

# Navigating the Waters of Sustainability: Assessing Jordan's Phosphate Mining Industry for Environmental Responsibility

Jordan, a country struggling with severe water scarcity, faces a critical challenge in managing its limited water resources. This predicament is exacerbated by the country's low annual renewable water resources per capita, placing a deep strain on its ecosystems and communities. In this context, a recent study focusing on the effluent wastewater from two phosphate mines in Jordan, Al-Abiad and Eshidiya, sheds light on the complex interplay between water management, industrial mining activities, effluent water quality and sustainable development goals (SDGs).

The study analysed the composition of effluent wastewater from these mines, comparing it against both national and international standards for irrigation and industrial effluent. Results revealed significant deviations from recommended guidelines, particularly in salinity levels driven by high chloride concentrations. Furthermore, the presence of heavy metals exceeding recommended thresholds set by the Food and Agriculture Organization and Jordanian standards posed environmental and public health concerns. However, existing treatment methods are often costly and may require significant energy inputs.

The growing demand for fertilizers is driving increased phosphate mining activity, increasing water consumption. This is particularly concerning given Jordan's limited freshwater resources, posing challenges at local, regional, national, and global levels. Over-abstraction of groundwater not only impacts local water tables but also exacerbates salinity, reducing productivity and necessitating further water extraction. While the phosphate mining industry is important to

Jordan's economy, providing employment opportunities and fostering economic growth, the sustainability of current practices is called into question. Moreover, the government's partial ownership of mining operations intertwines economic interests with responsibilities for sustainable water management. Also, the release of toxic pollutants from mining activities threatens both human health and the environment.

To address these challenges and align with SDGs, sustainable water management practices must be prioritised in phosphate mining operations. This requires investment in effluent wastewater treatment technologies to mitigate pollution and ensure compliance with water quality standards. By prioritizing sustainability and embracing innovative solutions, Jordan can chart a course toward a more resilient and just future. Such efforts not only safeguard precious water resources for present and future generations but also contribute to the attainment of broader developmental objectives outlined in the SDGs.

In conclusion, while phosphate mining remains vital to Jordan's economy, current practices are unsustainable. Urgent investment in wastewater treatment is necessary to mitigate environmental harm, safeguard public health and ensure the industry's long-term viability within the framework of sustainable development goals. By embracing innovation, collaboration, and a steadfast commitment to environmental stewardship, stakeholders can navigate the complex challenges posed by water stress and pave the way for a more sustainable and inclusive future.