

An strategy for big data analyses towards urban resilience-water nexus

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UK-Brazil Collaboration

**Urban
Resilience**



Make cities and human settlements inclusive, safe, resilient and sustainable.

Health



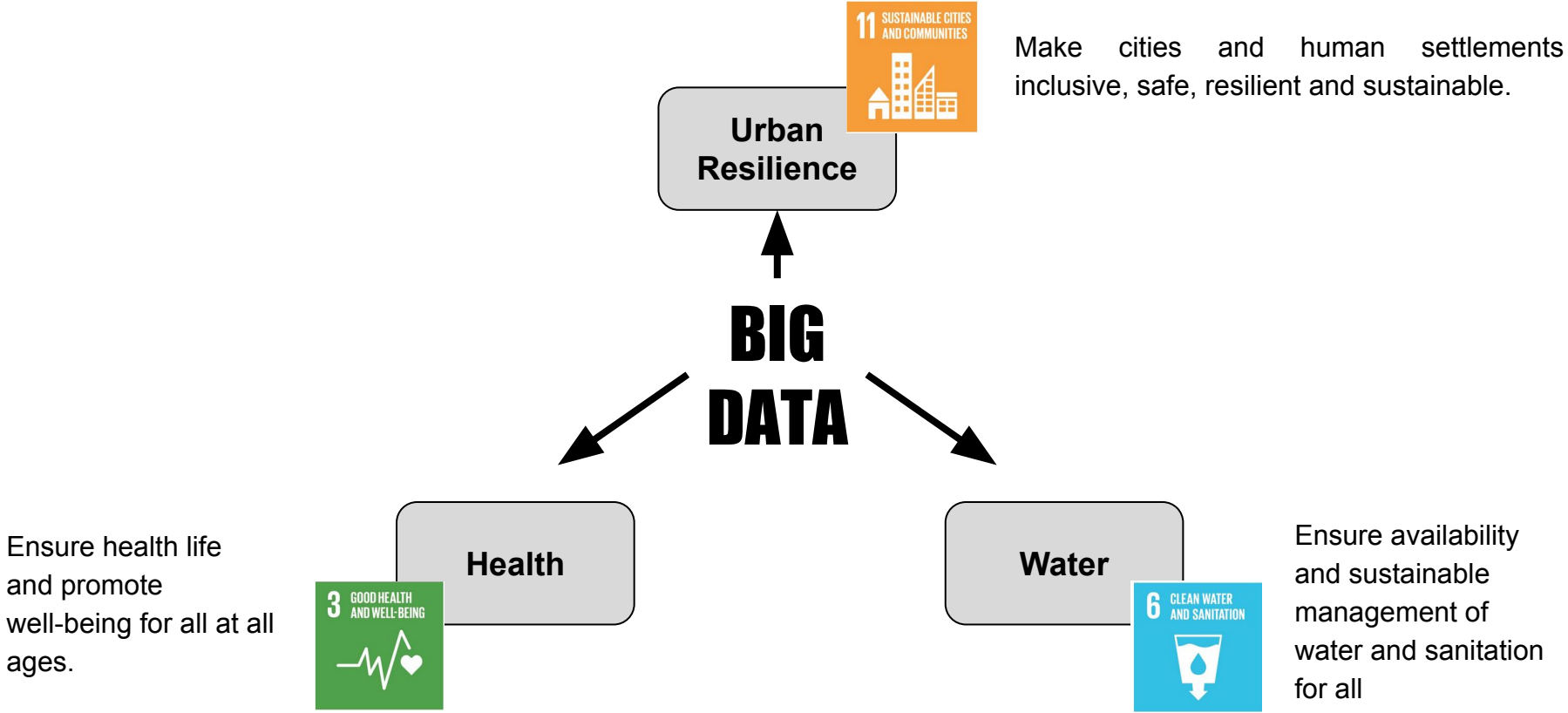
Ensure health life and promote well-being for all at all ages.

