Waterproofing Data: reframing floods, data and resilience with an interdisciplinary approach

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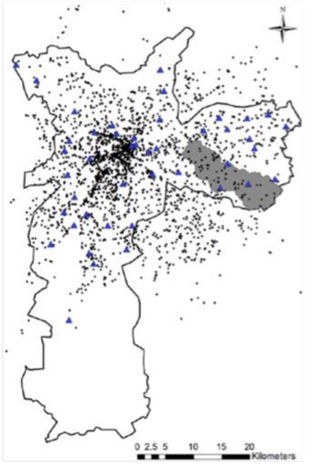
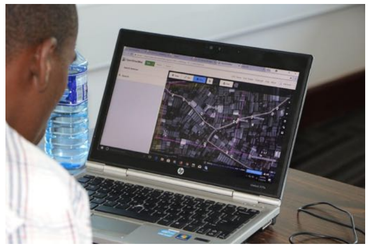
Turing Fellow, The Alan Turing Institute

Sustainable Cities Research @ University of Warwick, 31 October 2018 (World Cities Day)

Context: Sustainable Urbanisation Research



- Interdisciplinary methods:
  - Geographic Information Science / Sociospatial Data Science / Urban Geography
  - Topics: Citizen participation / Sustainable Development
- Research interests / projects:
  - **Disaster resilience**
    e.g. ‘Waterproofing Data” project on floods in Brazil (PI: €1m ESRC/GCRF/Belmont Forum grant)
  - **Urban health**
    E.g. greenspace policy, healthcare access in the global South (Co-I: £6m NIHR grant)
  - Sustainable urbanization and the Food-Water-Energy Nexus
    E.g. ”Creating Interfaces” project (Co-I/UK PI: €1.2m Belmont Forum/ESRC)
  - Urban sustainable development (SDGs)
    E .g. ESRC IAA “Making Sense of Humanitarian Data”, in collaboration with BRC, MSF, UN Habitat



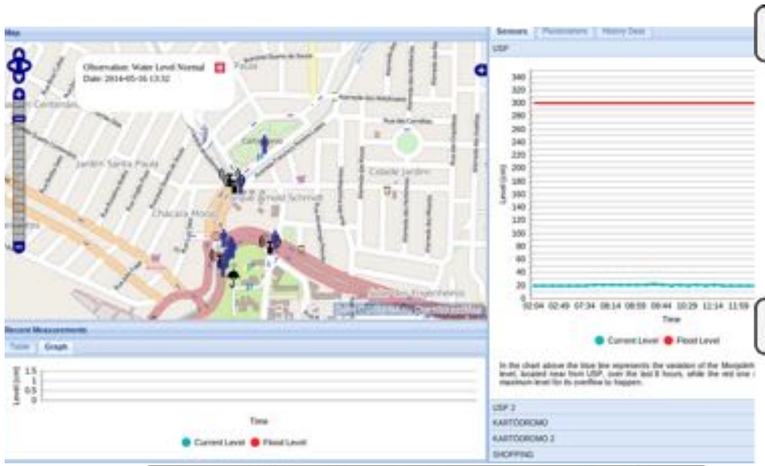
Transformations to Sustainability
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL
EPSRC Engineering and Physical Sciences Research Council
Funded and supported by NHS National Institute for Health Research

