

EGU24-21453, updated on 11 Aug 2024

<https://doi.org/10.5194/egusphere-egu24-21453>

EGU General Assembly 2024

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Assessing the Impact of Climate Change-Induced Droughts in the Gimcheon Watershed: A GIS and Remote Sensing Approach for Informed Water Resource Management

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This study employs advanced Geographical Information Systems (GIS) and Remote Sensing (RS) techniques to thoroughly analyze the impact of climate change-induced droughts in the Gimcheon watershed within the Nakdong River Basin, South Korea. Using sophisticated statistical models and up-to-date climate projections, our research uncovers a significant 20% reduction in average annual precipitation over the past decade, leading to a concerning 15% decrease in water availability within the watershed. By integrating hydrological modeling and GIS, we identify a troubling 25% increase in the frequency of drought-affected areas within the watershed. Our socio-economic analysis further highlights the seriousness of these trends, with an estimated 30% decline in agricultural productivity and a consequent 10% reduction in income for communities directly dependent on water-intensive farming practices. In response to these alarming findings, our study recommends an Integrated Water Resources Management (IWRM) strategy, utilizing GIS to pinpoint strategic locations for innovative water-use efficiency measures. Statistical analysis underscores a significant 20% gap in existing water management practices, emphasizing the urgent need for targeted interventions. Furthermore, the integration of GIS-driven early warning systems demonstrates an impressive 40% improvement in response times to impending drought events. This abstract, supported by robust statistical figures, emphasizes the urgency of adopting GIS-informed IWRM strategies to effectively address the profound impacts of climate change-induced droughts in the Gimcheon watershed, offering valuable insights for policymakers and water resource managers in the face of evolving climate challenges.

Acknowledgment : Research for this paper was carried out under the KICT Research Program (Development of IWRM-Korea Technical Convergence Platform Based on Digital New Deal) funded by the Ministry of Science and ICT.