Adaptive governance of water resources and risks through continuous monitoring and citizen science

Wouter Buytaert and the Mountain-EVO team

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For quality of life
CONDESAN
Consorcio para el Desarrollo Sostenible de la Ecorregion Andina
SOCIETY OF HYDROLOGISTS AND METEOROLOGISTS
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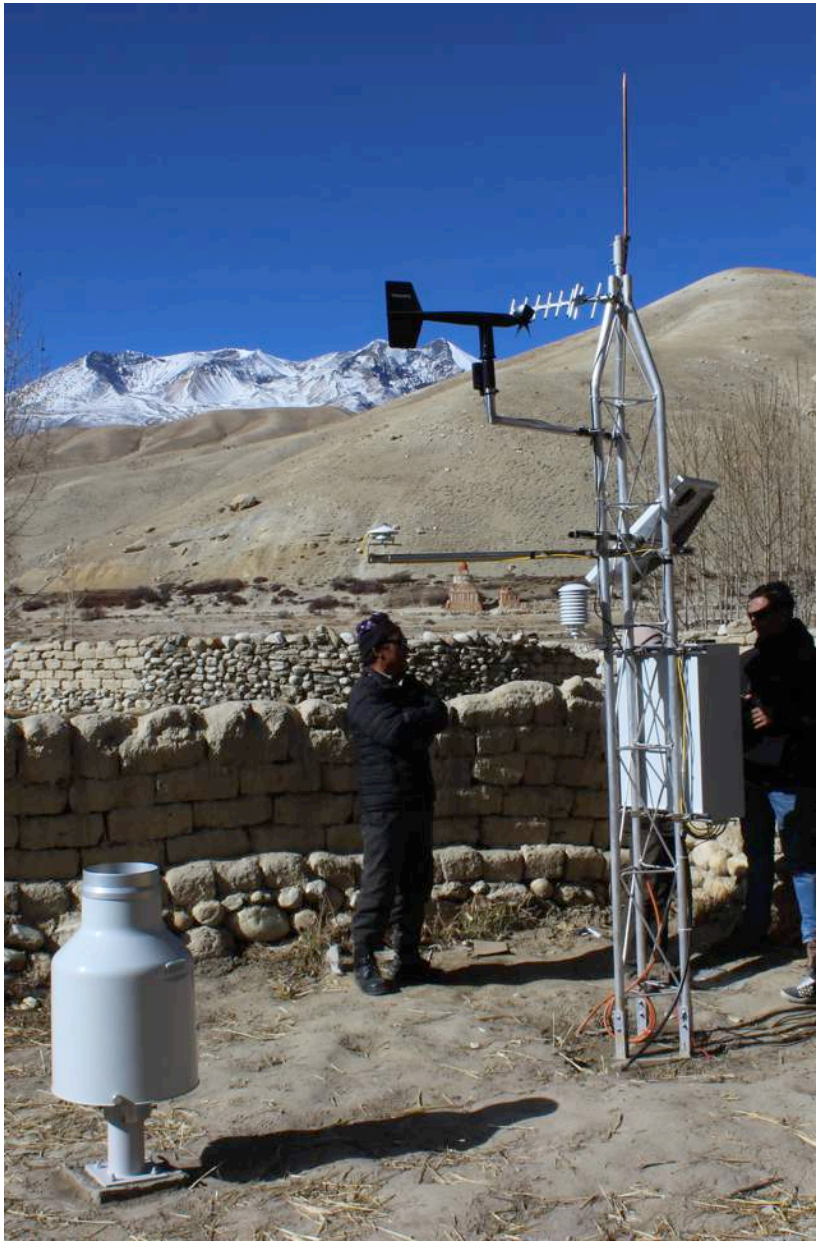
UCA
UNIVERSITY OF CENTRAL ASIA
Cornell University
Freie Universität Berlin
UNESCO
United Nations Educational, Scientific and Cultural Organization
Universiteit Antwerpen