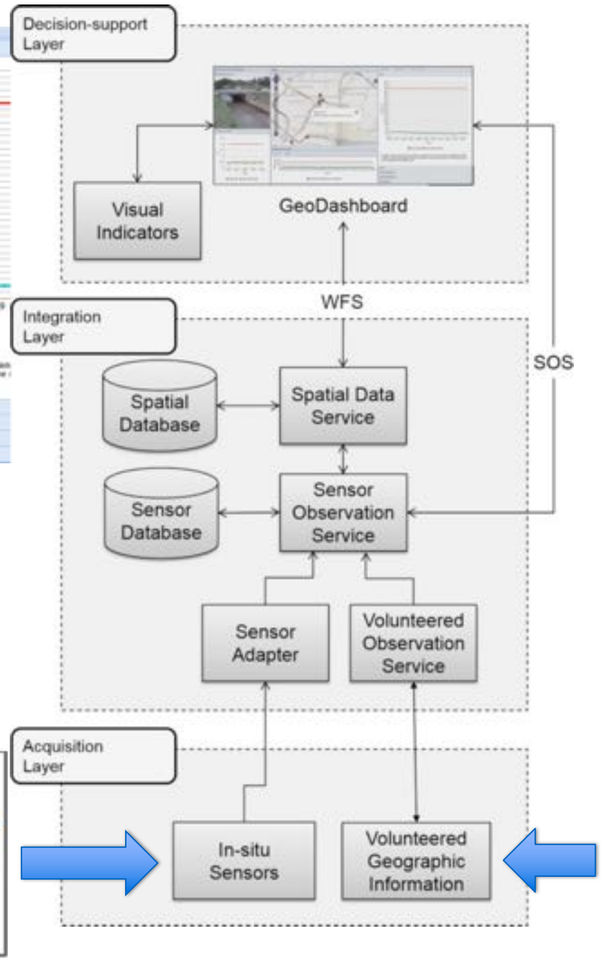
Why collaborate to improve resilience to disasters?

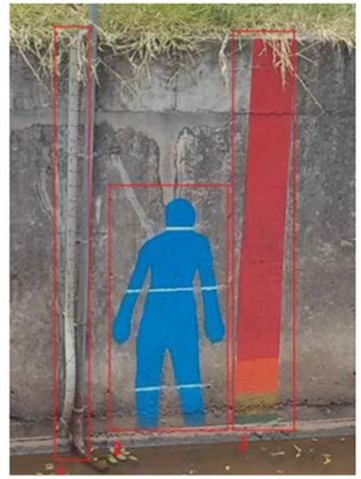
Praia Grande/SP, Brazil, February 2016

Carlisle, UK, January 2016

Background: AGORA project







Horita, F. E. A., de Albuquerque, J. P., et al. (2015). Development of a spatial decision support system for flood risk management in Brazil that combines volunteered geographic information with wireless sensor networks. Computers & Geosciences, 80, 84–94.

UK-Brazil Collaboration on Leveraging Crowdsourced and Sensor Data to Support Decision-Making towards Urban Resilience

- EPSRC GCRF Institutional Awards
  - Field Trips and workshops in UK and Brazil (2017)
  - Established an interdisciplinary network and a collaborative research agenda:
  - Innovative methods and emerging data sources to improve resilience to floods and landslides

