

Imperial College  
London



Organización de las Naciones Unidas  
para la Educación, la Ciencia y la Cultura

# Workshop Drought Vulnerability

Wouter Buytaert, Boris Ochoa, Barbara Orellana



# The science – policy interface

---

10 – 12.30pm: The science – policy interface in water management

(Wouter Buytaert)

A participatory monitoring network (Boris Ochoa)

Discussion

1.30 – 4pm: Changing Water Cycle: Hydrological Extremes and

Feedbacks (Barbara Orellana)

Discussion and breakout working groups



# The science – policy interface in water management

## Experiences from the Andes



Wouter Buytaert

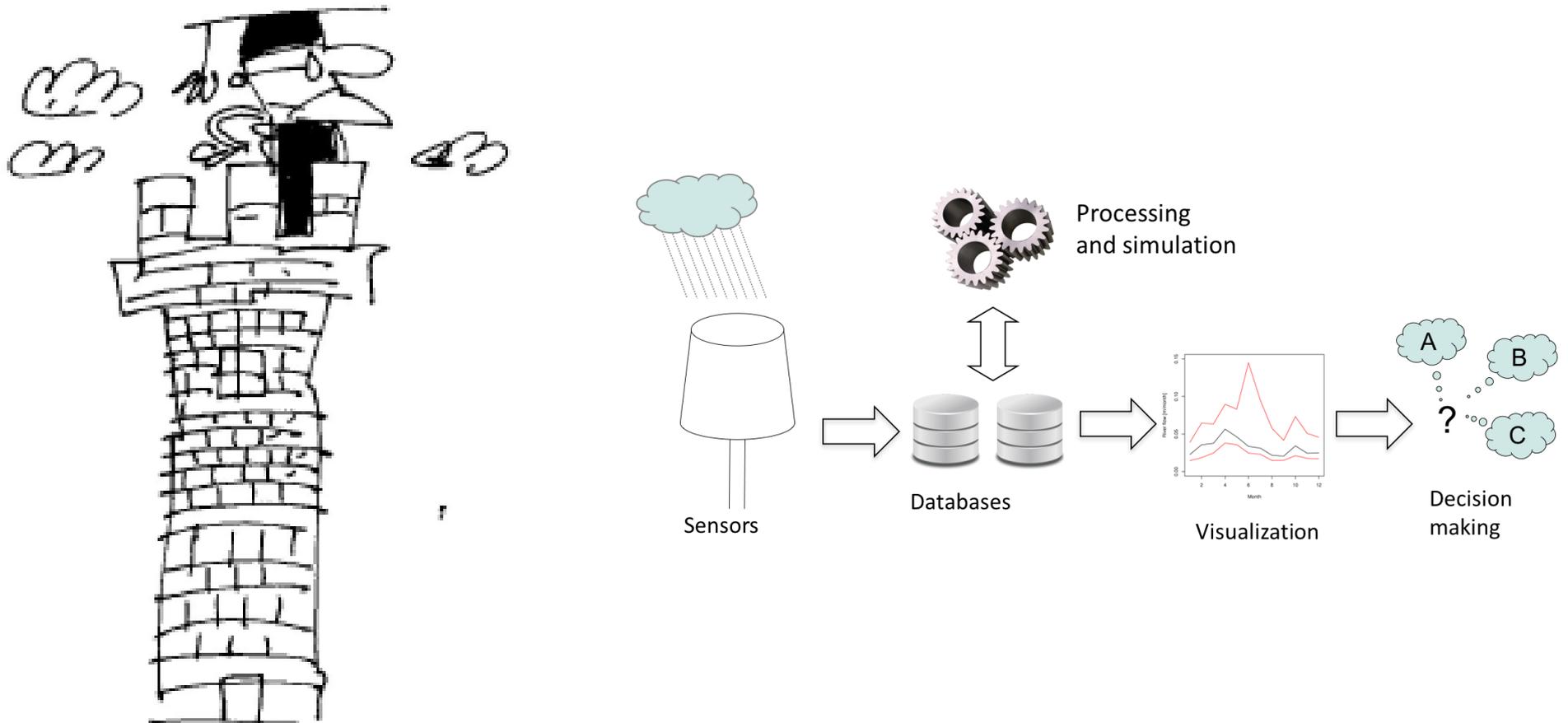
w.buytaert@imperial.ac.uk



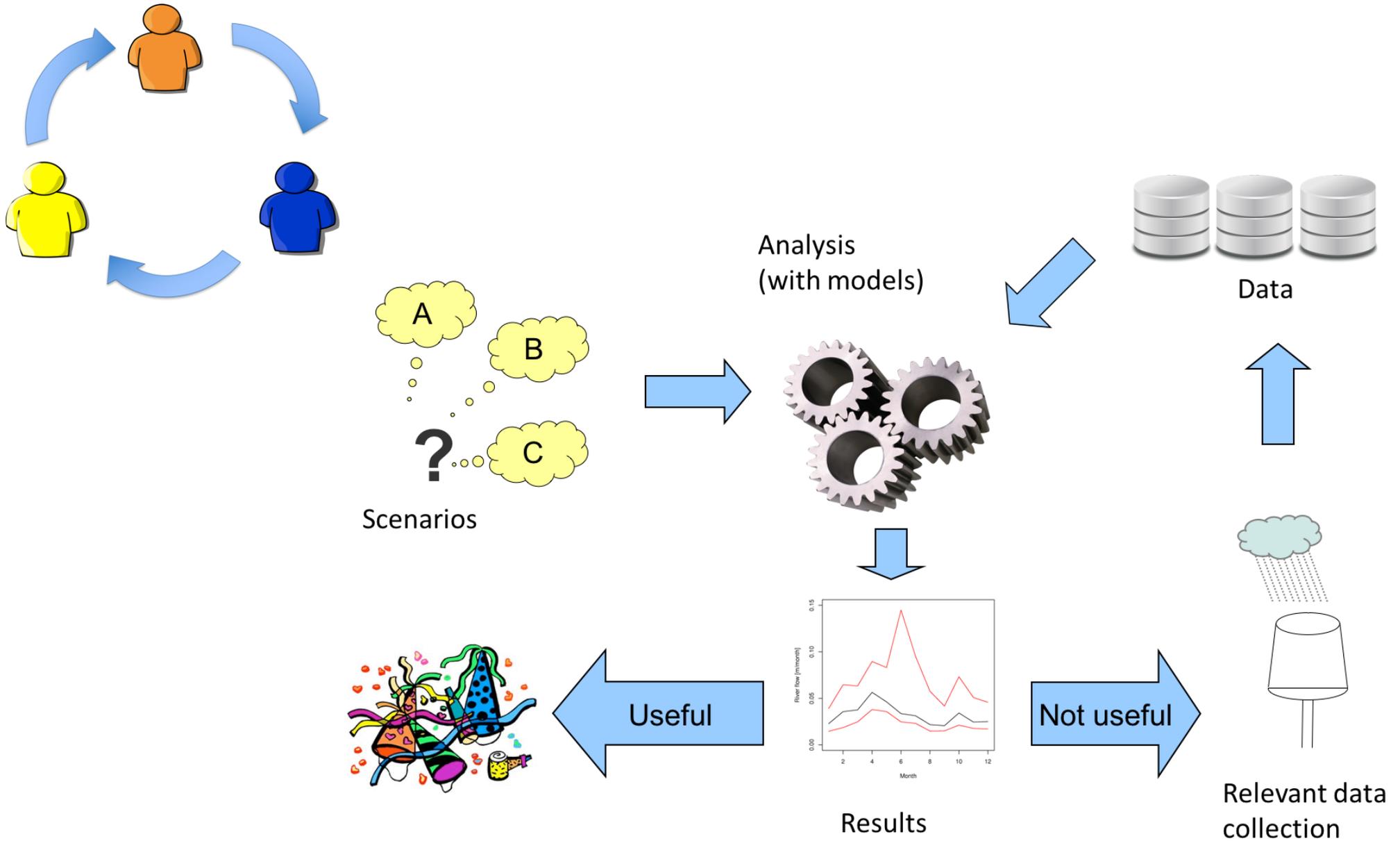
# The science – policy interface

---

## The “classic model”



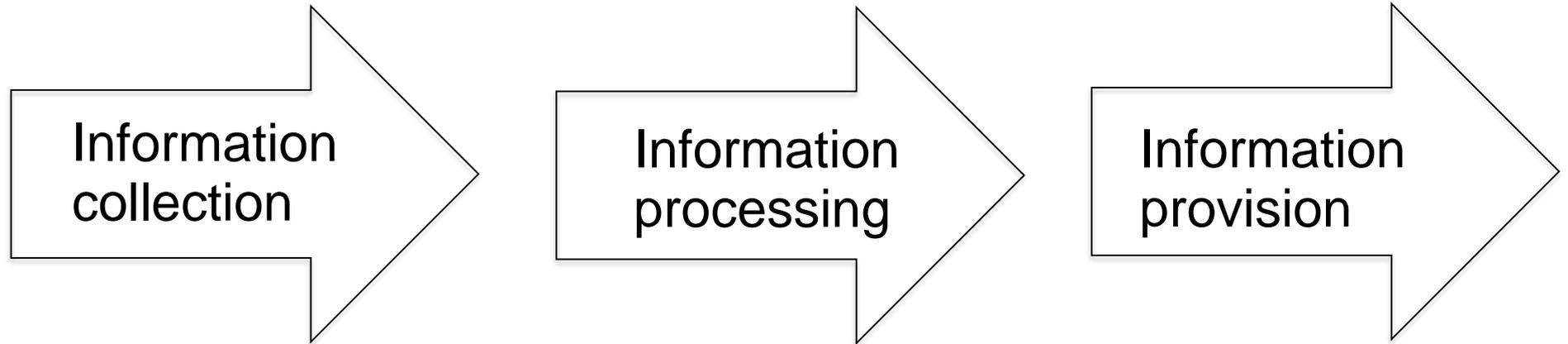
# A polycentric, multidirectional and interactive model



