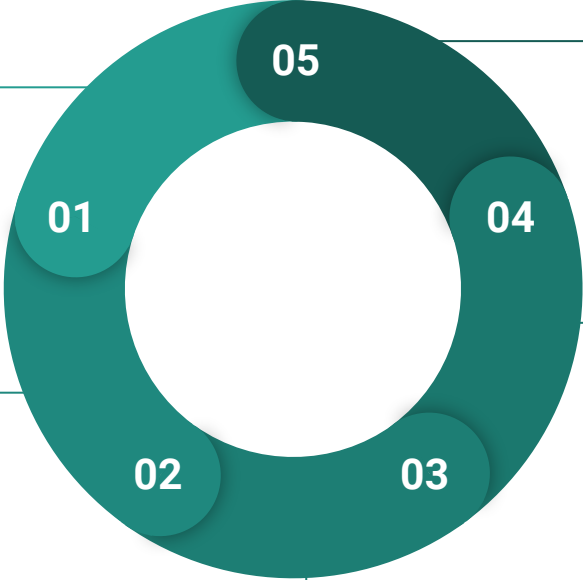
PRE-PILOT

- Project Ideation
- Problem Statement
- Literature Review
- Objectives
- Methodology Design
- Phase-wise solution
- Project pitch
- Identification of pilot city

PILOT

- Deployment to city
- User Research
- Data Collection
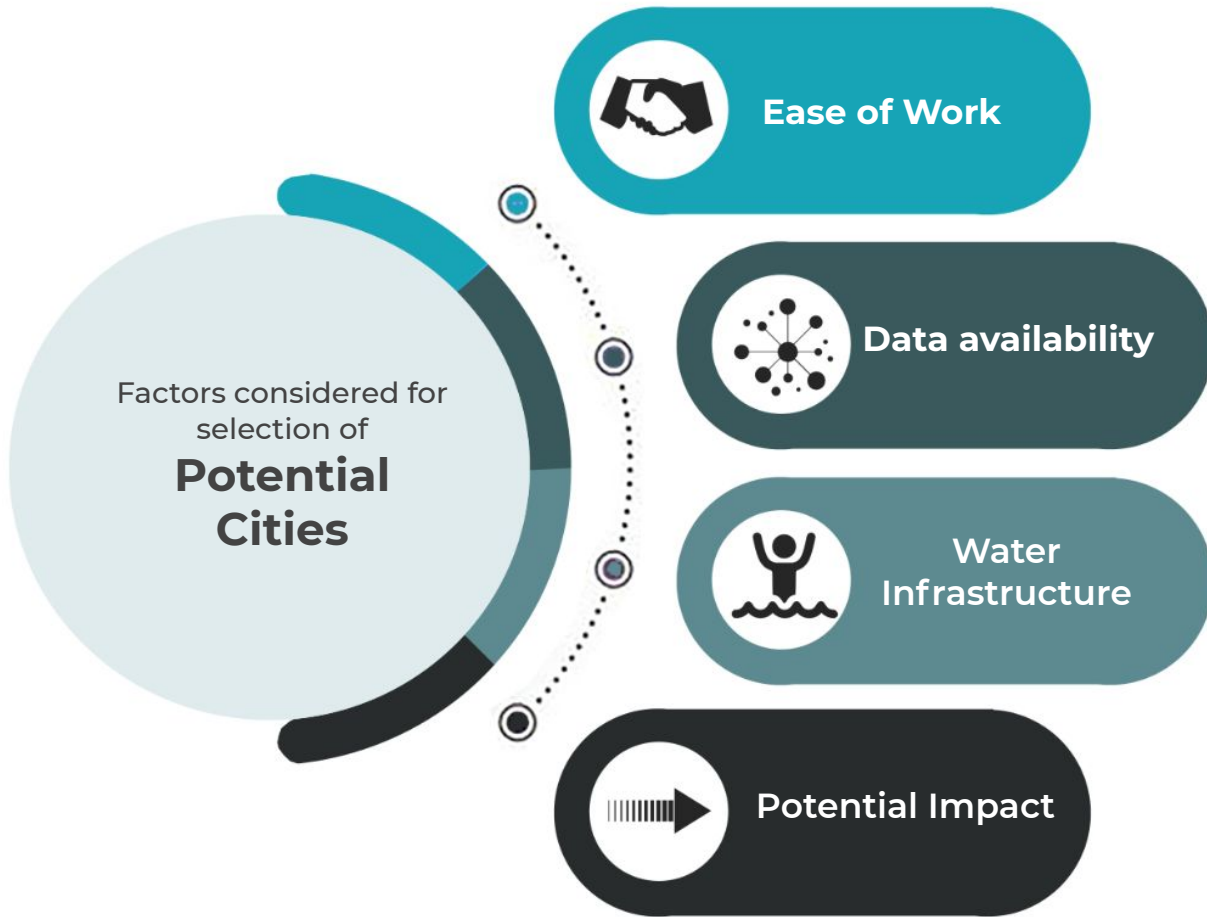- Site-specific Methodology Design Adaptation
- Data Standardization & Importing to GIS
- UI-UX design
- Scope of Work
- Expression of Interest
- Developer Onboarding
- Dashboard Development

