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Assessing the economic benefits of preserving strategic groundwater resources for present and future generations using the ecosystem services approach

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Groundwater resources provide societies with numerous benefits whose sustainability is likely to be affected by global changes. However, preserving good-quality groundwater resources faces several barriers locally, as it will set constraints in land and water management for stakeholders, while they might not be aware of the benefits of protecting these resources. One powerful lever for implementing efficient groundwater preservation measures consists in enhancing the support of local stakeholders, by improving their understanding of the benefits that preservation can bring to their territories. We develop an economic rationale based on the ecosystem services assessment framework to highlight the economic benefits of preserving territories hosting strategic groundwater resources for future water supply. Compared to conventional economic valuation methods applied to groundwater management, this approach does not focus on the sole benefit associated with the good status of groundwater. It expands the analysis by considering as benefits the broad spectrum of services provided by ecosystems that are compatible with the maintenance of a good-quality groundwater resource. Located in Southern France, the study site is a 70 km² natural area mainly covered by forest, which hosts large volumes of good-quality water that are not used today but that could be used in the future to supply the growing population of coastal urban areas. Nine ecosystem services are characterized and quantified: agricultural and wood production, climate regulation, water purification, flood protection, hunting, fishing, hiking and speleology. The overall economic benefits of preserving the strategic groundwater zone are estimated to range between 2,9 and 5,4 billion euros per year (390 - 730 €/ha/year), with two third of them being associated to recreational activities, and only 7% directly related to groundwater.