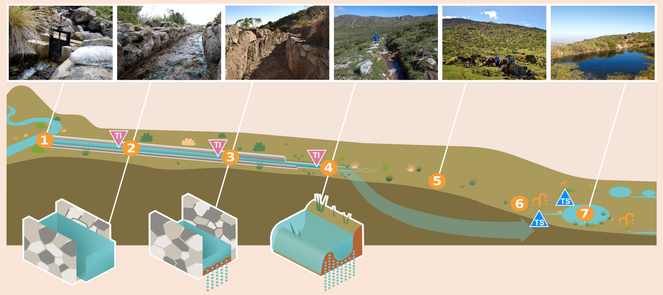
[1] Imperial College London [2] iMHea [3] atuk

H11J-1627 | Inclusive hydrology

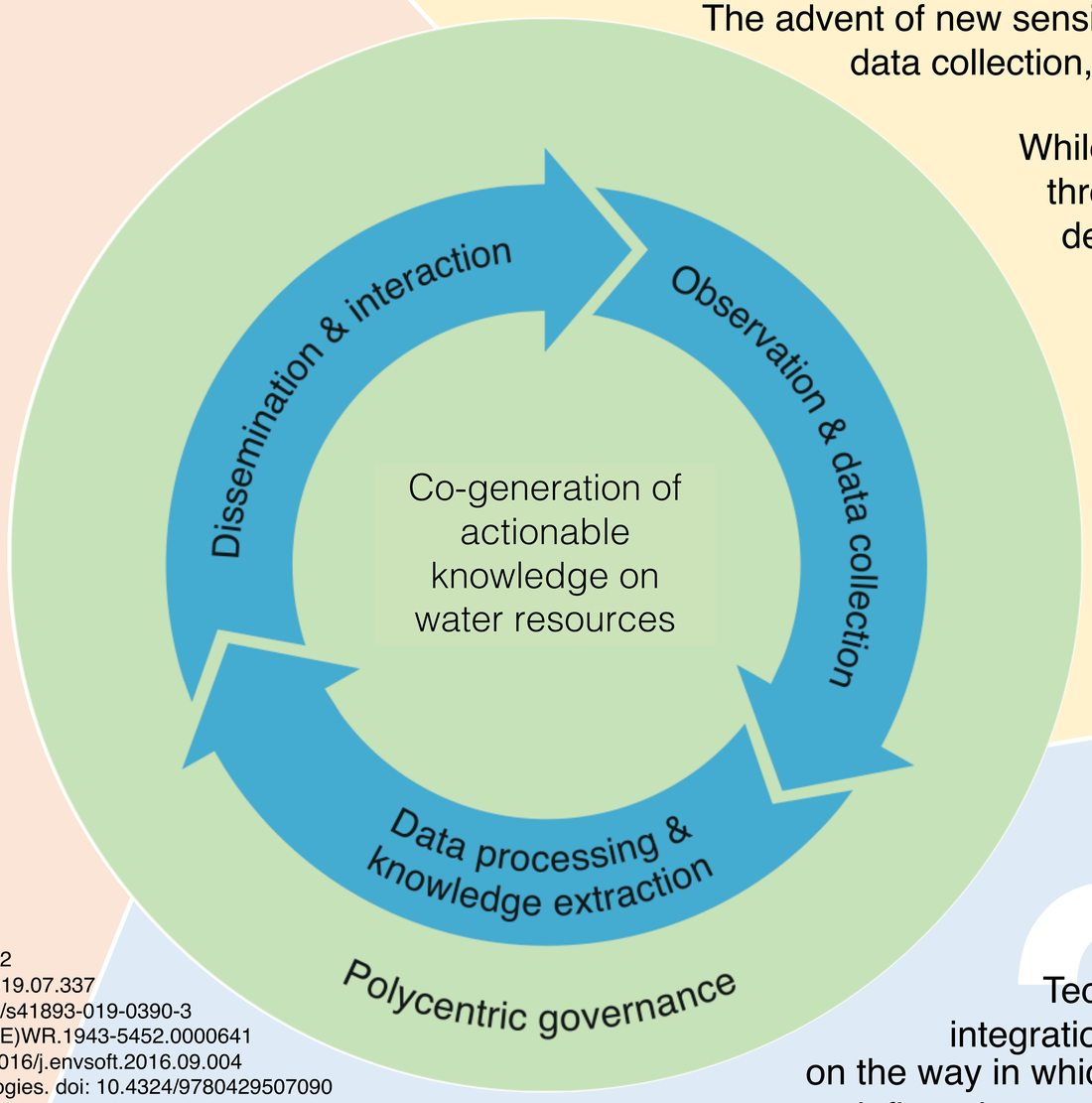
how to maximize participation and actionable knowledge creation in water resources

Boris F. Ochoa-Tocachi[1,2,3]*, Jonathan D. Paul[1], Wouter Buytaert[1,2]

Fig. 2. Conceptual model of a pre-Inca infiltration enhancement system: diversion canals (1 and 2), infiltration canals (3 and 4), infiltration hillslopes (5), springs (6) and ponds (7).



Integrating societal knowledge with hydrologic science is not only a 21st century task. Historically, many civilizations have developed local water harvesting and management practices that cope with water stress by using **ancient and nature-based knowledge**. Indigenous peoples developed solutions that were inspired and supported by nature, and use, or mimic, natural processes to contribute to improved water management and to safeguard their **water security**.



The advent of new sensing equipment provides opportunities for data collection, especially in a **citizen science** context.

While non-expert citizens have been present throughout the history of scientific practice, developments in sensing technology, data processing and visualization, and the communication of ideas and results, are creating a wide range of new opportunities for public participation in scientific research.

Fig. 1. Nepali students taking dendrochronological measurements (May 2019).

Technological development and knowledge integration also have a more fundamental impact on the way in which hydrologic knowledge advances, how it flows between different actors, how it disrupts **power relations**, and thus how it influences **decisions and policy-making**.

In the next century, hydrologic science will benefit from co-creating knowledge that emerges from citizens, resonates with nature, and integrates ancient wisdom.

Read more:

Citizen science in hydrology. doi: 10.3389/feart.2014.00026
Citizen science for hydrological risk reduction. doi: 10.1002/wat2.1262
Citizen science in hydrological monitoring. doi: 10.1016/j.scitotenv.2019.07.337
Citizen science and the sustainable development goals. doi: 10.1038/s41893-019-0390-3
Citizen science for water resources management. doi: 10.1061/(ASCE)WR.1943-5452.0000641
Environmental data visualization for non-scientific contexts. doi: 10.1016/j.envsoft.2016.09.004
Co-generating knowledge on ecosystem services using new technologies. doi: 10.4324/9780429507090
High-resolution hydrometeorological data using community-based monitoring. doi: 10.1038/sdata.2018.80
User-driven design of decision support systems for polycentric management. doi: 10.1016/j.envsoft.2016.10.012
Potential contributions of pre-Inca infiltration infrastructure to Andean water security. doi: 10.1038/s41893-019-0307-1

*BOT is a Postdoctoral Research Associate at the Department of Civil and Environmental Engineering, Imperial College London, UK. Email: boris.ochoa13@imperial.ac.uk.