Geophysical Research Abstracts
Vol. 21, EGU2019-7389-2, 2019
EGU General Assembly 2019

Declining Saline Lakes: Building Resilience to Climate Change

Amirhossein Hassani (1), Adisa Azapagic (1), Paolo D'Odorico (2), Amir Keshmiri (3), and Nima Shokri (1)

(1) School of Chemical Engineering and Analytical Science, The University of Manchester, Manchester, UK (amirhossein.hassani@postgrad.manchester.ac.uk), (2) Department of Environmental Science, Policy, & Management, UC Berkeley, California, USA., (3) School of Mechanical, Aerospace & Civil Engineering, The University of Manchester, Manchester, UK

River inflow reduction as a result of anthropogenic activities and climate change is alarmingly desiccating saline lakes around the world. A typical example of these saline lakes is Lake Urmia in Iran, the second hyper-saline lake globally, which lost 96% of its initial volume (35.11 km3) in only 20 years. As a result, salt-rich dust deflated from desiccated sediments of Lake Urmia threatens the biodiversity and well-being of nearby habitats. Here, we assess the span of ecological impacts of Lake Urmia's contraction and establish a salt-water balance over the lake to estimate the water input required for mitigating some of the environmental hazards resulting from changes in lake extent. Assuming the remaining water (the difference between total available and required input water) in each supplying basin as a constraint, a broad array of climatic, hydrological, agronomic, and demographic stressors are linked to an economic objective function to propose a scenario-based cropping pattern/land use change scheme. This land-based solution for restoration of the lake ensures maximized farmers' household income at the basin scale. The recommended restoration strategy can shed light on the way forward for building resilience to climate and human-induced threats for other declining saline lakes.