



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

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Introduction

Lake Urmia, an endorhetic salt lake located in northwestern of Iran, is facing ecological collapse. However, This paper actually argues that a polycentric approach, combined with agroecological practices, can restore Lake Urmia's ecosystem while sustaining agricultural livelihoods.

Introduction to Study area

The lake is located between the provinces of East Azerbaijan and West Azerbaijan in Iran, and west of the southern portion of the Caspian Sea. At its greatest extent, it was the largest lake in the Middle East. It is the sixth-largest saltwater lake on Earth, with a surface area of approximately 6,000 km² (2,300 sq mi), a length of 140 km (87 mi), a width of 70 km (43 mi), and a maximum depth of 20 m (66 ft).



Figure 1. Geographical location of Urmia Lake in the northwestern of Iran (from Asem et al., 2014).

Ecosystem services of Urmia lake

Lake Urmia, a historically vast saline lake in Iran, once provided numerous ecosystem services including water provision, microclimate regulation, and supporting biodiversity.

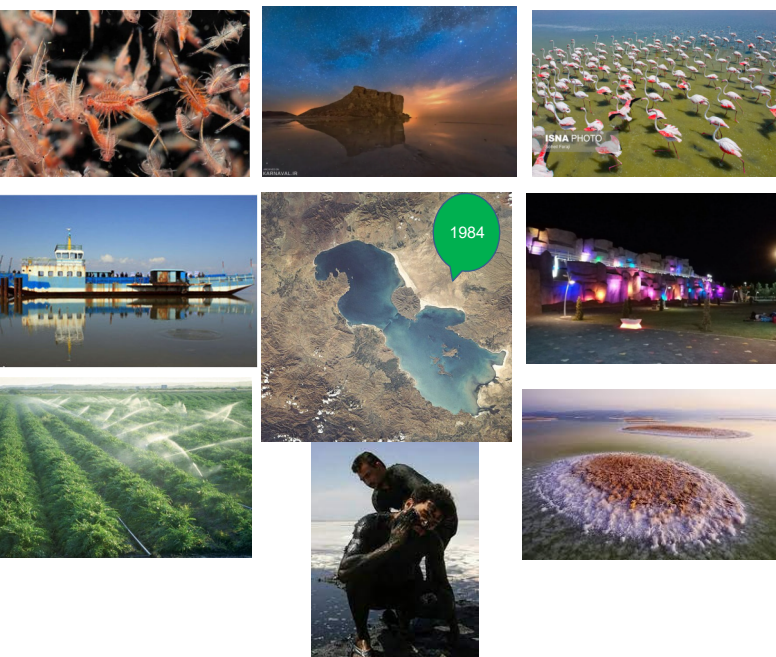


Figure 2: Some ecosystem services of Urmia lake before being dry (Photos from Internet).

Environmental issues

Lake Urmia, once a vibrant ecosystem in Iran, faces severe environmental issues primarily due to its dramatic shrinkage, leading to salt storms, soil degradation, biodiversity loss, and economic hardship in the region. Climate change and increased agricultural water demand are the main drivers behind its decline, with the drying lake bed becoming a new source of dust storms and pollutants.

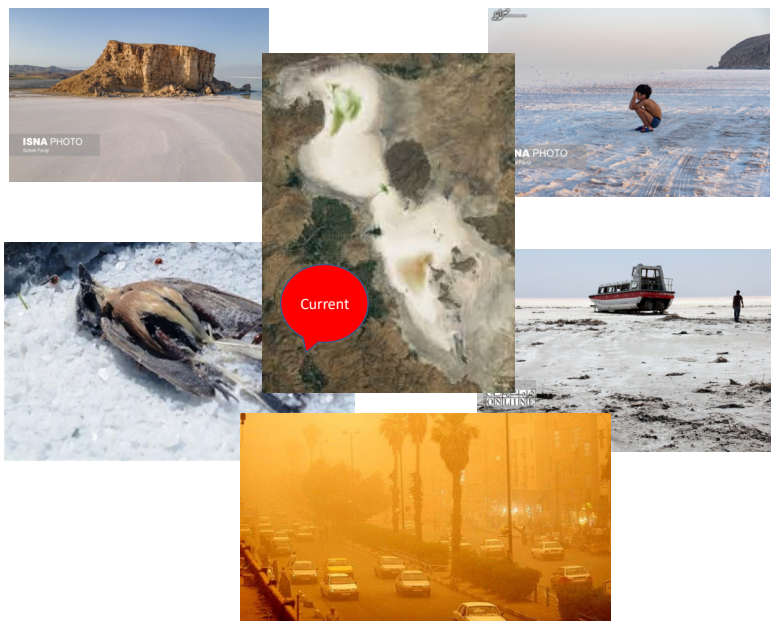


Figure 3: Environmental issues of Urmia lake after being dry (Photos from Internet).

Reasons

This lake holds 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 m³ 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.

Solution

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.