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Water-saving interventions assessment framework: an application for the Urmia Lake Restoration Program

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Increasing water demand often results in unsustainable water use leaving insufficient amounts of water for sustaining natural environments. Therefore, to save natural resources water-saving interventions have been introduced to the environmental policy agenda in many (semi)-arid regions. Many policies, however, have failed reaching their objectives to increase water availability for the environment. This calls for a comprehensive tool to assess water-saving policies. Therefore, this study introduces a constructive framework to assess the policies by estimating five components: 1) Total water demand under socio-economic scenarios, 2) Water supply under climate change scenarios, 3) Water withdrawal for different sectors, 4) Water depletion and 5) Environmental flow. The framework, was applied to assess Urmia Lake Restoration Program (ULRP), which aims to restore the drying Urmia Lake in north-western Iran by increasing the lake inflow by 3.1×106m3yr-1. Results suggest that although the ULRP helps to increase inflow by up to 57% it is unlikely to fully reach its target. The analysis shows that there are three main reasons for the potential poor performance. The first reason is decreasing return flows due to increasing irrigation efficiency. This means that the expected increase in lake inflow volume is smaller than the volume saved by increasing irrigation efficiency. The second reason is increased depletion which is due to neglecting the fact that agricultural water demand is currently higher than available water for agriculture. As a result, increasing water use efficiency may result in increased water depletion. The third reason is ignoring the potential impact of climate change, which might decrease future water availability by 3% to 15%. Our analysis suggests that to reach the intervention target, measures need to focus on reducing Water demand and Water depletion rather than on reducing Water withdrawals. The assessment framework can be used to comprehensively assess water-saving intervention plans, particularly in water-stressed basins.