



Comparison of HELP and Forest, Rangeland and Watershed Management Methods on Watershed Sustainability Assessment: A Case Study of Bakhtegan, Fars Province

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Extended Abstract

Introduction: as healthy watersheds provide many ecosystem services in various fields such as social and economic welfare, some methods need to be developed for measuring the extent of watersheds' health and sustainability. Sustainable development is a comprehensive approach to improving human life quality by providing the economic, social, and environmental well-being of human settlements. Therefore, it is achieved if there is an overlap between the ecological, economic, and social layers. The purpose of this study was to compare two methods of HLEP and the organization of forests, rangelands, and watershed management in assessing the sustainability of the Bakhtegan watershed in Fars province.

Materials and methods: The first Method used the guidelines for monitoring and evaluating natural resource management and watershed management plans prepared by the Vice President for Strategic Planning and the Organization of Forests, Rangelands, and Watershed Management for Iran. In this method, the watershed was divided into five ecosystems: forest, desert, rangeland, aquatic environment, and economic and social issues. Different criteria and indicators were defined, determined, and measured for each of these ecosystems. Each variable was divided into different classes numerically, and each class was given a score (from high to low). The second method for analyzing and measuring stability in the field was the HELP that was based on four

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categories of hydrology (quantitative and qualitative), environment, watershed life, and policy-making. Moreover, three parameters of pressure, status, and reaction were used under the title of Basin Stability Index (WSI) to study basin stability at three levels: low, medium, and high.

Result: as for the first method, the scores were added up to create a class, and according to the study area, three criteria, nine indicators, and 14 variables were selected and measured based on the rangeland and desert ecologists' section. In the ecologists' section, five criteria and 16 indicators (the indicators themselves act as variables) were selected and measured. The final scores for rangeland and desert ecologists and the economic and social issues were reported as 45 and 32, respectively, putting both in the middle class. The watershed's sustainability status was also determined using the score estimation matrix and watershed assessment table. Taking the Bakhtegan watershed's total points into account, it could be said that it is in a weak position in terms of stability. The results of the application of the HELP method showed that the pressure parameter with a score of 0.75 and the response parameter with a score of 0.45 had the highest and lowest scores for assessing the sustainability of the Bakhtegan watershed, respectively, indicating an appropriate response to reduce the pressure on the ecosystem. The results also suggested that quantitative hydrological sub-indices with a score of 0.25 and environment with a score of one had the highest and lowest priority for watershed management (especially management and protection of existing water resources), respectively. The level of watershed stability was assessed with a mean downward score of 0.61 in the study period, indicating that improving the region's level of sustainability requires more attention.

Discussion and Conclusion: This study's results in terms of selected criteria and indicators concerning the quality and quantity of information and accuracy of the data could be generalized to other parts of Iran (although similar to the field). To achieve acceptable sustainability, the area must be developed in terms of ecosystem, economic, and social issues and surpass the current equilibrium state. These conditions are made possible by protecting the ecosystem and providing a decent life for watershed dwellers. Considering the watershed management operations carried out in the basin, it is expected that the ecosystem sector will reach the desired level of stability. Moreover, for the basin to be sustainable, the economic and social sectors must get involved, conducting some measures to improve people's living standards. Naturally, ecosystems' substantive and functional value in the formation and sustainability of watersheds are not the same; Therefore, according to the consensus of experts, aquatic ecosystems have the highest value, and desert ecosystems have the lowest value in the evaluation of a watershed. Thus, in the process of determining the sustainability of the watershed, the essential value of the composition of the ecosystems and the surface of the watershed that are covered must be taken into consideration.

Keywords: Bakhtegan Watershed, Ecosystems, HELP, Sustainability Assessment, Sustainable Development.