EPSRC Engineering and Physical Sciences Research Council

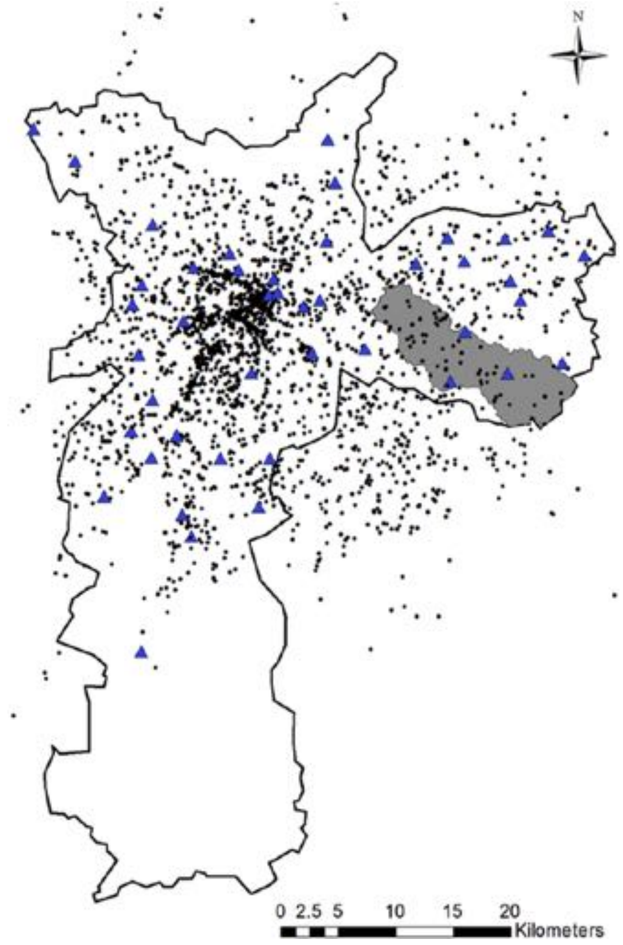
UFRJ

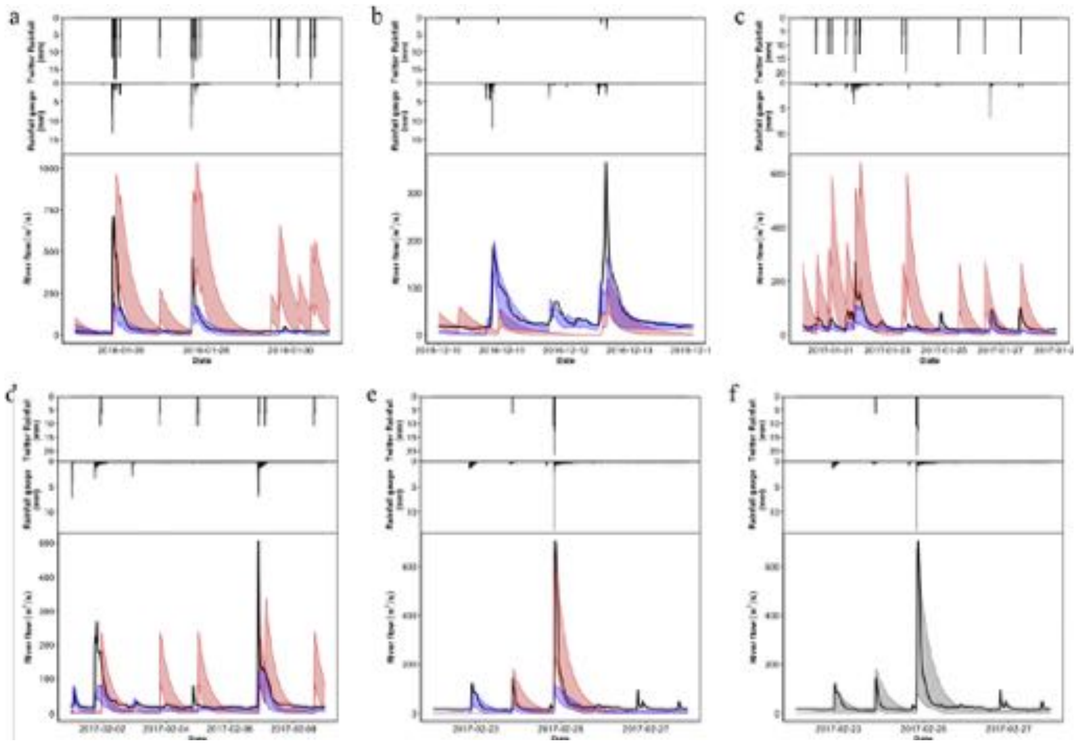
CPRM Serviço Geológico do Brasil

Cemaden Centro Nacional de Monitoramento e Alertas de Desastres Naturais

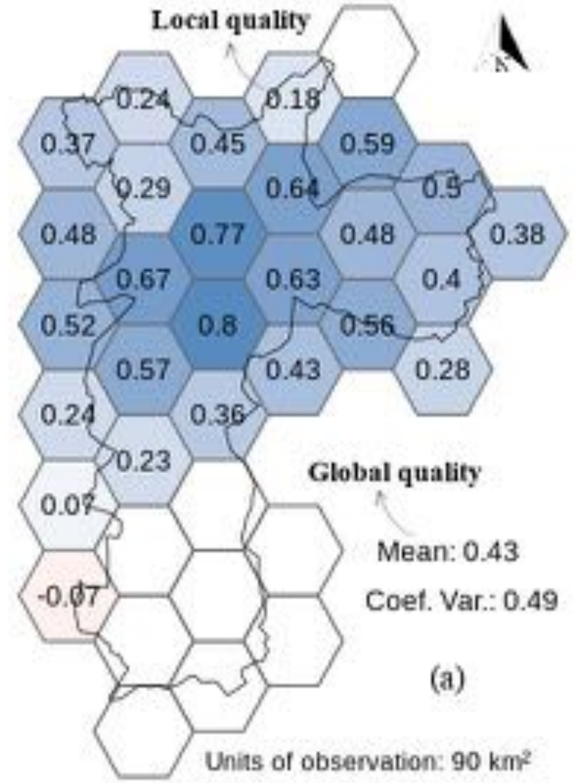
British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL