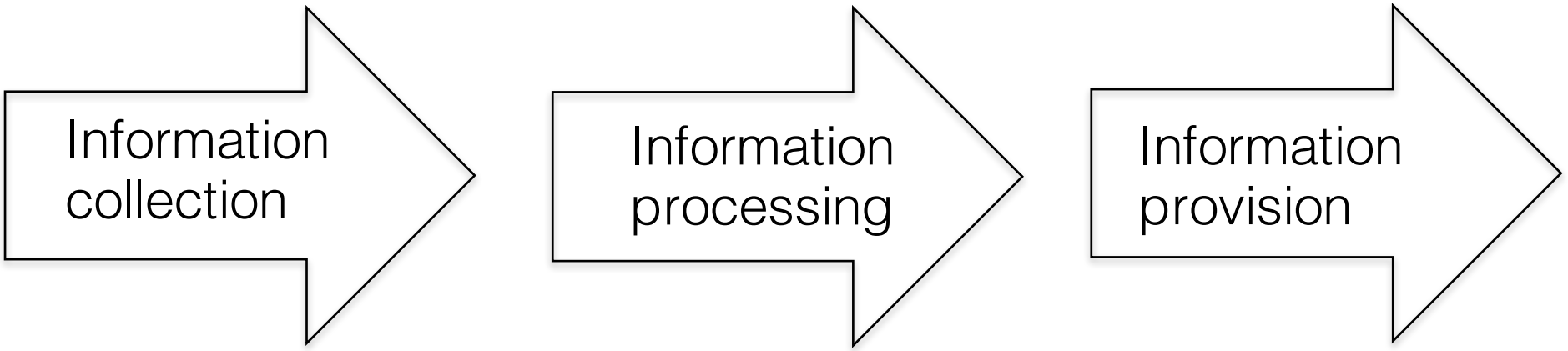
Climate change and water resources

- Low data availability
- Deep uncertainties
- A need for flexible, no regret strategies

-> Increasingly, “predict and control” based approaches are being replaced by more **adaptive** approaches to **governance** of natural resources and risks



Actionable knowledge generation



Multi-level monitoring, data collection & citizen science

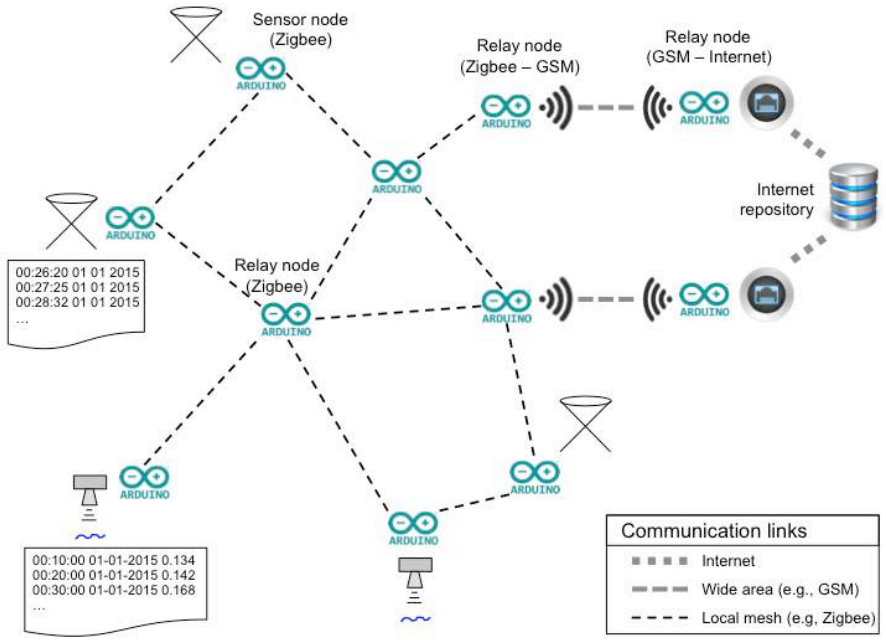
Modular and distributed workflow construction, simulation, and prediction

De-centralized communication and policy support systems

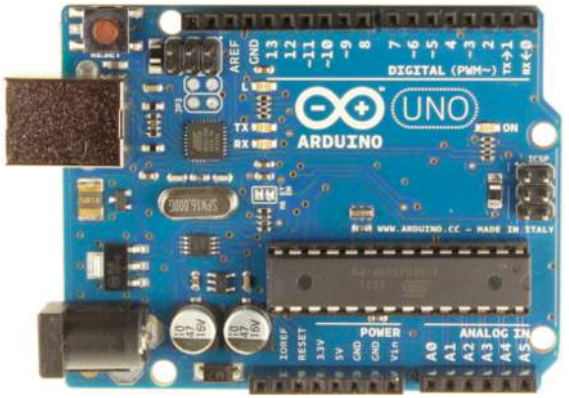
Polycentric governance of natural resources

