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Citizen science for water resources management: toward polycentric monitoring and governance?

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Novel and more affordable technologies are allowing new actors to engage increasingly in the monitoring of hydrological systems and the assessment of water resources. This trend may shift data collection from a small number of mostly formal institutions (e.g., statutory monitoring authorities, water companies) toward a much more dynamic, decentralized, and diverse network of data collectors (including citizens and other non-specialists). Such a move towards a more diverse and polycentric type of monitoring may have important consequences for the generation of knowledge about water resources and the way that this knowledge is used to govern these resources.

An increasingly polycentric approach to monitoring and data collection will change inevitably the relation between monitoring and decision-making for water resources. On a technical level, it may lead to improve availability of, and access to, data. The opportunity for actors to design and implement monitoring may also lead to data collection strategies that are tailored better to locally specific management questions. However, in a policy context the evolution may also shift balances of knowledge and power. For example, it will be easier to collect data and generate evidence to support specific agendas, or for non-specialists to challenge existing agreements, laws, and statutory authorities.

Analysing a case study in the Peruvian Andes, we identify strong links with polycentric models of river basin management and governance. Polycentric models recognize the existence of multiple centres of decision-making within a catchment and provide a potential alternative to the top-down centralizing tendencies of integrated water resources management. Although polycentric systems are often associated with data scarcity, we argue that citizen science provides a framework for data collection in such systems and that it provides opportunities for knowledge generation, institutional capacity building and policy support, in particular in basins that are faced with multiple challenges, stressors, and resource scarcity.