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## Reservoirs in world's water towers: Need for appropriate governance processes to reach Sustainable Development Goals

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Mountains play an essential role in storing water and providing it to downstream regions and are therefore commonly referred to as 'water towers of the world'. In particular, they provide runoff in the lowlands' low flow season by contributing snow- and glacier melt. Mountain runoff thus plays an important role in achieving the UN Sustainable Development Goals (SDGs), in particular regarding water, food, and energy. However, the mountains' water provision service is strongly challenged by climate change leading to the retreat and volume loss of glaciers, rising snow lines, and changes in precipitation amount and variability. One potential strategy for addressing these changes is the construction of new water reservoirs or the adjustment of current reservoir management strategies. These strategies need to take account of various, eventually competing water uses rooted in different sectors relevant at different scales and governments with different economic interests.

We investigate the governance process related to the planning of a future reservoir in one of the most important water towers of the world, the European Alps. We ask why and how governance processes can lead to a coordination gap between upstream reservoir planning and the development of strategies allowing for the alleviation of downstream water shortage. We show on a case study in the Swiss Alps, that downstream water deficits could potentially be covered through a newly constructed upstream reservoir if management strategies were flexible enough. However, additional water uses than hydropower were not taken into account in the governance processes leading to the provision of a concession for the new reservoir. Instead, the decision-making within a participative process was influenced by (a) a lack of knowledge and data, (b) an interest to increase renewable energy production, (c) a focus on environmental agreements, and (d) economic interests. We conclude that upstream and downstream water demands need to be balanced in governance processes. Such balancing can be achieved by clarifying process design and by evaluating who can lead such complex processes with actors from different governments and sectors under the umbrella of non-uniform and incoherent institutions.