

Climate Change Effects on Western Coastal Groundwater in Yemen (1981-2020)

Authors : Afrah S. M. Al-Mahfadi

Abstract : Climate change is a global issue that has significant impacts on water resources, resulting in environmental, economic, and political consequences. Groundwater reserves, particularly in coastal areas, are facing depletion, leading to serious problems in regions such as Yemen. This study focuses on the western coastal region of Yemen, which already faces risks such as water crises, food insecurity, and widespread poverty. Climate change exacerbates these risks by causing high temperatures, sea level rise, inadequate sea level rise, and inadequate environmental policies. Research Aim: The aim of this research is to provide a comprehensive overview of the impact of climate change on the western coastal region of Yemen. Specifically, the study aims to analyze the relationship between climate change and the loss of fresh groundwater resources in this area. Methodology: The research utilizes a combination of a literature review and three case studies conducted through site visits. Arch-GIS mapping is employed to analyze and visualize the relationship between climate change and the depletion of fresh groundwater resources. Additionally, data on precipitation from 1981 to 2020 and scenarios of projected sea level rise (SLR) are considered. Findings: The study reveals several future issues resulting from climate change. It is projected that the annual temperature will increase while the rainfall rate will decrease. Furthermore, the sea level is expected to rise by approximately 0.30 to 0.72 meters by 2100. These factors contribute to the loss of wetlands, the retreat of shorelines and estuaries, and the intrusion of seawater into the coastal aquifer, rendering drinking water from wells increasingly saline. Data Collection and Analysis Procedures: Data for this research are collected through a literature review, including studies on climate change impacts in coastal areas and the hydrogeology of the study region. Furthermore, three case studies are conducted through site visits. Arch-GIS mapping techniques are utilized to analyze the relationship between climate change and the loss of fresh groundwater resources. Historical precipitation data from 1981 to 2020 and scenarios of projected sea level rise are also analyzed. Questions Addressed: (1) What is the impact of climate change on the western coastal region of Yemen? (2) How does climate change affect the availability of fresh groundwater resources in this area? Conclusion: The study concludes that the western coastal region of Yemen is facing significant challenges due to climate change. The projected increase in temperature, decrease in rainfall, and rise in sea levels have severe implications, such as the loss of wetlands, shorelines, and estuaries. Additionally, the intrusion of seawater into the coastal aquifer further exacerbates the issue of saline drinking water. Urgent measures are needed to address climate change, including improving water management, implementing integrated coastal zone planning, raising awareness among stakeholders, and implementing emergency projects to mitigate the impacts. Recommendations: To mitigate the adverse effects of climate change, several recommendations are provided. These include improving water management practices, developing integrated coastal zone planning strategies, raising awareness among all stakeholders, improving health and education, and implementing emergency projects to combat climate change. These measures aim to enhance adaptive capacity and resilience in the face of future climate change impacts.

Keywords : climate change, groundwater, coastal wetlands, Yemen

Conference Title : ICERD 2023 : International Conference on Environmental Remediation and Development

Conference Location : Toronto, Canada

Conference Dates : September 18-19, 2023