# Conceptualization

---

## Actionable knowledge generation



Multi-level  
monitoring, data  
collection &  
citizen science

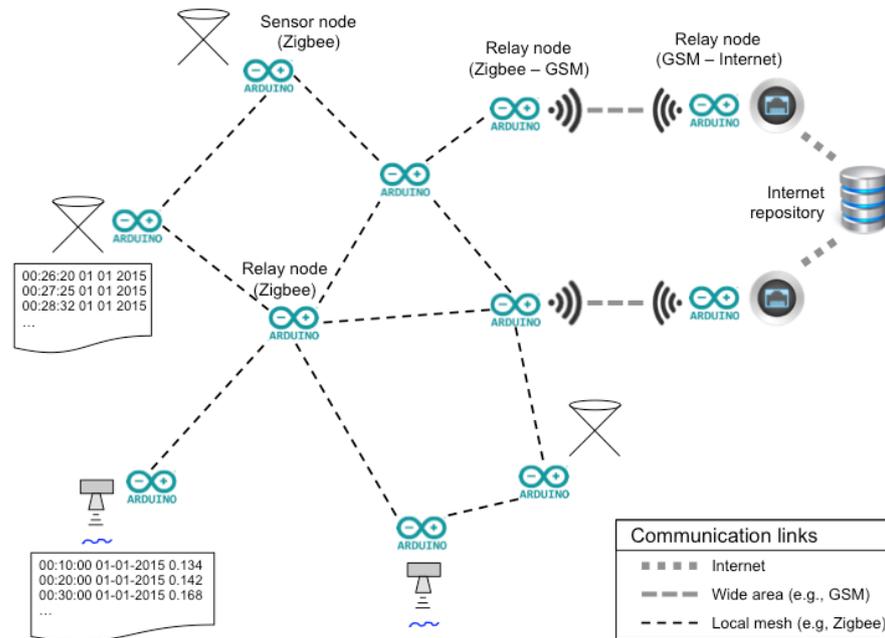
Modular and  
distributed workflow  
construction,  
simulation, and  
prediction

De-centralized  
communication and  
policy support  
systems

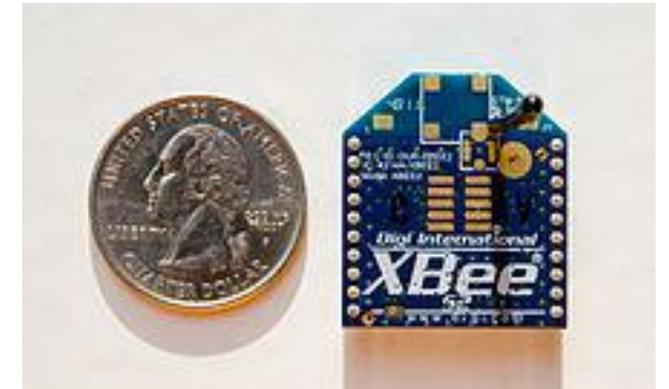
## Polycentric governance of natural resources

# New technologies for environmental sensing

## Sensor networks

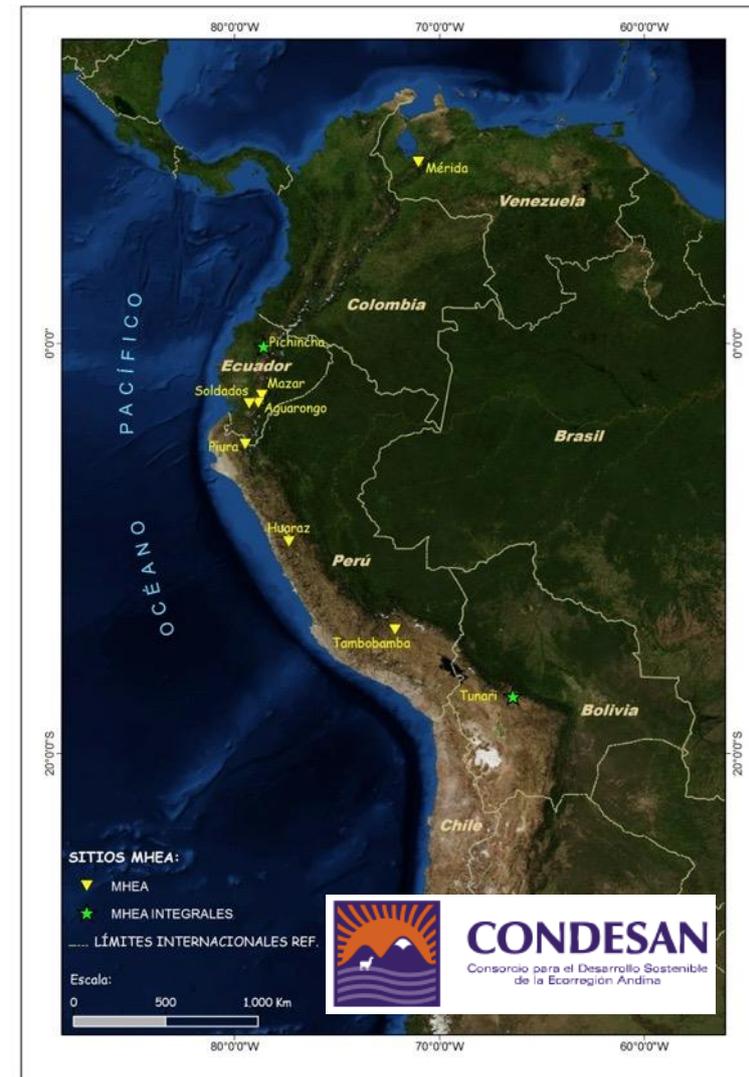


[oxfloodnet.co.uk](http://oxfloodnet.co.uk)



