

Content



The Challenge

Water quality assessment in Pakistan today

Overview



Our Approach

One integrated system: ground truth + real-time sensing + satellite eyes + AI



**Conventional
Testing**

Baseline accuracy

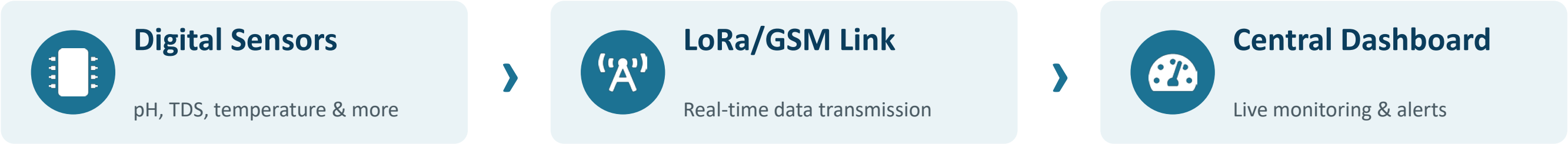
SMART WATER QUALITY MONITORING SYSTEM (SWQMS)

Overview of the Project — Real-Time Water Quality Monitoring

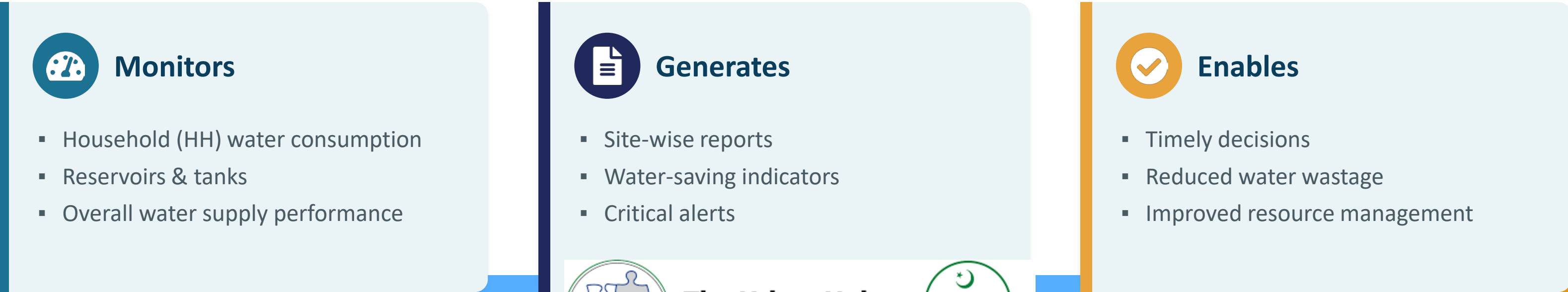
CM PUNJAB INITIATIVE



An initiative of The Urban Unit modernizing water quality management across District Murree & Kotli Sattian

