Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

Governance system analysis: A conceptual approach to saving lake urmia, Iran

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Abstract

Lake Urmia, an endorhetic salt lake located in northwestern of Iran, is facing ecological collapse. Its closed basin system span over 51,900 km^2 and hold major environmental and economic significance. However, climate change, unsustainable agriculture, excessive water withdrawal, dam construction, and poor policy decisions have reduced the lake's surface area by 95 % as of 2022.

Agriculture, consuming about 90 % of the region's 4.83 billion m^3 annual water use, has played a central role in the lake's degradation. Long-standing national policies promoted water-intensive crops such as apples, replacing traditional, less water-intensive ones like grapes and dried fruits. Furthermore, decisions on land use, water infrastructure, and agriculture have been made by separate ministries without coordination, exacerbating the crisis.

Despite the formation of a committee for the "Rescue and Restoration of Lake Urmia" two decades ago, monocentric governance has hindered meaningful change. Empirical observations show that lack of institutional collaboration and disregard for local actors have prevented effective water management. A transition to polycentric governance—where multiple actors across sectors and scales coordinate and share responsibility—could be crucial.

This paper argues that a polycentric approach, combined with agroecological practices, can restore Lake Urmia's ecosystem while sustaining agricultural livelihoods. By involving farmers directly in decision-making, water use can be reduced and crop choices adapted. Local interest in reviving raisin production illustrates that farmer mindsets are already shifting. Thus, this study calls for a transformation of both governance structures and agricultural paradigms to enable a resilient future for the Lake Urmia basin, highlighting how a systemic and inclusive approach can prevent irreversible damage and offer a model for similar regions worldwide.

Keywords: Ecological agriculture, governance systems, Lake Urmia, Water conflict

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