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Looking into the value of non-strategic reservoirs in drylands for social, economic, environmental and cultural sustainability under climate change

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Across dryland regions worldwide, small non-strategic on-farm reservoirs serve as critical non-conventional water resources that enhance access to water for agriculture and households. This study examines the role of non-strategic reservoirs in drylands in advancing social, economic, environmental, and cultural sustainability in the context of climate change, by providing examples in four case studies in the Mediterranean region, Asia, Africa and Brazil. The results suggest that strategies aimed solely at maximizing farm income frequently expose farmers to extended periods of financial deficit, caused by variable rainfall and amplified by interest rates on borrowed capital. Such financial volatility is particularly problematic for subsistence-oriented, smallholder family farms that dominate these regions. Using a case study from Brazil, we demonstrate that improving financial resilience is possible by maintaining the same principles of water allocation while modestly lowering income targets. The study concludes that by incorporating hydrological uncertainty explicitly and its effects on the finances of local communities, non-strategic reservoirs can be managed more effectively to support livelihoods in dry environments.