# Participatory monitoring

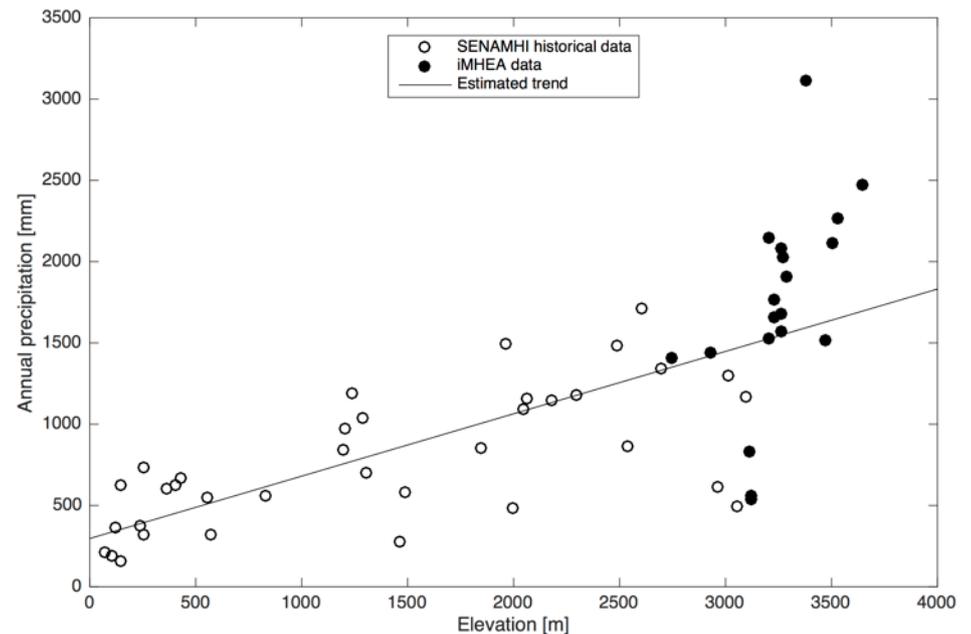
- Precipitation and river discharge
- Responding to local questions on land-use impacts
- Local buy-in and participation



# Information collection: new institutional dynamics

---

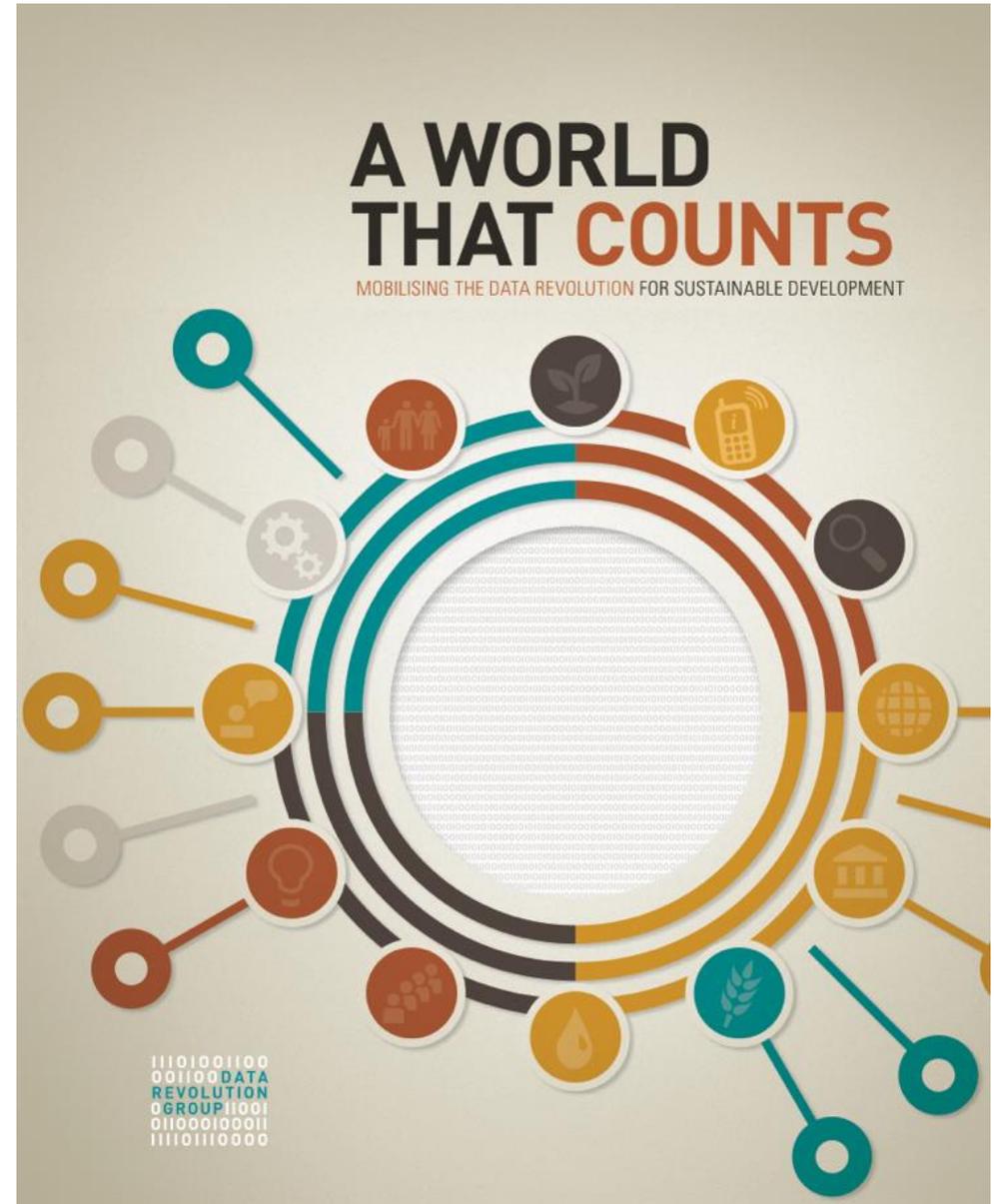
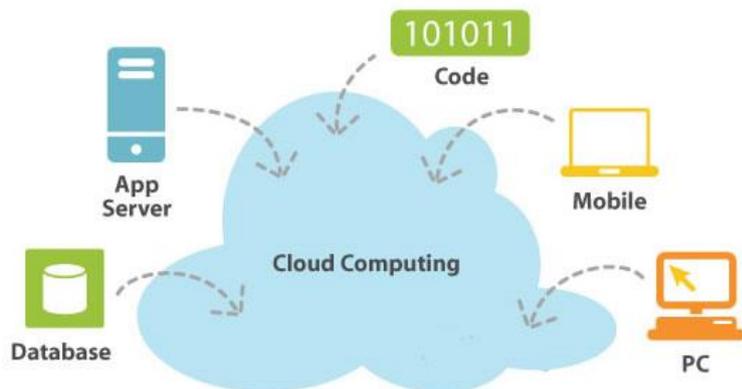
- Potential to break open traditional and formal monitoring silos
- Multilevel, multipurpose
- Complementarity vs. resilience
- Adaptive governance
- Trust, credibility, acceptance
- “Polycentric monitoring”



