

Research Paper

Assessing the Environmental Hazards of the Coasts of the Oman Sea: An Assessment Based on a Participatory Approach

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Abstract

The coasts of the Oman Sea are known as one of the most prone areas to climatic disasters. The geographical location of the country in the desert and earthquake belt of the world, as well as the tropical and subtropical climate transition zone, has caused it to repeatedly experience severe environmental events such as floods, storms, droughts, river erosion, sea level rise, salinity, etc. This region is very vulnerable to climate change and natural disasters caused by weather. This study identifies the potential hazards due to climate change, vulnerability, capacity, and risk associated with them on the Oman Sea coast and examines the existing strategies for disaster risk reduction. This study has evaluated the climatic hazards of coastal areas by descriptive-analytical method, using field techniques and questionnaires with a participatory approach, and analyzed the dimensions of vulnerability, risk probability, hazards, and the capacity of the local community. The target community is the villages located on the coast of the Oman Sea from Bandar Gwder to the westernmost coastal point of Sistan and Baluchistan province. The number of these villages is 15. The sample was 151 households. The results showed that this region's most important climatic hazards are floods, storms, and salinization of water sources, and the level of vulnerability in these villages is high. Rainwater collection by hotspots, risk awareness, vocational training for new businesses, and government assistance are strategies that can reduce the area's vulnerability to hazards.

Keywords: Climatic shocks, Local communities, Vulnerability, Oman coast.

Highlight

- Identifying the risk factors, potential management policies to reduce climatic disasters, assessing the risk in different coastal areas
- Disaster preparation plan, correct and observed rules for disaster preparation, the status of the diversity of livelihood options in the local communities, existing local governments and resource levels to minimize disaster risk in Oman's coastal areas.
- Carrying out measures such as reducing the structure, such as creating a shelter for hazards, storm warning system, etc., reducing the risk of disasters at the level of the coastal community.

Extended Abstract

Introduction

The phenomenon of climate change has many negative effects on various systems, such as water resources, environment, industry, health, agriculture, and all systems that interact with the climate system. During the past two decades, the people of the coasts of the Oman Sea have been facing increasing vulnerability due to multiple risks, including the flood of 2018, the Shaheen storm in 2014, etc. This risk is the possibility of a hazard turning into a disaster that severely affects families or communities. The lives and livelihoods of vulnerable communities are seriously disrupted beyond their ability to cope or resist using their resources. As a result, the affected population suffers serious human, material, economic or environmental losses. The coastal region of the Oman Sea is highly vulnerable to natural hazards such as floods, hurricanes, cyclones, tidal waves, typhoons, river banks, and coastal erosion due to its unique environmental characteristics. This research evaluates the probability of risks

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in different sectors by identifying the risk factors and potential management policies to reduce climate-related disasters. This study aimed to conduct a risk assessment for the community at risk in the coastal area of Chabahar and the Oman Sea and seeks to identify possible risk reduction strategies. This study aimed to explore people's understanding of risk, vulnerability, and capacities and to analyze risk; also, strategies to reduce the risk of possible disasters would be investigated.

Methodology

It is a descriptive-analytical study. The research sample was selected using a simple and multi-stage random sampling method. In the first stage, 14 population points (villages) from 45 coastal villages (coastline up to 10 km from the coast of the Oman Sea) were randomly selected. The total number of households in these three villages is 421 households (Iran Statistics Center, 2015). It was tried that the selected samples cover most of the coastal areas. Therefore, the required sample size was 140. Finally, the research sample included 151 households. A semi-structured questionnaire was designed considering various indicators to collect household data. Thus, the household survey was mainly designed as a closed questionnaire with limited options. The questionnaire was divided into four different parts: (1) socio-economic characteristics of the respondents; (2) perception, knowledge, and attitude related to risks and vulnerability; (3) household assets and livelihood strategies (4) shocks, stresses, and coping strategies to adapt to climate changes.

Results and discussion

About 60% of respondents reported that they were exposed to various natural hazards throughout the year. More than 90 percent of respondents stated that floods and storms and water stress have increased, followed by increased salinity intrusion, river erosion, and dust storms. Also, 66, 46, and 45% of the respondents put heavy rainfall, drought, and pest attack in the middle categories. About 71-78% of the respondents emphasized that poor road infrastructure, high dependence on nature for income, vulnerable shelter to storms and floods, and fluctuating and declining wage rates were aspects of increased vulnerability. The vulnerabilities of this area are strongly related to the increase in the tendency to obtain high-interest loans, the increase in the number of non-fishing days, the lack of health awareness, and the unsustainable growth of shrimp farming in salt water inside the ponds, and lack of disaster preparedness. Among the 12 capacity variables, the most important aspect is disseminating early warning messages about storm and flood risks. More than 90% of the respondents said that publishing reports and forecasts of the Rapid Warning Center of the General Directorate of Meteorology of Sistan and Baluchistan were useful and important for publishing information about the storm. Also, about 65% of the respondents mentioned that the people of this city have migrated to other cities or regions to earn better income. The findings showed that structural mitigation measures such as the construction of hazard shelters, storm warning systems, etc. are very important to reduce disaster risk at the community level. Levees play a vital role in protecting coastal people and their property during storm surges. As a result, several hectares of agricultural land in this area were damaged.

Conclusion

Findings showed that coastal flooding, river overflowing, salinity intrusion, river bank erosion, and storm were the most common hazards in the study area. Also, the results showed that storms, erosion of river banks, and salt intrusion are the main factors of vulnerability in the study area. The assessment of capacities showed that the society has less capacity to deal with the erosion of river banks, storms, and floods. There are many effective ways to increase risk resilience at the government and household levels, but they are not enough. The most important measures that reduce vulnerability include building more storm shelters. Building a disaster-resistant house; construction or improving dams; construction or improving communication ways; improving the rainwater harvesting system; providing community-based health facilities; alternative livelihoods; and arranging sector-based training systems to create self-employment and home-based businesses.

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Authors' Contribution

Authors contributed equally to the conceptualization and writing of the article. All of the authors approved the content of the manuscript and agreed on all aspects of the work

Conflict of Interest

Authors declared no conflict of interest.

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