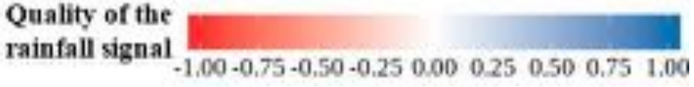
Preliminary results: social media to map rainfall in Brazil





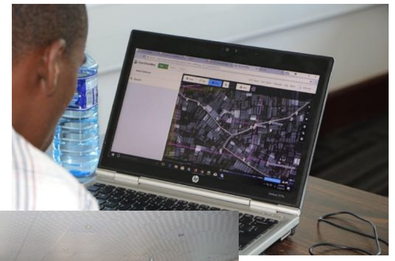
$$p_{social} = \alpha\left(1 + \eta_{strong} + \eta_{soft}\right)\frac{f_{kw}}{A_{interest}} + \sum_{i=20}^{n}\beta_i\frac{F_{kw(i)}}{A_{interest}}$$





Restrepo-Estrada, C., de Andrade, S. C., Abe, N., Fava, M. C., Mendiondo, E. M., & de Albuquerque, J. P. (2018). Geo-social media as a proxy for hydrometeorological data for streamflow estimation and to improve flood monitoring. Computers & Geosciences, 111, 148–158. http://doi.org/10.1016/j.cageo.2017.10.010

Research Challenges : inherent tensions in the of framing floods and data



Instrumentality

–Citizens as sensors: ’data providers’?

–Data to support decision-making in centres of expertise

–Data quality as a technical property

Empowerment

–- Digital technologies enable citizens to produce alternative views of the urban space

– More inclusive/polyvocal information spaces

–Data effectiveness comes from engagement capacity

Waterproofing Data

Engaging stakeholders in sustainable flood risk governance for urban resilience

(October/2018- September/2021)

Challenge

How to rethink flood data production and flow to enable transformations to build sustainable, flood resilient communities?

Where?

Flood-prone communities and local governments of two different cities in Brazil: Rio Branco (Acre) and São Paulo (SP).

Project Partners:

WARWICK THE UNIVERSITY OF WARWICK

FGV EAESP ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

UNIVERSITÄT HEIDELBERG ZUKUNFT SEIT 1386

Co-operation Partners:

Cemaden Centro Nacional de Monitoramento e Alertas de Desastres Naturais

PREFEITURA DE SÃO PAULO INOVAÇÃO E TECNOLOGIA

sema Secretaria de Estado de Meio Ambiente do Acre

CPRM Serviço Geológico do Brasil

BGS British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL

Funding Agencies:

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

FAPESP SÃO PAULO RESEARCH FOUNDATION

Federal Ministry of Education and Research

In coordination with:

Transformations to Sustainability

BELMONT FORUM

NORFACE ERA-NET

Waterproofing Data

Engaging stakeholders in sustainable flood risk governance for urban resilience

Objectives

Develop three innovate interdisciplinary methods:

1. **Make visible how stakeholders engage with data**
   Data diaries
2. **Engage citizens to produce, circulate and embed data**
   Digital flood memories, data-driven-installations, citizen science
3. **Integrate citizen-generated data with other sources to support decision and policy making**
   Participatory mapping, decision-support system

