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Hydrological method designed to enhance governance in the Brazilian semiarid region

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The Brazilian water legislation advocates that, under scarcity, some uses (such as human and animal supply) have priority over others. Although the law has been applied for over two decades, this aspect has not been clearly tackled, generating serious conflicts among water users, especially during droughts. In the context of the Water Basin Committees, authorities usually refer to hydrological models to justify their decisions on water allocation. However, a significant group of stakeholders does not feel qualified to discuss hydrological models and, therefore, are set aside from the decision process. Technocracy surpasses democracy, with negative consequences to water access for the poorer stakeholders. In the Brazilian Semiarid Region, 90% of the water supply derive from surface reservoirs, whose operation is crucial to society. We hereby propose a hydrologically robust method to correlate each water use with the respective reservoir alert volume, yielding a simple table that can be useful to the empowerment of the less-educated (in terms of Hydrology) committee members. The four-step method consists of: (i) generating the "water yield" versus "reliability" curve for the reservoir using a stochastic approach; (ii) generating the "maximum withdrawal discharge" versus "alert volume" family of curves using a daily water-balance approach; (iii) selecting one curve from step ii by calibrating its key parameter T using field data; and (iv) associating each water use with its reliability level and, therefore, with its alert volume. We have applied the method to four of the largest reservoirs (2.10^3 - 2.10^2 hm^3) of the semiarid Ceará State. The results indicate that uses with very low priority should start rationalization when the reservoir volume is, on average, below 20%; whereas uses with very high priority should start rationalization when the reservoir volume is below 10%. Such guidelines, although based on a sound hydrological analysis, are simple, which should help enhance water governance among the poorer stakeholders of reservoir-dependent water-scarce regions.