Buytaert, W., Dewulf, A., De Bièvre, B., Clark, J., & Hannah, D. M. (2016). Citizen Science for Water Resources Management: Toward Polycentric Monitoring and Governance? *Journal of Water Resources Planning and Management*, 01816002.

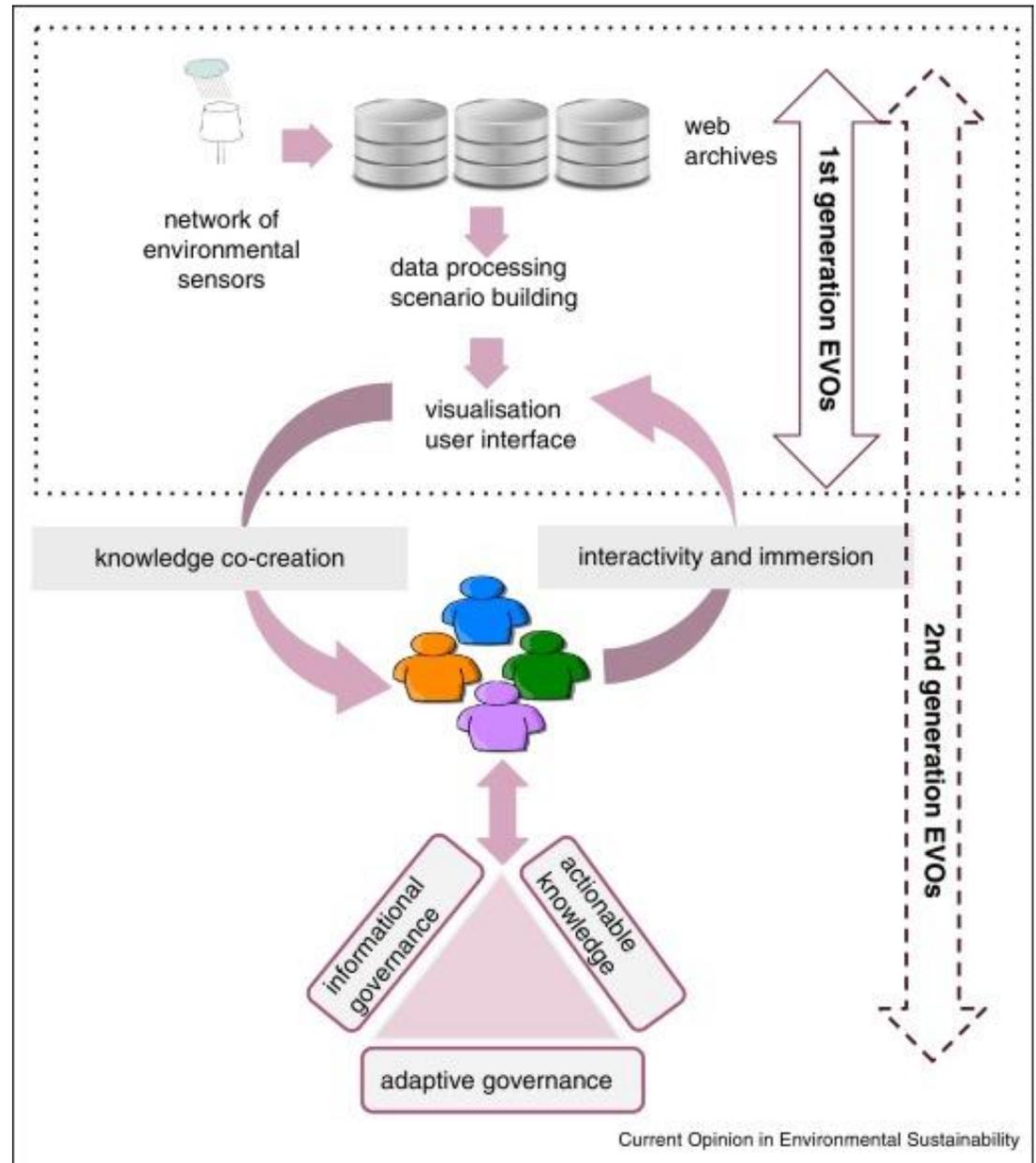
# Information processing: new technologies

- web technologies
- Cloud computing
- Big data
- Web-based processing and modelling
- Model coupling, uncertainty analysis, uncertainty propagation



# Information processing: new policy dynamics

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





## Simulating the impact of land-use changes

This system allows you to simulate the impact of land-use changes in the Pacaipampa basin. Select the land-use scenario with the sliders below and click the simulation button. Simulations are performed in real-time using a hydrological model (topmodel).