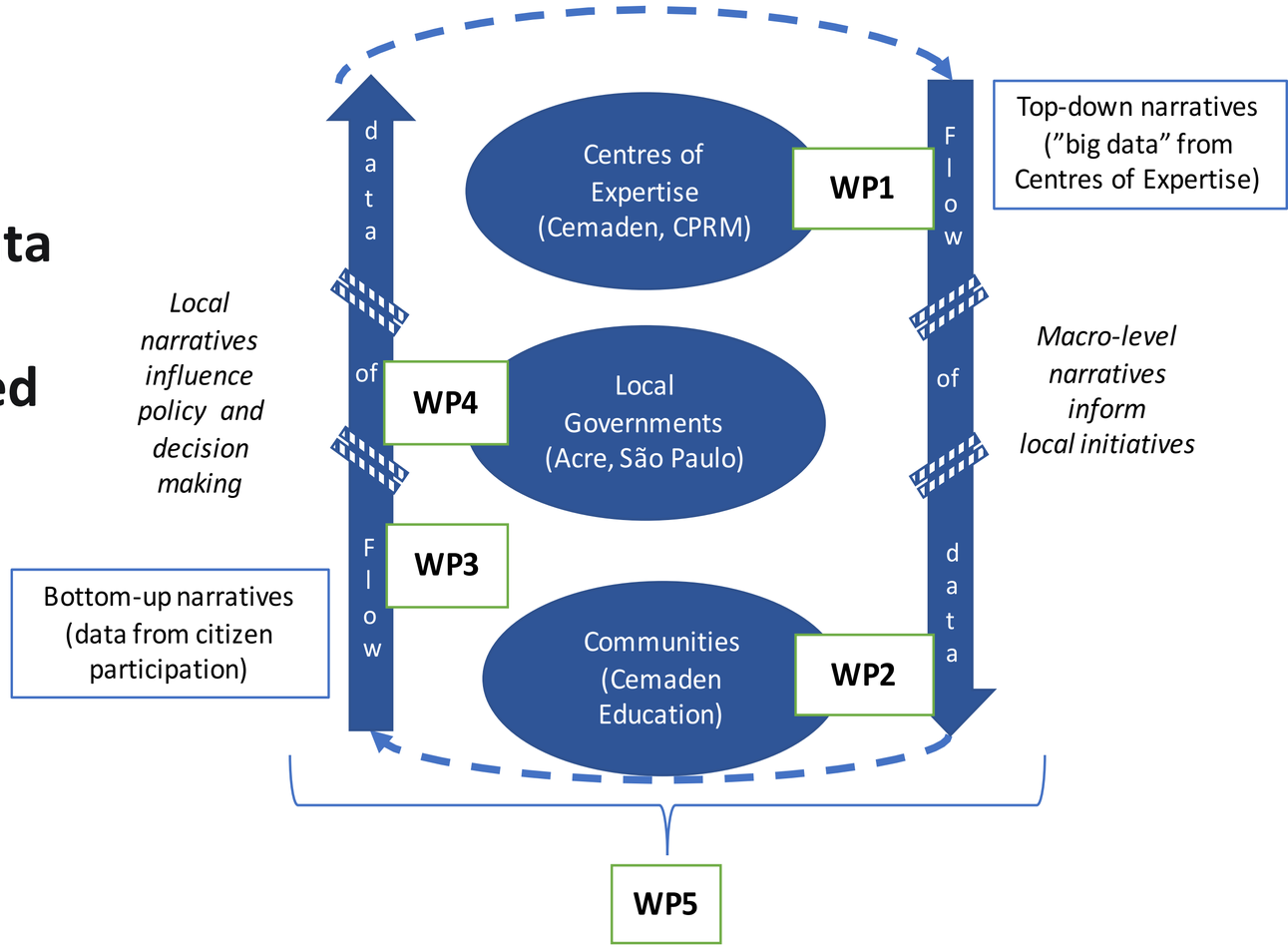
