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Research Paper

Coastal Land Use Planning of the West Māzandarān with Focus on Sustainable Development Approach

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Abstract

The coast has many unique features. The most important and prominent of these features are the dynamic land-sea interactions. This causes excessive accumulation in parts of coastal areas and the destruction of these valuable areas, irregularities in construction, as well as the lack of management and clear rules and regulations on how to use the land, causing improper use and excess coast capacity, especially on the west coast of Māzandarān. Therefore, choosing a systematic approach to coastal planning is needed to take an important step in stabilizing coastal resources by determining the type of appropriate coastal use. In this research, the analytical network process (ANP) and fuzzy logic were used to determine the appropriate environmental map, which dealt with the coastal villages' zoning and land use determination by determining the main components of the land use type. Also, using strategic rules and regulations and a set of guidelines and recommendations for the Tonkābon coastal areas, it was tried to create sustainable coastal use. This research showed a direct and reciprocal relationship between the current pattern of land use and the destruction of resources due to the lack of clear rules and regulations. With coastal land use planning through a sustainable development approach, the nature and quality of the development of the coastal strip west of Māzandarān, especially the city of Tankabon, would be sustainable, people-oriented, and based on comfort, well-being, and environmental sustainability.

Keywords: Land Use, Sustainable Development, Coastal Planning, West coasts of Māzandarān.

Highlight

- In order to find the suitability of optimal lands with the approach of sustainable development in coastal areas, the ANP model can be used by integrating environmental, economic and social criteria.
- By redefining the mechanism of determining land use with emphasis on sustainable development, it is possible to ensure the sustainability of development in coastal strip lands, and this issue pursues the goal of expanding the balance in the distribution of population and activities in susceptible areas.

Extended Abstract

Introduction

The rapid increase of population around the world, along with economic activities, has led to the gathering of cities, and subsequent expansion of the construction lands has led to rapid changes in land use. Land usage change is one of the effective factors on the coastal lines. Therefore, coastal lines are increasingly threatened. Thus, in line with decreasing the loss imposed, the ecosystem requires sustainable solutions such as management and planning the coastal line based on a sustainable development approach. Protective actions should be balanced with development to plan for coastal regions.

Methodology

The present study was quantitative. In terms of objective, it was descriptive-analytic. It is considered a case study. The research population included the residents of the city of Tonkābon (194,719 people), from which 384 people were selected as the research sample using Cochran's formula. Following the determination of the scope of the

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study and examining and analyzing the problems, limitations, and capacities, as well as planning the objectives of coastal land use, there was a need to determine criteria for planning sustainable coastal land use. In this stage, the comments of Urban and regional planning experts have been used. After determining the planning criteria and sub-criteria, it is necessary to evaluate and assess the degree of importance of each one, which was done using the analytic network process (ANP), which is one of the most comprehensive systems designed for decision-making with multiple criteria. The ANP includes four steps, namely modeling and transforming the case study to the network structure, forming a binary comparison matrix and determining priority vectors, forming a supermatrix and transforming it into a limit supermatrix, and mapping the environmental appropriation by providing an information layer from each sub-criteria and combining them based on the value of each sub-criteria. To provide an information layer from each sub-criteria and combine them based on the value of each sub-criteria and also to achieve the mapping of environmental appropriation, the fuzzy logic is used considering its strengths compared to other combination methods. GIS is used to implement all the steps mentioned above in spatial form. In this research, it has been intended to use two techniques: analytical network process (ANP) to evaluate the criteria of sustainable development of land usage for the Tonkābon coastal line (as a case study) that mutual dependence and feedback among decision factors, and fuzzy logic to combine layers and making the spatial decision to allocate lands and area.

Results and discussion

The proper usages within the coastal line were considered based on the intervention area. According to the investigations, the determination of the land usage of the studied area was based on how to intervene in the coastal lands according to the sustainable development approach. The land usage related to the forest lands with an area of about 20114 hectares (41%) had the highest level of usage according to characteristics area, which in the field of maintenance intervention will try to maintain the existing conditions and only use its indirect benefits. Also, the agricultural usage with 11239 hectares (22%) in the three sectors of irrigated agriculture, rainfed agriculture, and horticulture is in the second level of area uses in the area of regenerative and management intervention. Since the usage changes in this area could bring a revival in this domain by changing the traditional agricultural view into industrial and preventing usage change by applying efficient management.

It is noteworthy that by having an area of 10114 hectares (21 percent) and considering the location of the area that is placed beside sea and mountain, tourism usage has special situation leading to economic prosperity and income increase in this area. Due to its sensitivity, according to the conducted surveys, the current pattern of land use definition in the coastal lands will not answer the present generation. Therefore, by redefining the mechanism of land use with an emphasis on sustainable development, it can be expected that by taking the special arrangements into account, it will be possible to make sustainable development in the coastal strip lands. This issue aims to expand the balance in population distribution and activities following resources, environmental power, and the carrying capacity of ecosystems in susceptible areas.

Conclusion

This research titled "Coastal Land Use Planning of the West Māzandarān with Focus on Sustainable Development Approach" attempts to introduce the aforementioned approach and the method of land use in the coastal line west of Māzandarān with an emphasis on Tonkābon city. In this study, an attempt was made to preserve the valuable lands of the coastal line by presenting the ideal land use model and establishing appropriate activities to prevent the destruction of valuable lands caused by unbalanced constructions. However, such an action should be performed in the form of integrated coastal management. Due to the spatial management dispersion in this area, the only solution is to develop rules and regulations which deal with this problem in minimum time and environmental damage leading to the sustainable development of the coastal line. Based on the examinations, to find the optimum proportion of lands using a sustainable development approach in the coastal line, the ANP model was used, which integrated environmental, economic, and social criteria leading to defining the diverse area by preserving the sustainable pattern. Although ANP follows a more or less similar process to other methods to determine the power, ability, or capability of land, it has been able to define the most appropriate activity for the studied area due to the extent of the analysis of the layers. Considering the areas of policy and intervention, an attempt was made to clarify the determination of appropriate use based on different approaches. Given the strategic rules and regulations, this planning intends to simultaneously develop and balance the Tonkābon coastal population. Without unique and dominant management, achieving such an important goal would be difficult.

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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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