### Basin characteristics

#### Land use

Change the sliders from top to bottom. You cannot change the last slider. Instead change the other three.

- Native Forest:  15%
- Pine forest:  0%
- Grassland:  80%
- Cultivation:  5%

Simulate

You can also call the modelling server directly using [this link](#) or pasting the following url in your browser:

```
http://paramo.cc.ic.ac.uk/espa/server?
Service=WPS&Version=1.0.0&Request=GetCapabilities
```

Note: you will need to authenticate first.



Map Satellite

Google

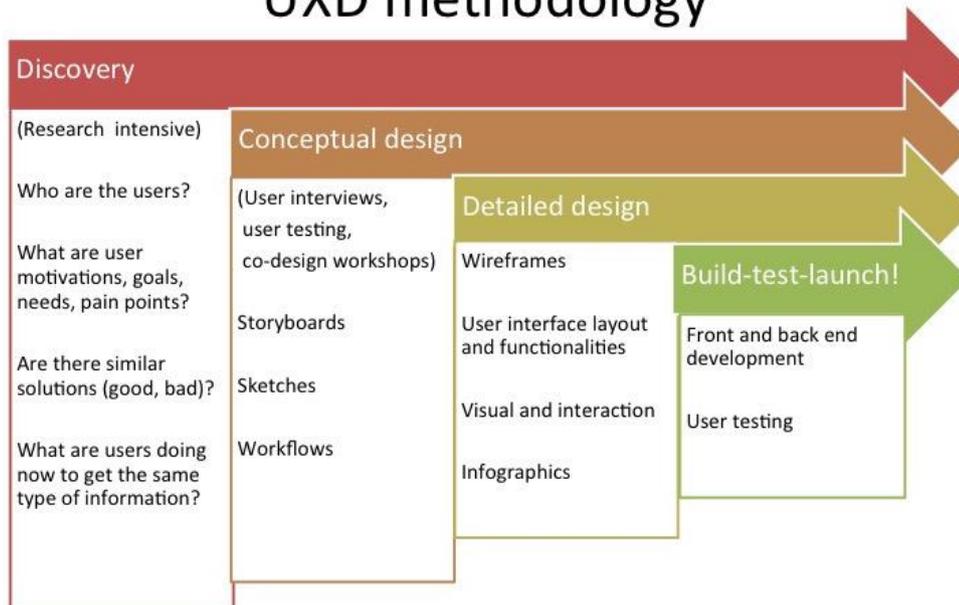
Terms of Use

# Information provision

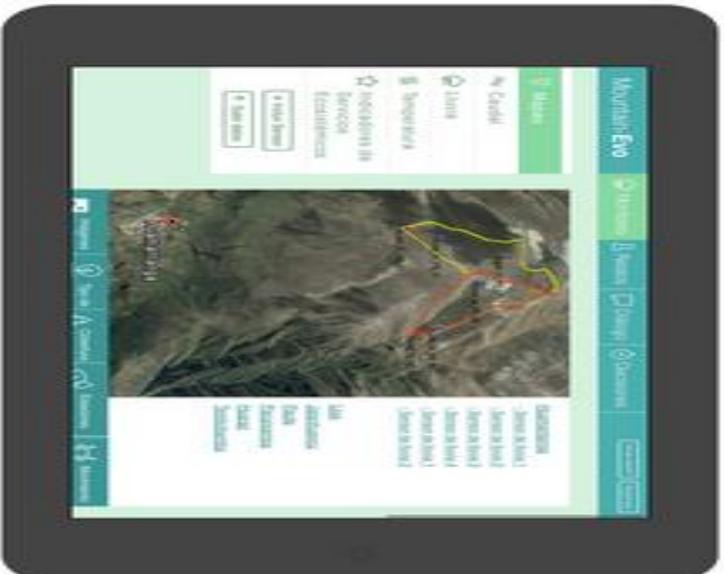
- Visualization & communication
- User interface design
- Scenario building