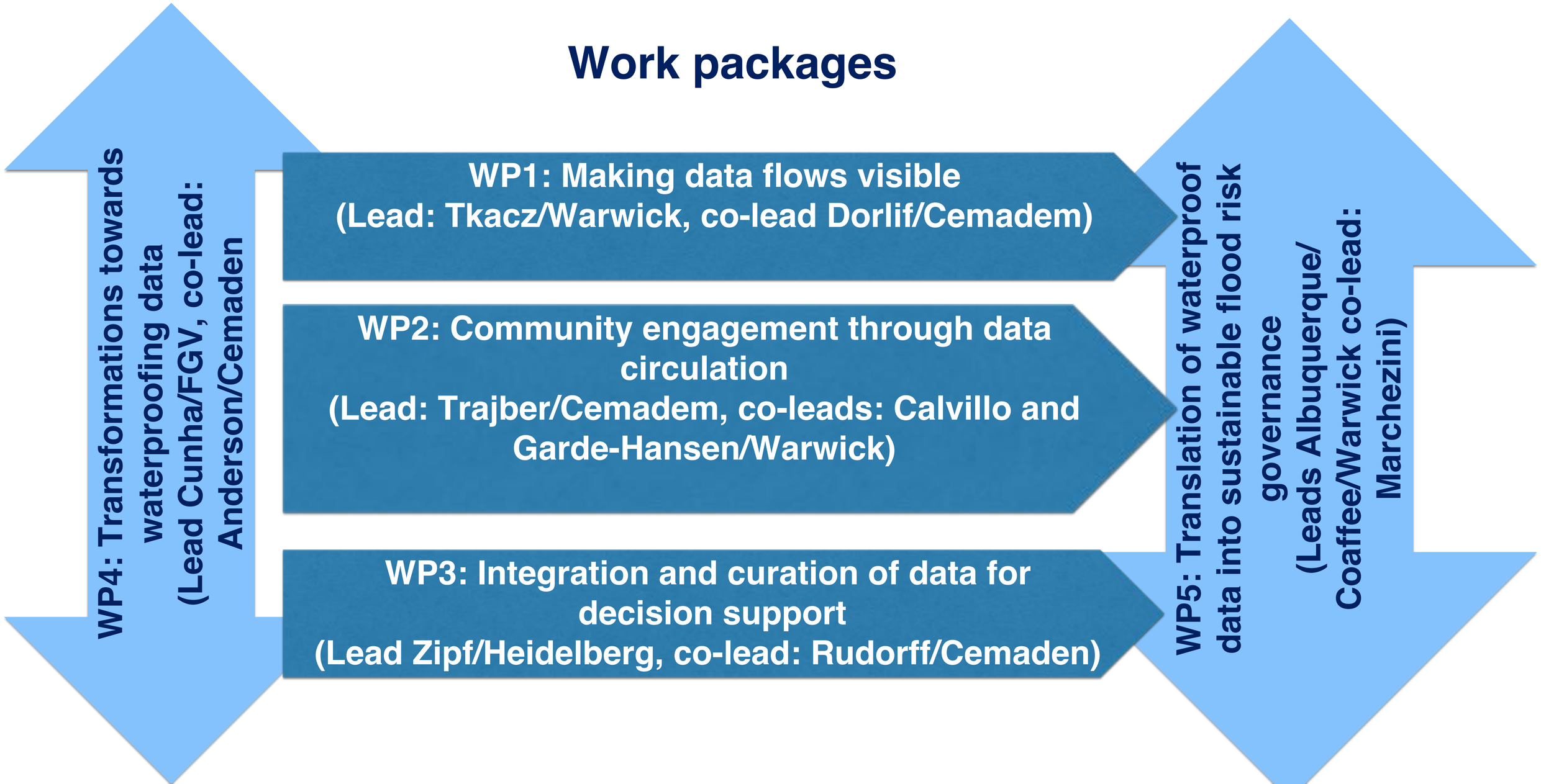