POST-PILOT

- User Testing
- Stakeholder training
- Data Feeding & Updation
- Integration with upcoming ICCC
- Extensions: flood modelling, alternate water, urban growth prediction

ENGAGEMENTS

Chandigarh Smart City Limited

Government Agencies

Private Companies

Chandigarh Municipal Corporation

Educational/ Research Institutions

Public

USER EXPERIENCE

empathise — define — ideate — design ----- validate

empathise	define	ideate	design	validate
user research	pain points needs features	personas user journey information architecture user flows	wireframe prototype	

Nandini

Looking at the bigger picture

Age	45
Gender	Female
Occupation	CFO, CSCL
Location	Chandigarh

Context and obstacles faced:

- Coordinating with multiple departments for data collection in order to analyse project feasibility.
- Probability of calculation errors using existing systems
- No historical data to understand patterns

How will he/she interact with the product?

- To look at the relevant analysis for understanding project requirements

Questions he/she will ask

- What is sector wise consumption pattern? Can I identify peak hours of consumption and water wastage zones?
- What would be the situation 20 years later in terms of water supply?
- Do we have any alternate water supply sources that we can rely on?
- What is the drinking water requirement for the new project?

Vikram

Efficient water management

Age	52
Gender	Male
Occupation	Executive Engineer
Location	Chandigarh

Amandeep

Observing and innovating

Age	25
Gender	Male
Occupation	Researcher
Location	Bengaluru

Harleen

Citizen

Age	38
Gender	Female
Occupation	Homemaker
Location	Chandigarh

LANDING PAGE

- REVIVE introduction and water facts
- 'Login' button that redirects to Login page

LOGIN (ULB)

- Input login credentials to sign in

LAYER SEARCH

- Using layer search option
- Browsing through layers and sublayers listed under parameters
- Set location/ timeframe (optional)

DOWNLOAD

- Select desired file format to download (excel, shape files, png and jpeg)

LAYER SELECTION

- Selecting desired layers and sublayers to overlay over the basemap and analyze
- Access analysis charts, data tiles and other output layers
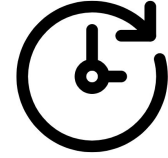
CHALLENGES

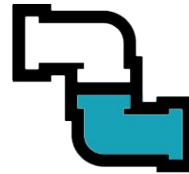Data Collection → Lack of Availability of GIS data

Administration Incoordination
(during Developer Onboarding) → Delay in overall project timeline

Technology → Lack of digital monitoring systems to enable dynamic data collection

Project Mock-Up

CRITIQUE

LACUNAE	SOLUTION

DATASETS

- Certain **datasets** are still **processed/updated manually**.

- Certain **datasets don't exist and lack of historic data**.

- Apart from this, **certain datasets are in the process of being authenticated**, hence **cannot be shared**.

- Datasets were **cleaned and digitised**.

- **Alternate data sources** were explored.

- For non-availability of the historical data, **digitised data aggregation on a single platform** would create a **base for predictive modeling**.

CRITIQUE

LACUNAE	SOLUTION
PROJECT PILOT → **Project execution was delayed** due to **administrative in-coordination** and **undefined clear process for developer service acquisition**. Finding developers skilled in developing an **open-source, WebGIS based dashboard is a persistent issue.**	• The developers currently are being seeked through the tendering process on the GeM portal.
POST-PILOT → **It is important to have the core parameters** apart from the supplementary and additional parameters. The project is data driven.	• The city must collect core parameter data • The accuracy of the dashboard vary according to the resolution of the data layers uploaded.

Future Scope

SCALABILITY

- The dashboard will help the ULBs to identify vulnerable regions in the city and **plan adequate Eco-DRR infrastructure**.

- Features like **flood modelling and zonation**, **tracking alternate water and urban growth prediction** can be included on the dashboard with addition of more parameters.

- **Integration with the data collecting tools** i.e. the on-ground sensors, **data processing tools** i.e. SCADA system and with the main upcoming **decision support system i.e. ICCC**.

- The dashboard can prove to be useful in **accounting unconventional parameters** such as Water Productivity, **developing various water and other related sector works and reports** in missions such as Jal Jeevan: Urban.

Future Scope

REPLICABILITY

- Dashboard parameters cover a **wide set of datasets** addressing multiple **water related aspects along with other data sets like Land Use Land Cover; Blue-Green spaces,** population, etc. **This parameter list can be further tailored as per city's requirement** in order to function as an efficient decision support system.

- The **Web-GIS based open source platform** dashboard **code could be copied and replicated** for similar projects.

- The **dashboard can accommodate data of varying granularity i.e. the resolution** as per the city.