## UXD methodology



# Technological opportunities



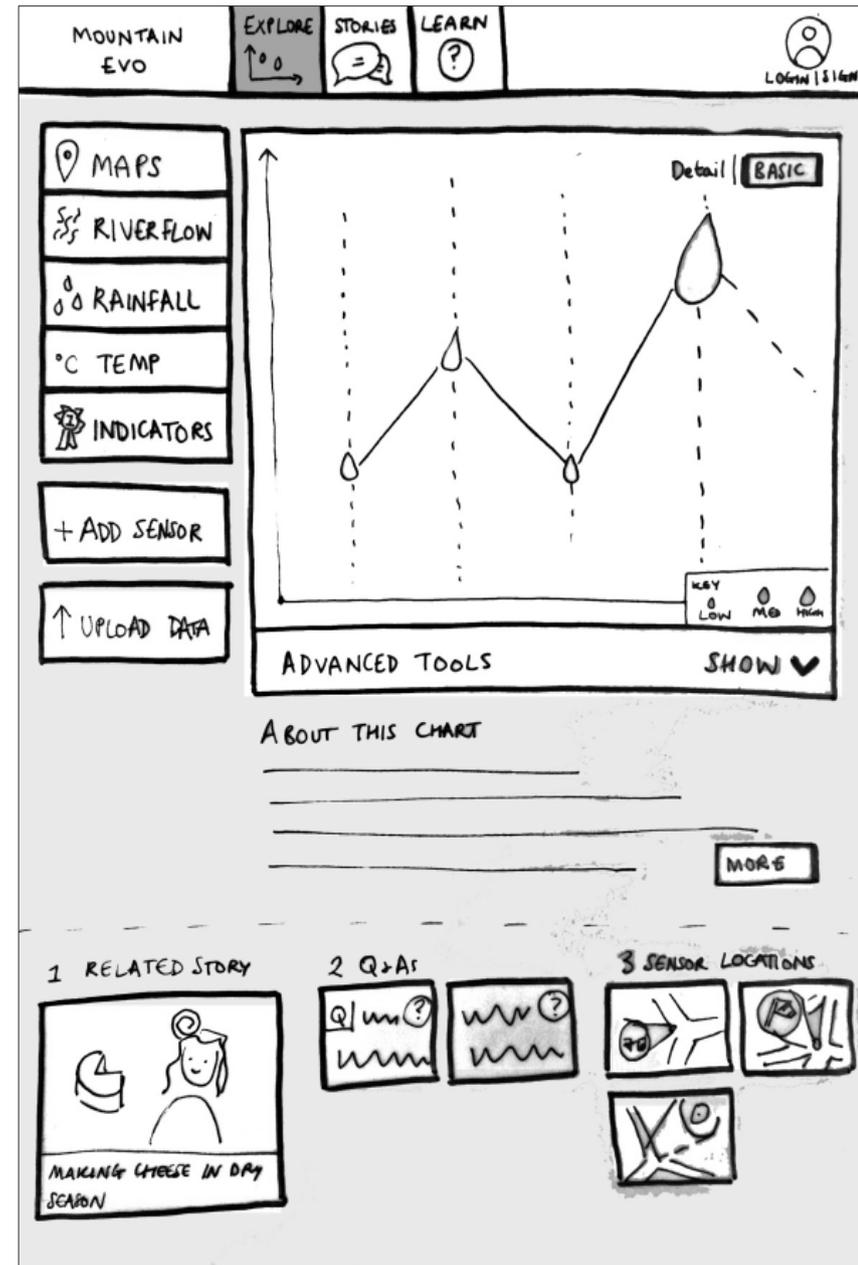
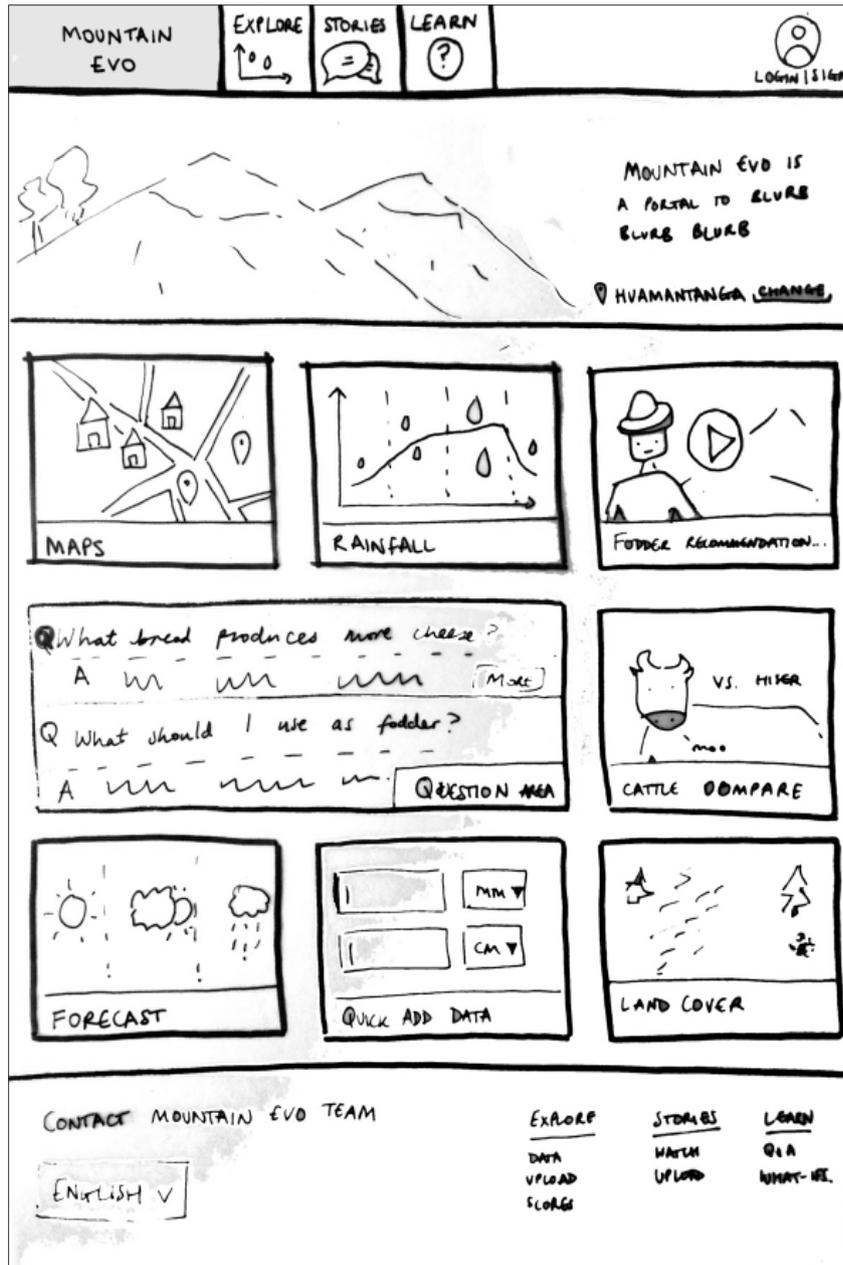
This screenshot shows a news article within the 'MyWorld-Evo' app. The article is titled 'Evoluția indicatorilor' and features a photo of a person. The text discusses the evolution of indicators and mentions 'Căminul de bătrâni' (Elderly home). The app's navigation bar and sidebar are visible at the top and left.

