Proceedings of the 9th International Conference of Recent Trends in Environmental Science and Engineering (RTESE 2025)
July, 2025 | Imperial College London Conference Center, London, United Kingdom
DOI: 10.11159/rtese25.002

A Knowledge Management Model for Strengthening Coastal Aquifers Resilience in Latin-American Countries Against Potential Climate Change Impacts.

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Extended Abstract

Groundwater worldwide has become an essential resource in developing countries, especially in countries such as Colombia, where superficial water availability (the main source for industrial, drinking water supply) is decreasing because of contamination, land use, climate change effects, and increased water demand [1]. Groundwater resources in Latin America are natural privileges, considering that there are up to today more than 30 aquifers with recharge that can reach rates greater than 200 mm/year supplying water to communities in Argentina (Mar del Plata, Bahia Blanca, La Plata and La Costa Partido region), Brazil (Recife, Fortaleza, Maceió, Rio de Janeiro region), Chile (Easter Island region), Colombia (Santa Marta, Urabá Banana Axis, Morrosquillo and San Andrés Island), Costa Rica (Nicoya Peninsula, Cahuita and Tamarindo region), Cuba (Cayo Largo del Sur and Havana South Basin), Mexico (Hermosillo Coast), Peru (La Yarada and Caplina/Concordia transboundary aquifers) and Uruguay (Raigón and La Paloma region) [1], [2], [3]. Due to this groundwater abundance and demand, there is a need to develop proper management strategies to protect groundwater resources from threats to their quality and future availability [2]. Therefore, the purpose of this work is to present a knowledge management model (KMM) to strengthen coastal aquifer resilience in Latin American countries to mitigate the potential impacts of climate change and population growth. For this purpose, an analysis of the current state of the KMM was conducted, along with a literature review of the effects of climate change on aquifers in Latin America. The Arroyo Grande coastal aquifer located in northern Colombia was used as a case study, and the anthropic and environmental conditions were monitored for three consecutive years. The monitoring program consists of hydrogeological and environmental characterization of the aquifer, 2. Evaluation of the effects of climate change and anthropogenic dynamics on the aquifer, 3. Identification and selection of resilience strategies applicable to the coastal aquifer. In both Latin America and Arroyo Grande, coastal aquifers are affected by overexploitation, land subsidence [4], and salinity intrusion [5], [6]. Compared with the key deficiencies identified in the GW throughout the world, the coastal region has all the following deficiencies: low political commitment and inadequate leadership from government agencies to limited integration of science-based groundwater understanding into related national and local policies. Based on the results, the proposed model comprises four integrated stages: knowledge governance, data and information acquisition, knowledge development, and sharing and extending knowledge to all aquifer stakeholders. The community should be involved in each of the four KMM stages. It is recommended to promote open hubs of science (i.e., technical, social, environmental, and economic data available to all stakeholders. Academia and universities should play a key role in managing scientific and technical knowledge; and should also be part of the decision-making aquifers committee. The design of a model of multi-stakeholder articulation around conservation and ecological restoration is needed. Recommendations and plans to increase knowledge of the resource were included, all of which contributed to create a more sustainable and long-lasting resource.

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