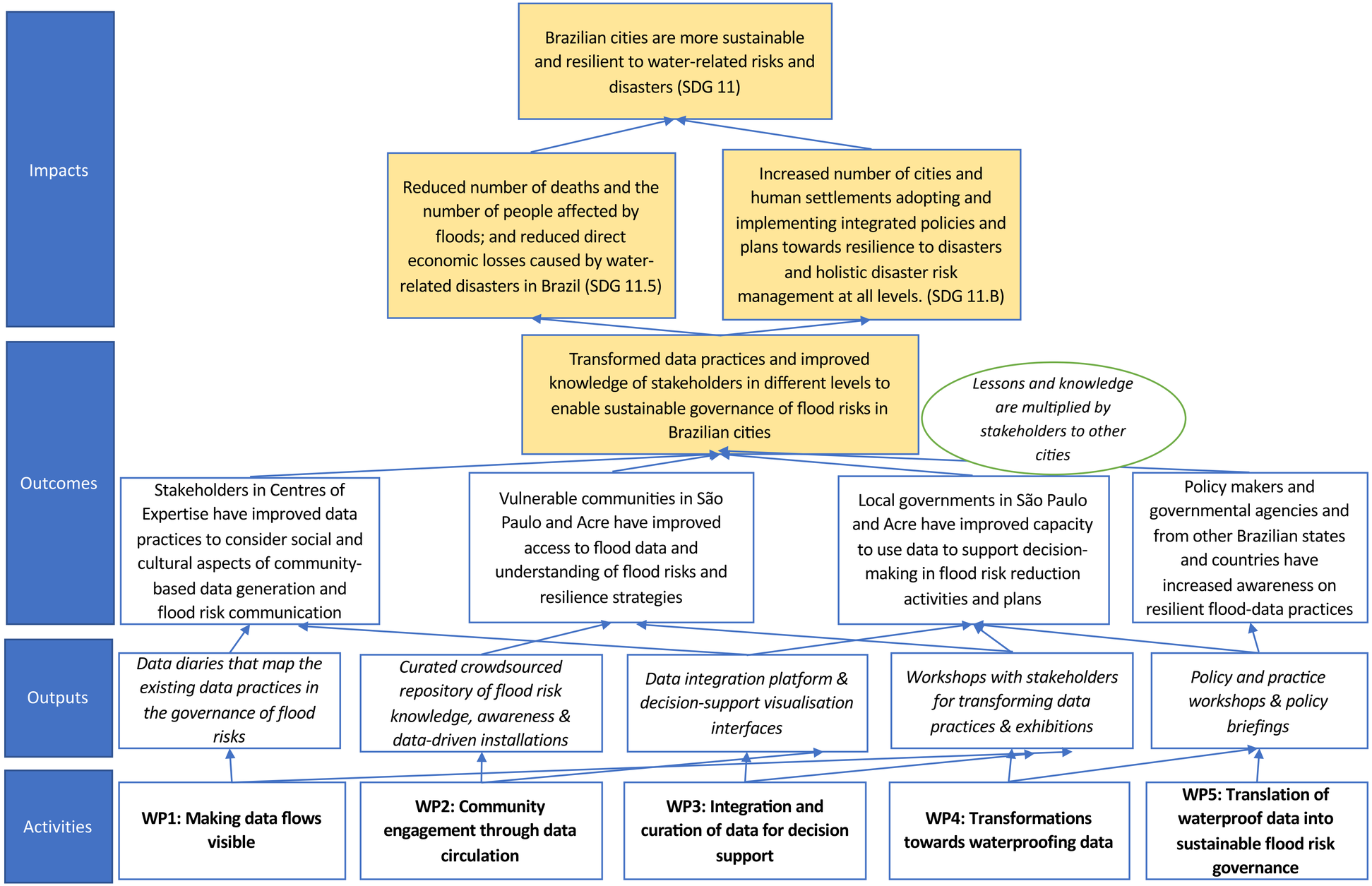
Figure 1. Scales and work packages of the project

Waterproofing Data

Engaging stakeholders in sustainable flood risk governance for urban resilience

Work packages





Waterproofing Data – Impact Pathways - Theory of Change

Roadmap: Mapping urban spaces – challenges towards an interdisciplinary methodological framework

- Different frames as constitutive tension (Albuquerque & Almeida, 2018)
- Community data production not only as epistemological problem, but as a critical pedagogical process (Freire, 1976)
  - Not a passive “knowledge transmission” but co-production
  - Find out the “generative data”
- What is to reframe data and knowledge in a post-truth scenario?
  - Can we construct flows between frames that simultaneously build trust and resilience?

THANK YOU

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