Assessment of Rural Systems Sustainability Response to Drought Hazard With Wind Processes Intensification Approach (Villages in Kashan, Iran, and Bidgol District)

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Introduction

The occurrence of intermittent droughts is one of the most prominent features of the climate in Kashan, Aran and Bidgol, Noshabad, and its surrounding areas, which is of particular importance due to the proximity of these areas to sandy hills (Bandarig). In this study, we investigate the relationship between the occurrence of drought and the sand dangers of sandy sandstones in the region, in order to investigate the response of the rural settlements system to drought and sandstorm. Therefore, the sand dunes of the Rig dome, which dominate the urban and rural areas of the study area affected by the drought, are more intense in the stability or instability of the rural settlements system. It is necessary to study the risks of wind erosion, and the relation with that drought phenomenon in the elaboration of this study. Therefore, understanding the relationship between drought, and the dangers of displacement of sand dunes has been done using statistical analyzes and drought indicators. In the next step, the responses of rural systems in different dimensions were studied.

Methodology

In the methodology process of this study, at first 30-years weather statistics, including climatic elements that are effective in drought occurrence, and calculation of its indicators were obtained from synoptic station in Kashan. Then, using Excel software, the data were sorted, and the drought indices such as precipitation anomaly index, normal rainfall percentage, standardized precipitation index, and Z-Score index were determined to calculate the drought and its type. Then for the changes in the morphology of the sand dunes, the statistics of the fastest winds of the station were collected, arranged, and its annual average was calculated. In the area of zoning of the gravity hazards, the general method based on the spatial analysis method using GIS and its conformance with the evidence of field documentation based on the information

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value method was prepared by providing the layers needed for the motion of the sand. Emphasizing the value of information was used to delimit the hazard limits. The value model of information in its implementation model is mainly based on a set of data and digital information from land units, wind patterns, geology, land use, slope, direction of gradient, and the choice of factors and factors that influence the instability of the proposal and analysis. Based on this evaluation model, the weight and share of each of the classes and units of the effective parameter in the formation of the morphology of the citadel is as follows: In the final stage, using drought data and marsh movement hazards, completed questionnaires based on the analysis of the stability of rural settlements, and the responses of rural systems. Finally, along with library studies, the sustainability response of rural systems to drought hazards was studied by the intensification of the motion of the sand.

Discussion

According to the risk maps of the mist storms in the study area, villages around Abu Zaidabad, Noushabad, and surrounding villages such as Hussein Abad, Yazdan, Amin Abad, Mohammad Abad, Fakhra, and others are among the rural settlements currently affected by storm infestations. There are no grains and can be prevented by retrofitting future damage. In managing the thresholds of crisis, strengthening the capacity of adaptation of rural settlements in the region in response to drought hazards, and the movement of sandy sand can be effective in preventing the entry of wind process hazards and mastery of sand floods. Villages around the city of Aran and Bidgol, especially the Desert and Kavirat countryside, with a population of 4001 people and 1056 households, are among the areas that are on the verge of storm floods, which some of these areas are located in a very dangerous area. For this purpose, it is necessary to better understand the behavior of sand storms with the capacities of rural settlements, and promote the attitude of rehabilitation and protection of human structures. Otherwise, the dominance of the hazards of the sand may cause compulsory migration and damage to the region. In the study area, the villages of Aran and Bidgol County have been placed especially in high risk areas. According to the results of the risk zoning map, and field studies of the area, the possible advance of the storm flood could be detected in the near future. Because of the storm of sandstorms, the lives of rural residents will be disturbed. Therefore, with regard to environmental risk management strategies, it is necessary to use the knowledge of local residents of the region. A study was conducted to prevent the occurrence of natural disasters of sandstorm in order to perform financial support and allocation of funds to the public sector, especially in hardware actions such as the construction of obstacles in the influx of sand, and the process of reducing the degree of risk.

Conclusion

Considering the results obtained in the study area, it can be said that there is a significant relationship between drought and the occurrence of rapid winds as a result of displacement and change in the morphology of the sand dunes in intensifying the motion of the sand. Hence, with increasing drought in the region with moderate to severe dryness, the sand dunes have been displaced by drought, and have become a risk in the level of rural settlements in the study area. As a result, we need sustainable management and planning in relation to the development of various environmental management activities and issues in the region. In this regard, in order to stabilize the rural settlements of the study area, the responses of rural systems in Aran, Bidgol, Kashan, and Abu Zaidabad cities were investigated at different levels of balances, crisis thresholds, hazards and natural disasters in the performance of drought-induced sand storms. Each of the above steps was studied in the status of the studied villages, such as the use of indigenous knowledge, awareness and education, village participation, adjustment capacity, and so on. The results of the study indicate that the level of environmental exposure (from environmental sources to environmental hazards) is identified in the studied villages, which requires adopting appropriate strategies that according to the degree of risk of storms, indicate the level of risk in the rural systems of the study area. In this way, some study areas such as the villages of Abu Zaidabad, and Kashan need prevention at the level of the balance, and the threshold of the crisis. While, others such as the villages of Aran and Bidgol are at risk. Altogether, these results have become more and more utilized by indigenous knowledge of the behavior of sand dunes and severe droughts over the years, and finally, the education of rural communities has revealed this process. So that eventually disasters can be avoided at the level of rural systems in the study area.

Keywords: Sustainability of villages, sand dangers, sand dunes, climate drought, Kashan strain, rural systems reactions.