**Titlu:** Căminul de bătrâni  
**Text:** Un proiect nou este în desfășurare în județul Iași. Este vorba de construirea unui cămin de bătrâni în localitatea...  
**Tag-uri:** Iași, Cămin de bătrâni, Proiect nou

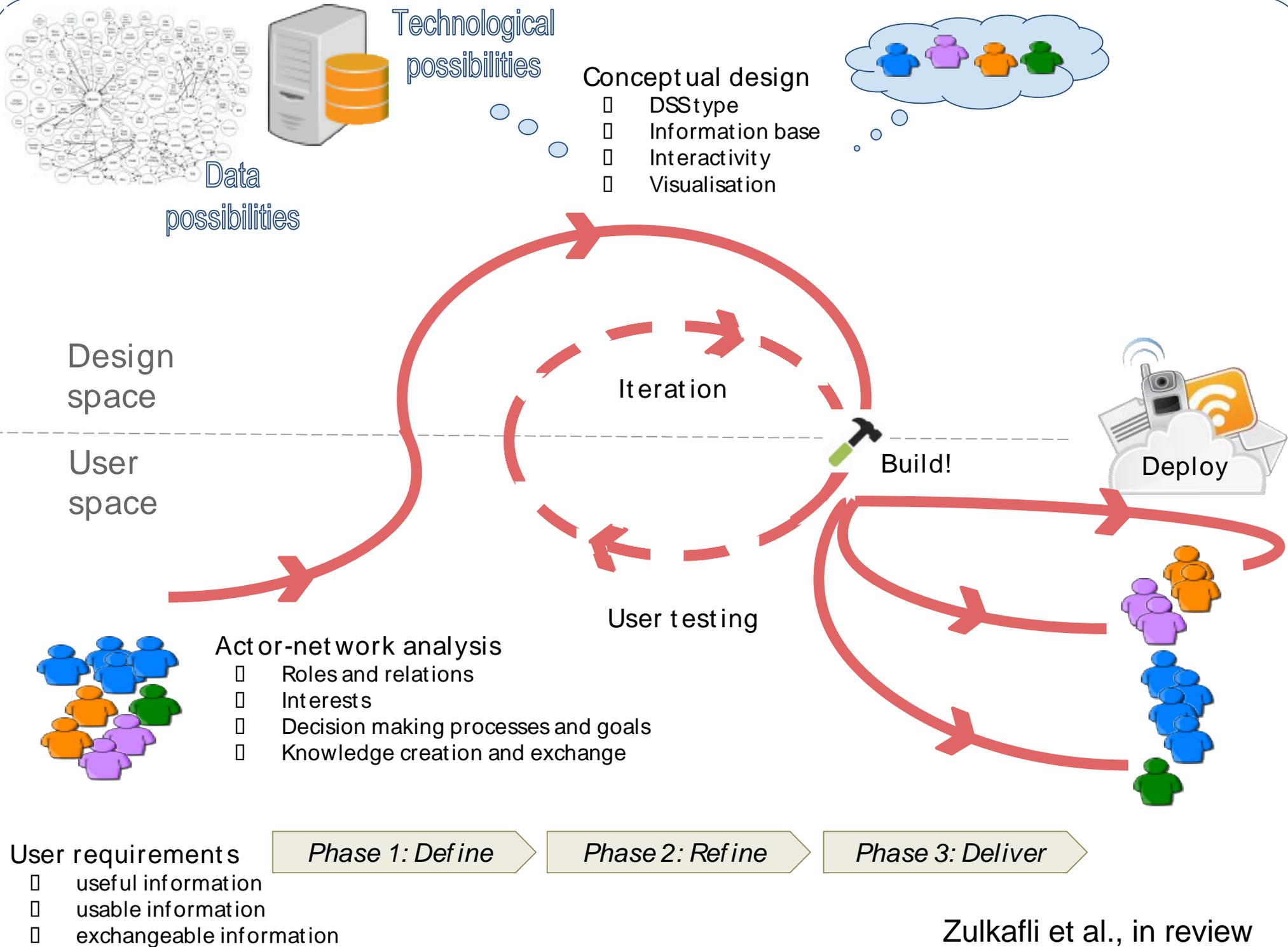
This screenshot shows a video player within the 'MyWorld-Evo' app. The video displays a person standing in a field with mountains in the background. The app's navigation bar and sidebar are visible at the top and left.

**Titlu:** Căminul de bătrâni  
**Text:** Un proiect nou este în desfășurare în județul Iași. Este vorba de construirea unui cămin de bătrâni în localitatea...  
**Tag-uri:** Iași, Cămin de bătrâni, Proiect nou

# User experience design







# Challenges

---

- Leveraging new technologies
- Ensuring a user centered approach
- Recognizing the polycentric nature of systems
- Adaptive governance & knowledge co-generation





Thank you



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

[w.buytaert@imperial.ac.uk](mailto:w.buytaert@imperial.ac.uk)

# Questions

---

- What are major gaps of data in your decision-making field and how can they be addressed?
- How are raw data processed in your decision-making field and how can this processing be made more actionable and relevant?
- How is information communicated in your field and how can these practices be improved?