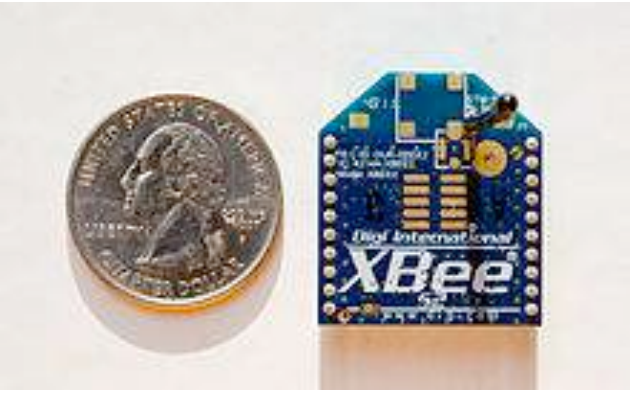
New technologies for environmental sensing

Sensor networks



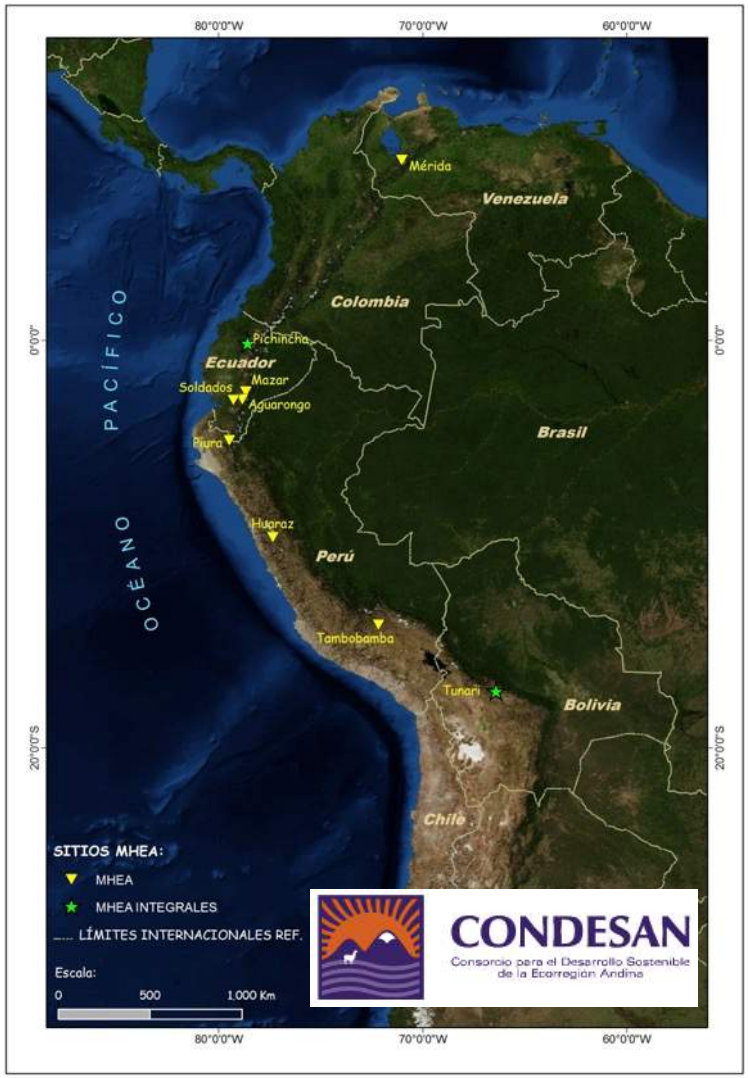
oxfloodnet.co.uk





Participatory monitoring

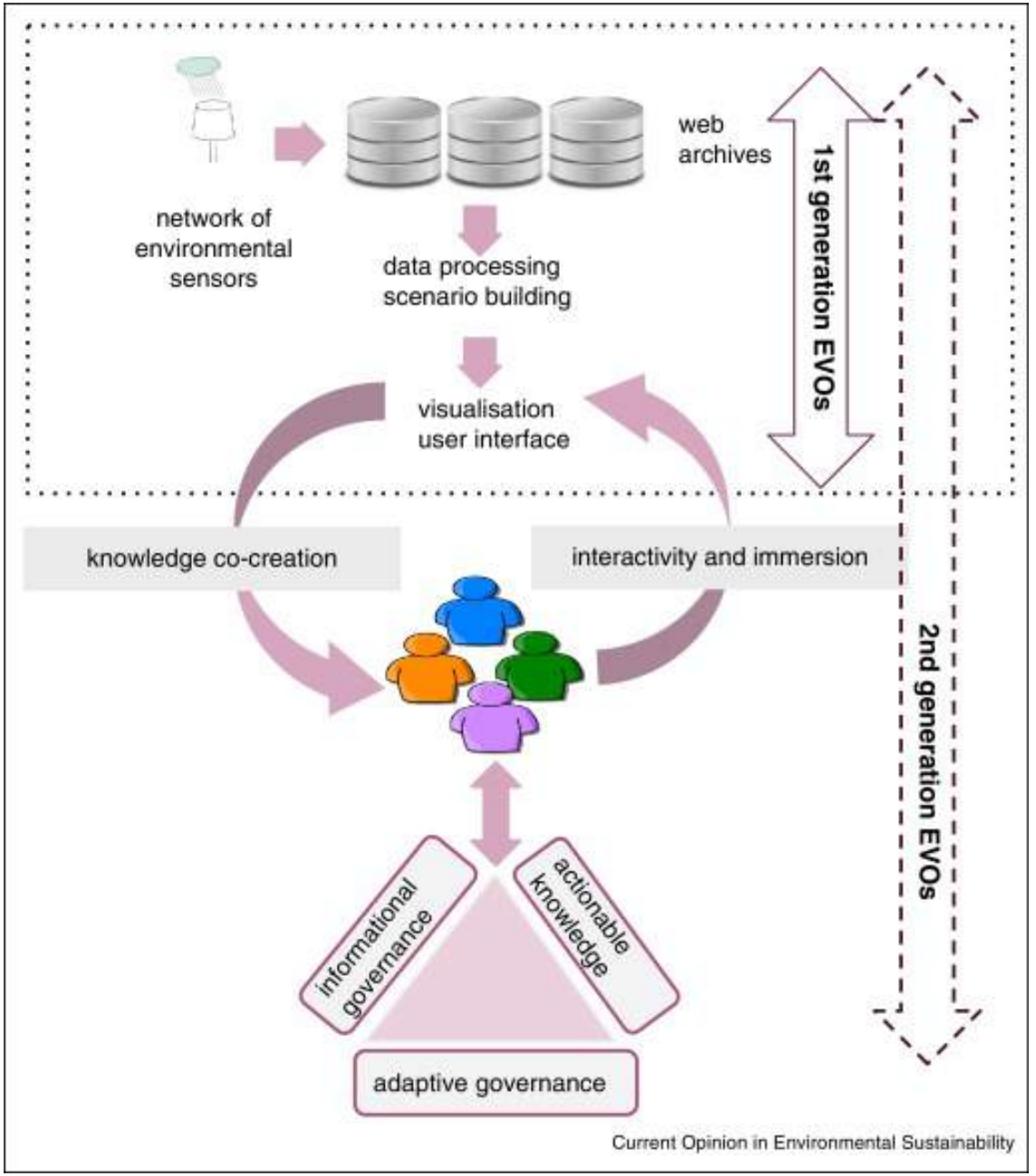
- Precipitation and river discharge
- Responding to local questions on land-use impacts
- Local buy-in and participation



Iniciativa Regional de
Monitoreo Hidrológico
de Ecosistemas Andinos

Knowledge generation

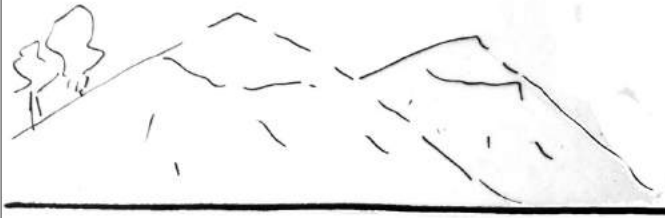
- ICT, web technologies
- Multilevel, multipurpose, multidirectional
- Integration of heterogeneous data & knowledge
- Polycentric models of data curation, knowledge co-generation, and governance



Karpouzoglou, T., et al. (2015). Environmental Virtual Observatories (EVOs): Prospects for knowledge co-creation and resilience in the Information Age. COSUST, 18, 40–48.

