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Challenges and Opportunities in Northern Mendoza's Groundwater Management

In the Northern Mendoza, Argentina, the groundwater resources are critical for agriculture, industry and urban water supply. In this arid region, the snowmelt in highlands is the main water source for rivers and groundwater systems. Climate change, coupled with social and economic pressures, threatens water reserves, exacerbates water scarcity risks, underscoring the urgent need for sustainable management. Despite this, the glaciers studies have attracted national and international attention in the study of the region's water resources.

The region comprises fractured and clastic aquifers. Historicaly, the research has focused on clastic aquifers in irrigated areas during the '60 to ´80, while fractured and clastics aquifers in mountain areas and out of irrigated lands remain understudied. Groundwater faces increasing stress due to overexploitation, contamination, and legal conflicts among users, exacerbated by inefficient irrigation practices. Additionally, outdated legal frameworks and fragmented management between surface and groundwater use exacerbate conflicts among water users.

Despite its role as a critical buffer against drought, groundwater of Mendoza is frequently referenced superficially in hydrological researches. This trend reflects the local challenge in water resource management, where, in addition, the scarce presence of professionals in hydrogeology, the interdisciplinary approaches are often overlooked. In this region, key hydrogeological aspects are omitted or generalized, resulting in oversimplified studies and that leads to a fragmented responsibilities between institutions. Consequently, is limited the scientific progress in groundwater issues and delayed the sustainable water management.

To advance, institutions must ensure clear delineation of roles, emphasizing transparency and cooperative engagement. Recognizing the groundwater as an integrated, finite system, driven by rigorous scientific assessment, is essential for efficient, science-backed decision-making. Only that can groundwater in particular and water recourses in general, be managed sustainably to support the region's long-term water security.

Keywords: Groundwater, Sustainability, Climate, Glaciers, Aquifers, Interactions

Biography

Dr. in geological sciences. Her research focuses on hydrogeology in sub-humid, semi-arid and arid environments. In particular, apply isotopic techniques to understand recharge and contamination processes in clastic and fractured aquifers. He develops hydrological models to identify water sources in Andean rivers and studies trace elements, such as arsenic and fluoride, in clastic aquifers. Her current research focuses on studies of surface water-groundwater interactions in arid and semi-arid systems to analyse the effects of climate change and land use over groundwater reserves in the western region of the country, in the Southernsouth of America.

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