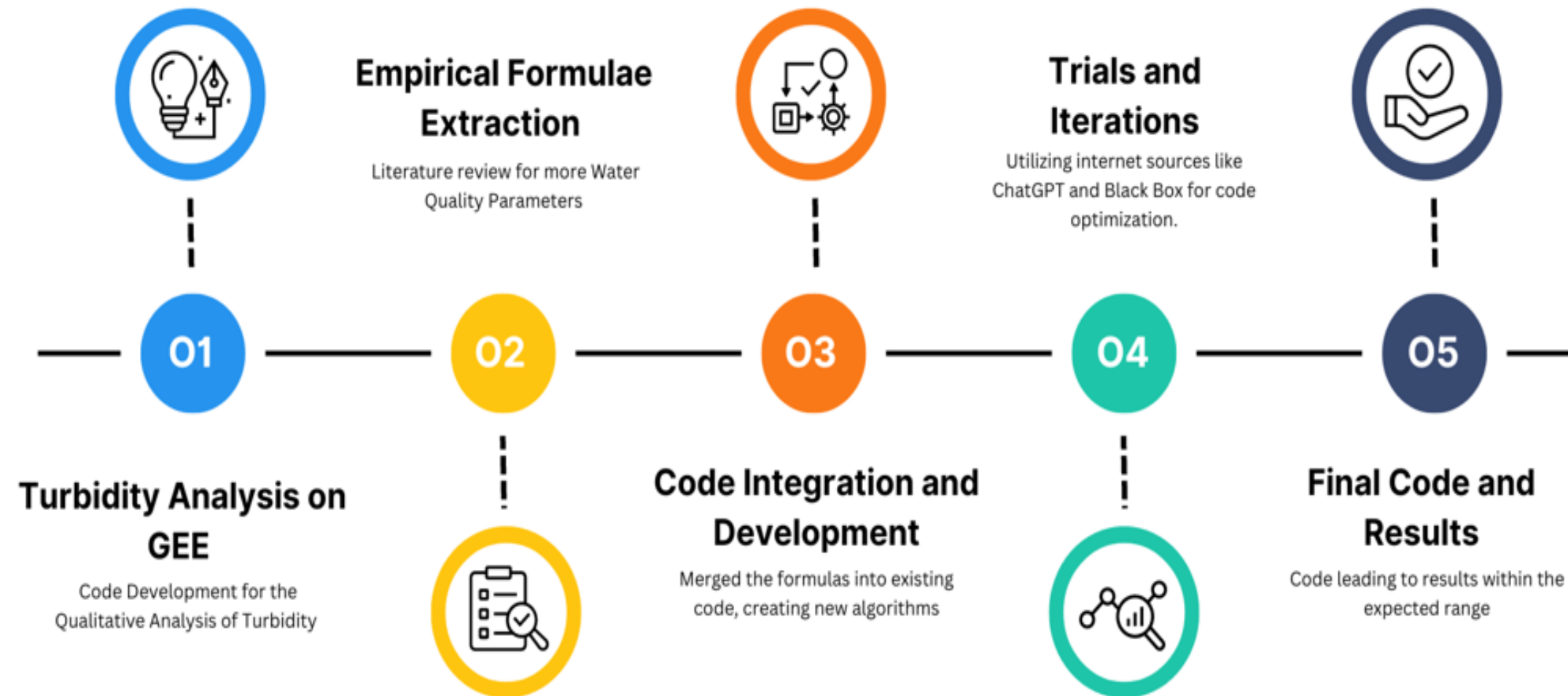


PARAMETERS MONITORED



Case studies – 3

Satellite based water quality monitoring



Satellite based water quality monitoring



Methodological Framework

Satellite Data Acquisition

Sentinel-2 MSI · Landsat-8/9 OLI

RS Index

Computation

NDWI · NDVI · NDTI · FAI · TSS · TDS ·
pH · Nitrate · CDOM · Secchi Depth ·
Chlorophyll-a · Turbidity ·

GIS Spatial Mapping

WQI computation · hotspot mapping

Pre processing (GEE)

Cloud masking · atmospheric correction

Statistical Calibration

Regression models · RS to field linkage

Google Earth Engine (GEE) Workflow

GEE served as the cloud-based geospatial processing platform, enabling automated, scalable, reproducible satellite analysis without local downloads or desktop GIS software.

GEE Script / Interface Screenshot



Water Quality Index Spatial Map

Keenjhar Lake: WQI & Overview

Very Poor

Dominant WQI
Category

Haleji Lake: WQI & Overview

67.2%
Very Poor
lake area

28.6%
Poor
lake area

Hamal Lake: WQI & Overview

52.8%

Very Poor
lake area

34.8%

Poor
lake area

Conclusion and way forward



IoT integration
in Industries

Smart
housing and

Impact

What this system enables for water resource management



Enhanced monitoring

