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Dealing with social dilemmas in the development and management of multipurpose water storage

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Multipurpose water storage requires sound insights into physical possibilities and constraints, and into social, economic and ecological impacts. Also, it requires that the involved stakeholders can discuss and negotiate about different multipurpose storage approaches. Planning, decision-making and management of multipurpose dams and reservoirs easily result in a social dilemma. In a social dilemma, system optimal solutions are not necessarily the solutions that are being realized by the actors in society – even if these system optimal solutions are defined based on multiple objectives and state-of-the-art science. Dealing with social dilemmas requires support for societal stakeholders and decision-makers beyond thorough systems analyses and impact assessments. Rather, it also requires informed and well-structured negotiation processes, where the different impacts of water storage arrangements can be explored and discussed. This reduces the likelihood that the involved actors leave value on the table or remain stuck in prolonged stalemates.

We have developed and experimented with an approach that helps actors to discuss values and trade-offs and to identify collaborative solutions for water management. The approach has been developed to offer support for actors not on multipurpose water storage, but in a related field, on nature-based solutions for flood defences in the Netherlands. We believe this approach also has potential to be further developed and tested for debates around multipurpose storage reservoirs. The approach is based on cooperative game theory, using a participatory model-building approach to structure stakeholder discussions and help analyse potential for mutual gains, but also identify potential bottlenecks and needs for compensation or mitigation. We will introduce the approach and its application, and discuss its potential for further development in relation to multipurpose reservoirs.