Visualization and communication

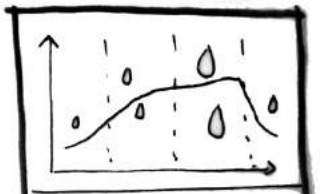
MOUNTAIN EVO | EXPLORE | STORIES | LEARN | LOGIN | SIGN



MOUNTAIN EVO IS A PORTAL TO BLURB BLURB BLURB

HUAMANTANGA CHANGE

MAPS



RAINFALL

FODDER RECOMMENDATION...

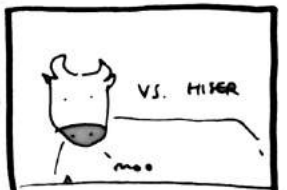
Q What bread produces more cheese?

A [MORE]

Q What should I use as fodder?

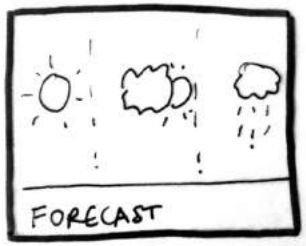
A

QUESTION AREA

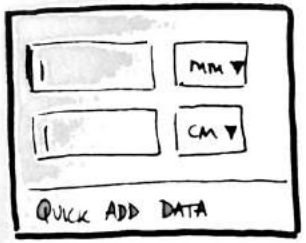


VS. HIGH

CATTLE COMPARE



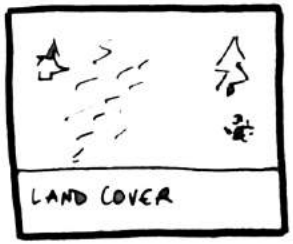
FORECAST



mm

cm

QUICK ADD DATA



LAND COVER

CONTACT MOUNTAIN EVO TEAM

ENGLISH

EXPLORE
DATA
UPLOAD
STORAGE

STORIES
MATH
UPLOAD

LEARN
Q&A
WHAT-IF

MOUNTAIN EVO | EXPLORE | STORIES | LEARN | LOGIN | SIGN

MAPS

RIVERFLOW

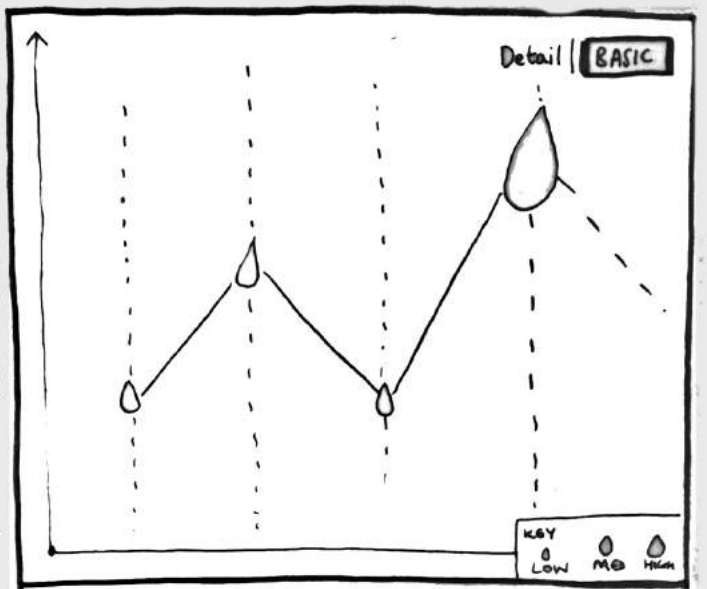
RAINFALL

°C TEMP

INDICATORS

+ ADD SENSOR

↑ UPLOAD DATA



ADVANCED TOOLS SHOW

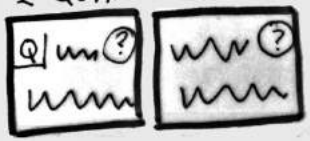
ABOUT THIS CHART

MORE

1 RELATED STORY

MAKING CHEESE IN DRY SEASON

2 Q+As

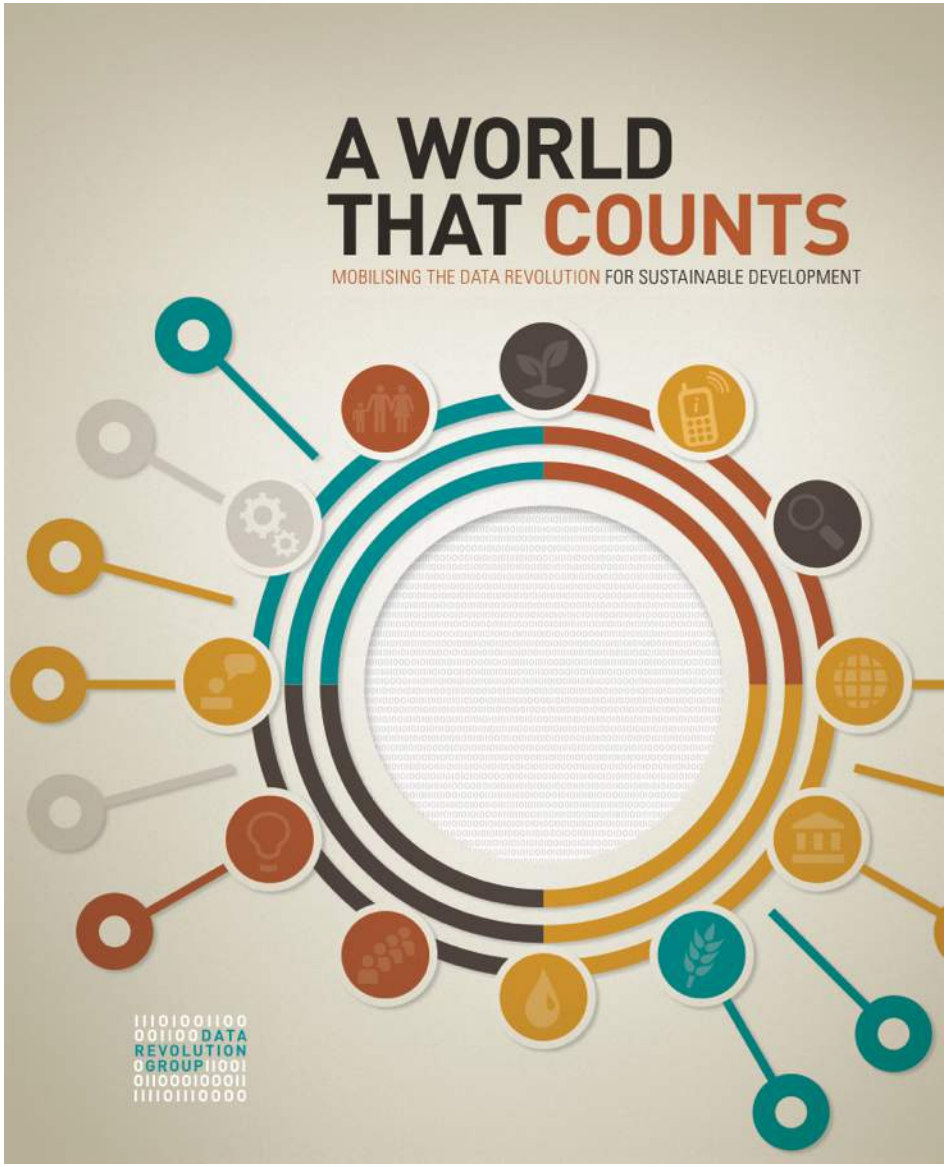


3 SENSOR LOCATIONS

Part of a bigger “data revolution”

Opportunities

- Increasing adoption of technologies by the poor
- Need for evidence-based decision-making
- Facilitating the involvement of marginalized communities
- Increased openness and transparency



frontiers in
EARTH SCIENCE

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Citizen science in hydrology and water resources: opportunities for knowledge generation, ecosystem service management, and sustainable development

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The participation of the general public in the research design, data collection and interpretation process together with scientists is often referred to as citizen science. While citizen science itself has existed since the start of scientific practice, developments in sensing technology, data processing and visualization, and communication of ideas and results, are creating a wide range of new opportunities for public participation in scientific research. This paper reviews the state of citizen science in a hydrological context and explores the potential of citizen science to complement more traditional ways of

Thank you

espa
ecosystem services
for poverty alleviation

Zed Zulkafli, Bhopal Pandeya, Sam Grainger, David Hannah, Julian Clark, Art Dewulf, Timos Karpouzoglou, Johan Bastiaensen, Gert Van Hecken, Achim Schultze, Bhanu Neupane, Mark Foggin, Chris Hergarten, Munuvar Zhumanova, Aiganysh Isaeva, Deepak Paudel, Keshav Sharma, Jagat Bushal, Praju Gurung, Santosh Regmi, Tammo Steenhuis, Seifu Tilahun, Tilashwork Alemie, Bert De Bièvre, Cecilia Sandoval, Luis Acosta, Miguel Saravia

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