

Karst Groundwater Risk Assessment in Siargao Island, Philippines Towards Sustainable Groundwater Resource Management

Arbe A. Ferreras

arbe.ferreras.phd@pcu.edu.ph
Philippine Christian University
Manila, Philippines

Abstract

The Philippines is known for its scenic karst landscapes, which contribute significantly to its economic performance in tourism. Many tourist destinations in the Philippines are located in karst regions. Due to the inherent characteristics of karst, groundwater quality is easily degraded by natural and anthropogenic factors. This research addresses a critical need for sustainable groundwater management in Siargao Island, a region facing escalating threats to its karst groundwater resources. In proposing mitigation strategies, this study assessed the risks to karst groundwater systems on Siargao Island using the combined hydrochemistry, geophysical survey, and spatial analysis data. The geochemical data revealed that geological features and land use influence groundwater quality. As such, groundwater resources in karst are highly vulnerable to anthropogenic contamination and saltwater intrusion due to numerous fractures and a network of cavities in the limestone. These findings are validated by the results of geophysical surveys indicating the presence of interconnected cave systems, lowering of the ground, and potential aquifers. The proposed karst management plan was formulated as a mitigation strategy to safeguard groundwater resources on the island. The goals and strategies are summarized as follows: (1) Effective management of ecotourism in Siargao Island as a strategy toward biodiversity conservation; (2) Strengthen groundwater resource management and development through an integrated and holistic approach; and (3) Encourage participation by stakeholders in the management of groundwater resources.

Keywords: karst, risk assessment, groundwater resource framework, aquifer management plan, sustainability, Siargao Island