Water



Ensure availability and sustainable management of water and sanitation for all

UK-Brazil Collaboration

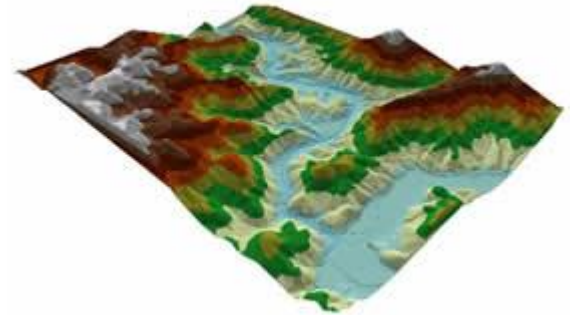


Flood Forecasting



**Real-time
data**

INPUT



**Watershed
Modeling**

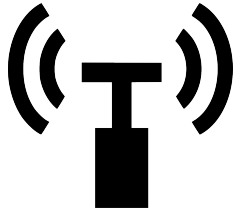
Sources of Information



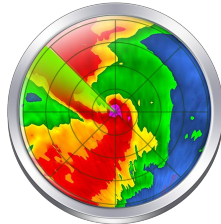
Satellite



Volunteers



Sensors



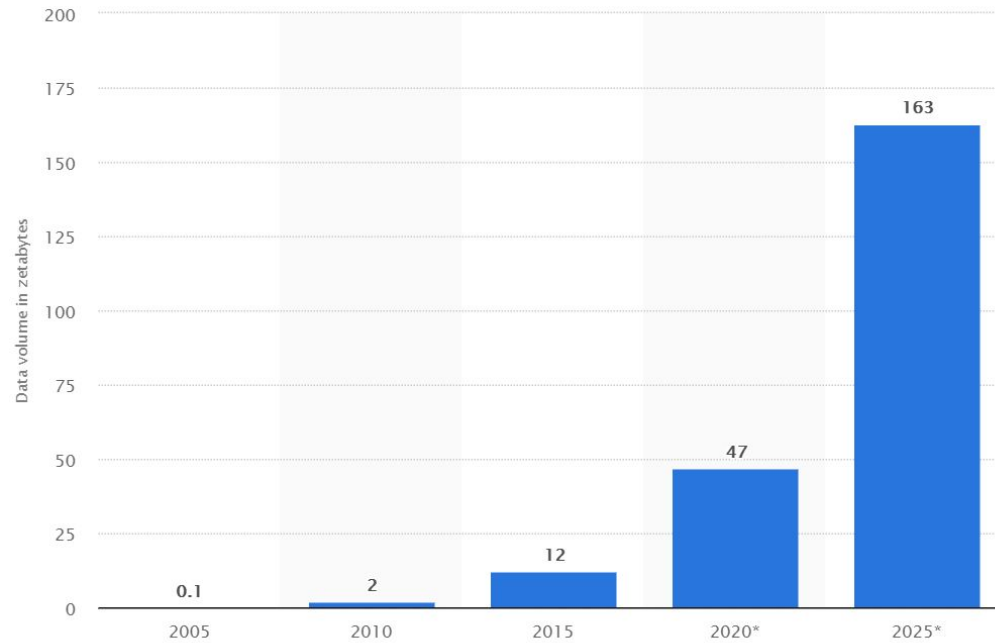
Weather
Radar

RESOURCES



**FLOOD
MODELING**
+
**URBAN
RESILIENCE**

Big Data



In 2015, worldwide 12 zettabytes of data was created globally. The number is forecast to reach 163 zettabytes in 2025.

