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Assessment of Geotourism Potential of Geosites in Hashtjin Township Using the Dynamic Model

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Abstract

Background and Objective: Tourism—particularly geotourism, as an emerging branch focused on geological and geomorphological phenomena—plays a significant role in sustainable development, environmental conservation, and regional economic improvement. With its vast natural diversity, Iran possesses great potential in this field. The city of Hashjin, located in southern Ardabil Province, with its distinctive natural features, is one of the promising areas for geotourism development that has not yet been comprehensively evaluated. This study aims to identify and prioritize the region's geosites and to analyze geotourism assessment indicators within the framework of the dynamic model.

Methodology: In this study, five selected geosites in Hashtjin Township were initially identified for analysis and evaluation. The statistical population consisted of experts in physical geography and tourists visiting the region. Using a non-random purposive sampling method, 15 experts and 30 tourists (a total of 45 participants) were selected to complete the questionnaire. Data collection tools included a researcher-designed questionnaire, geological and topographic maps, and ArcGIS software. Data analysis was conducted based on Hadžić's dynamic model by calculating three main indices: scientific value, additional values, and geosite vulnerability.

Results and Findings: The results revealed that Agh Dagh Mountain and Qezel Ozan River, with scores of 73.0076 and 64.303, respectively, exhibit the highest geotourism potential among the studied geosites. Diz Waterfall (38.9839), Jafarabad Zaviyeh Hot Spring (38.1518), and Nodeh Waterfall (33.014) ranked third to fifth. Qualitatively, Agh Dagh Mountain was classified as "very good," Qezel Ozan River as "good," and the remaining three geosites as "moderate." Additionally, the findings indicated that Qezel Ozan River, with a vulnerability score of 5.5, is the most vulnerable geosite, while Agh Dagh Mountain, with a score of 10, has the lowest vulnerability.

Conclusion: The findings of the study indicated that the geosites of Hashtjin, particularly Mount Agh Dagh and the Qezel Ozan River, possess high potential for geotourism development. Despite the advantages of using the dynamic model for evaluation, challenges such as weak infrastructure and high vulnerability in certain areas necessitate targeted management. Accordingly, strategies such as officially designating the region as a geosite, conducting comprehensive documentation, and developing localized evaluation models are recommended.

Keywords: Geotourism, Dynamic Model, Hashtjin Township, Geosites.

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Extended Abstract

Introduction:

Tourism, particularly geotourism, as an emerging and specialized branch focusing on geological and geomorphological features, plays a vital role in sustainable development, environmental conservation, and the enhancement of regional economies. Iran, with its diverse geological and geomorphological resources, holds significant untapped potential in this domain. Hashtjin County, located in the southern part of Ardabil Province, features distinct geomorphological and natural elements such as Mount Agh Dagh, the Qezel Ozan River, waterfalls, and mineral springs, making it a promising area for geotourism development. Despite its capabilities, a comprehensive scientific assessment of its geosites has been lacking. This study aims to identify, classify, and evaluate the geotourism potential of selected geosites in Hashtjin using the Hadžić Dynamic Model, addressing questions of relative potential and key assessment indicators.

Methodology:

This applied and descriptive-analytical research employed a mixed-methods approach. Five geosites in Hashtjin—Mount Agh Dagh, Qezel Ozan River, Diz Waterfall, Nodeh Waterfall, and Jafarabad Zaviyeh Hot Spring—were selected for evaluation. The statistical sample included 15 experts in physical geography and 30 tourists, chosen via purposive non-random sampling. Data collection tools included a researcher-developed questionnaire, geological and topographic maps, and ArcGIS software. The analysis was based on the Hadžić dynamic model, incorporating three main indices: scientific value, additional values, and vulnerability. Experts' and tourists' opinions were used with weighted influence, and the final geotourism potential (TE) was calculated accordingly.

Results and Discussion:

The results indicated that Mount Agh Dagh (TE = 73.0076) and Qezel Ozan River (TE = 64.303) have the highest geotourism potential and were categorized as “very good” and “good,” respectively. Diz Waterfall (38.9839), Jafarabad Zaviyeh Hot Spring (38.1518), and Nodeh Waterfall (33.014) were rated as “moderate.” Among the vulnerability scores, Qezel Ozan River had the highest vulnerability (5.5), while Mount Agh Dagh had the lowest (10). Sub-index evaluations showed that “regional rarity” was consistently rated highest across most geosites by both experts and tourists, while “scientific knowledge” and “supporting services” often received the lowest scores. The assessment also highlighted the lack of infrastructure and management as key challenges to geotourism development.

Conclusion:

Hashtjin County’s geosites, particularly Mount Agh Dagh and Qezel Ozan River, exhibit high potential for geotourism and sustainable regional development. While the dynamic model provides a robust framework for comprehensive evaluation, limitations such as infrastructural deficiencies and varying levels of site vulnerability underscore the need for strategic management. To foster development, it is recommended that the region be officially designated as a geosite, comprehensive documentation be undertaken, and localized evaluation models be developed in addition to the dynamic model. Engaging local stakeholders, enhancing infrastructure, and incorporating statistical and spatial analysis tools in future research will further improve geotourism planning and promotion in the region.

Declarations
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