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Lake Urmia (Iran): can future socio-ecologically motivated river basin management restore lake water levels in an arid region with extensive agricultural development?

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Lake Urmia, one of the world's largest hyper saline lakes located in northwest of Iran, is a UNESCO Biosphere Reserve and Ramsar site, protected as a national park and, supports invaluable and unique biodiversity and related ecosystem services for the region's 6.5 million inhabitants. Due to increased development of the region's water resources for agriculture and industry and to a certain extent climate change, the lake has started to shrink dramatically since 1995 and now is holding less than 30 percent of its volume. Rapid development in agricultural sector and land-use changes has resulted in immense construction of dams and water diversions in almost all lake feeding rivers, intensifying lake shrinking, increasing salinity and degrading its ecosystem. Recently, lake's cultural and environmental importance and social pressure has raised concerns and brought government attention to the lake restoration plans. Along with poor management, low yield agriculture as the most water consuming activity in the region with, rapid, insufficient development is one of the most influential drivers in the lake desiccation. Part of the lake restoration plans in agricultural sector is to restrict the agricultural areas in the main feeding river basins flowing mostly in the southern part of the lake and decreasing the agricultural water use in this area. This study assess the efficiency and effectiveness of the proposed plans and its influence on the lake level rise and its impacts on economy in the region using a system dynamics model developed for the Lake consist of hydrological and agro-economical sub-systems. The effect of decrease in agricultural area in the region on GDP and region economy was evaluated and compared with released water contribution in lake level rise for a five year simulation period.