Source: <https://www.statista.com/statistics/871513/worldwide-data-created/>

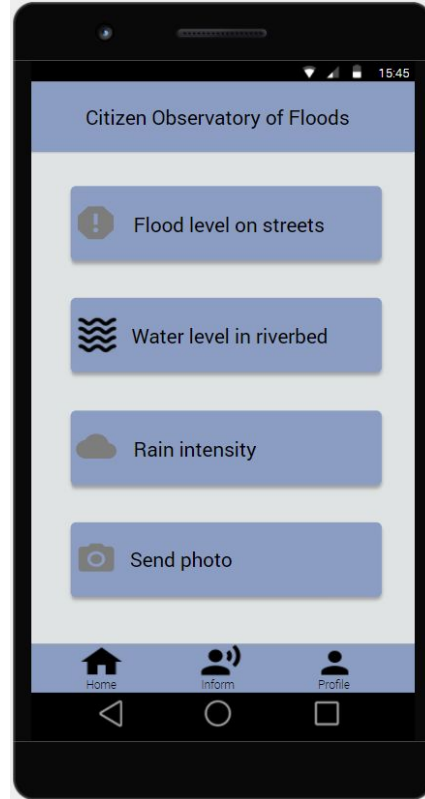
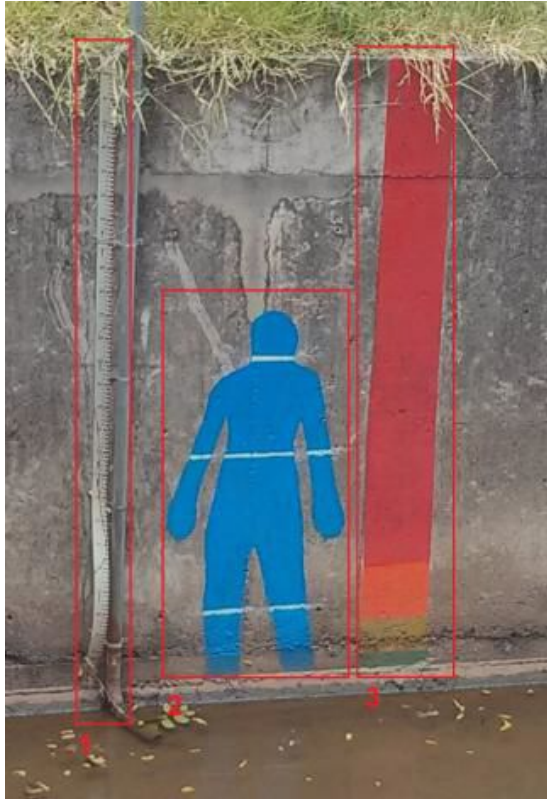
Big Data

- Velocity
- Value
- Volume
- Variety
- Veracity



- Data quality
- Missing data

Previous studies



+

FLOOD MANAGEMENT

Previous studies



Volunteers



**QUALITY
ASSESSMENT
METHOD(S)**



**QUALITY
INDICATOR**

DEGROSSI, L. C.; ALBUQUERQUE, J. P. de; ROCHA, R. dos S.; ZIPF **A taxonomy of quality assessment methods for volunteered and crowdsourced geographic Information.** Transactions in GIS, v. 22, p. 542–560, 2018.

Are our data good?

A growing amount of scientific research involves analyzing data that has already been collected.

Data are widely used for updating hydrological model, supporting decisions, etc.

Data analyses avoid misleading and wrong results

Are our data good?

Breda (2015) applied automatic measurements for the assessment of the quality of data from automatic gauges in Minas Gerais.

Missing data is the most compromising lack of data in rainfall data series.

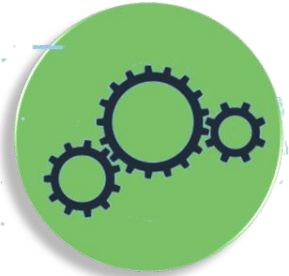
1 Identifying Problem



2 Designing Data Requirement



3 Pre-processing Data



5 Visualizing Data



4 Performing Analytics Over Data

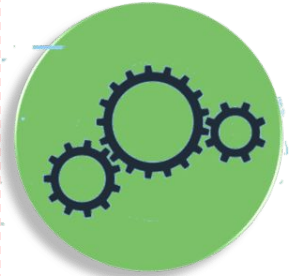
1 Identifying Problem



2 Designing Data Requirement



3 Pre-processing Data



5 Visualizing Data



4 Performing Analytics Over Data



Pre-processing Data

Range of observations,

Range of techniques,

Different errors,

Data gaps.

Research Opportunities:

How do we collect data? Is there a method for data collection?

How do we select and organize our data?

Thank you!

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