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Lake Gahar Basin: Environmentally Potential for Focused Ecotourism

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Abstract

Development of ecotourism industry is considered an economic endeavor leading to new job opportunities, community income increase, and, eventually, renewal of social structures of a territory. The present study aimed to examine the positive and negative consequences of ecotourism in Lake Gahar basin surrounded by Mount Oshtoran to prevent any problem that defective planning might create. Rooted in the principles of environmental planning, the study demanded a proper understanding of the current situation in Lake Gahar basin. The overlay method was, therefore, utilized to do the land unit mapping as well as the focused ecotourism; the method also helped the researcher make the conservation zoning map of the area. Data analysis revealed the existence of a lake with its cultural and natural attractions played a crucial role in developing the sector. It also implied authorities were responsible for creating balance between tourism and ecosystem preservation regarding the probable side-effects of this leisure industry.

Keywords: focused ecotourism, Lake Gahar, Mount Oshtoran, overlay.

Introduction

In the first decade of the third millennium, tourism industry will turn into the most lucrative business in the world although, even now, it accounts for the highest national incomes of many countries including a number of developing countries[1- 3]. In the same line, "ecotourism", created by the combination of the sciences of ecology and tourism, aims to develop tourism without compromising the environment[4]; it can be a source of social and economic blessing such as gain on foreign exchange and infrastructure reform, particularly in rural areas, for developing countries[3].

Focused ecotourism, a major type of ecotourism in terms of the development in open land, includes areas that require construction like swimming, skiing, camping, and historical sites[5]. Notwithstanding the positive effects of this special type of ecotourism on various aspects of social, cultural and economic life, authorities should, at the same time, create balance between tourism and preservation of the natural environment[6].

Many researchers have discussed the concept of national parks and their construction as well as development plans along with shortcomings, resources and the positive and negative effects of tourism on them[7]. National parks, if properly selected and well equipped, can play an important role in the local and national economy[7]. Tourism can be beneficial once it develops along with other elements in national parks, so conservation must be considered as the main operational principle in such parks[8]. Some, in addition to providing a definition for ecotourism or environmental tourism, discuss the benefits and hazards of weaknesses in tourism industry and the importance of proper planning and management in attracting tourists to natural protected areas of a country[9-11]. National parks and resorts can be invested on as the resources of tourism in Iran[5]. The first step in creating a chain ecotourism project is to determine the capacity of the resources, so a practical approach is offered for this purpose[12]. Using an ecological method, it is estimated that natural recreational spots in Iran are capable of welcoming 1,028,752,500 visits per year.

Lake Gahar, with a longitude of 48 and 58 to 49 and 25E and latitude 33 and 12 to 33 and 28N, is located 40^{km} away from Doroud city in Lorestan Province, Iran[9, 13, 14]. The lake type is land slide with the variable width of 500^{m} to 800^{m} and length of 1700^{m}. It has 85^{ha} to 100^{ha} water surface area and is 28^{m} to 40^{m} deep (figure 1). Considering the potentials of the lake's amazing natural landscape, such as its position and height as well as its surrounding sources, the area has high potentials for developing focused ecotourism[15]. Thus, while protecting the existing ecological values, the development of ecotourism industry in Lake Gahar area might be beneficial for social and economic status of the region[9,13]. Accordingly, organizing tourism in the region and conducting accurate studies on ecotourism of the area by the environmental protection agency – the authority responsible for the preservation of the area – is a necessity neglected so far[16,14,17].

The present study aims to study the environmental management of Lake Gahar. To achieve this goal, the researcher set minor objectives divided into three parts: i. mapping of conservational usage as an information layer; ii. properly supervising the tourism and environment sectors and relationships; iii. providing management solutions to restore balance between the needs of tourists, local residents, and the tourist spot. To this end, the project investigates the positive and negative consequences of ecotourism in the area in order to prevent any problem that defective planning may cause.

Material and Methods

The study is based on the principles of environmental planning. Inasmuch as the main issue is to identify any environmental structure and every physical change in the ecological structure based on the respective principles, a proper understanding of the current situation of the selected vicinity was a priority. First, the existing statistics and information gathered in the area were analyzed. Then, the collected information, based on the real condition of the area, was validated through doing field observations. Afterwards, the results were compared with the data obtained in the first step. In this way, the researcher could properly acquire knowledge about the past and present status of the area. The next step investigated the changes occurred in the area and the way they had occurred. Finally, the whole process was analyzed. The results were used to create an environmental management program for Lake Gahar basin grounded in the existing functions and in the results of the application of the program.

Since the general goal of the study was examining the role of ecotourism as the only variable regarding the characteristics of the investigated vicinity, parametric evaluation methods based on an optimal combination seemed most appropriate. The evaluation, done in a hierarchical fashion, was made compatible and combined with the planning requirements, the maps, and data. Then, following the collection and classification of the information, the overlay method was applied, the data was interpreted by the GIS software, and the two-agent method was utilized to extract the Thematic Map[18]. The map was, then, used to propose the protocol ecotourism management in the district of Mount Oshtoran or Lake Gahar basin.

The existence of Lake Gahar in the study area as well as its cultural attractions, unique beauty, bird migration along with capacity for recreational facilities all together highlight the capacity of the area for development and future programs if environmental standards are observed. The upper beach can be used for natural activities as sightseeing, camping, carriage riding, bird watching and cycling along with human activities like playing sports, shopping, dining and entertainment. Such plans are supported by the cultural heritage organization and environmental protection agency thanks to the importance of focused ecotourism in economic prosperity.

Results and Discussion

Data analysis as well as data preparation for final evaluation of the target area was aimed to study application of principles of ecotourism in Lake Gahar Basin. Thus, various ecological data were, first, classified and the respective maps were, then, made. In the next step, the layers of all the ecological resources were combined to achieve the units or the units of the possible layers of ecological resources. The final maps obtained through this method are called unit maps or environmental unit.

To identify the ecological resources of the area including the sustainable (stones, geomorphology and shape of land, soil and crops) and unsustainable resources (weather and climate, water resources, and animals)[16], the necessary maps were made as follows: map of geomorphology (figure 2), and map of soil (land functions) (figure 3).

Zoning for achieving a mapping unit: Mapping unit is called environmental unit because it is responsible for land evaluation and planning. It can be considered equal to a micro-ecosystem[16]. Since the resulting environmental unit is derived from the combination of a vast number of ecological parameters, it can reveal a better representation of the capacity of the land. Therefore, zoning is done to achieve a mapping unit (environmental units) in order to acquire similar and homogeneous structures based on the data on the map (which displays the location of the data). Thus, after summarizing the data by modeling, it is much easier and more accurate to evaluate the capacity as well as planning needs and, finally, to make decisions[16].

Mapping Environmental Unit with GIS: Mapping Environmental unit is done through several steps: First, the basic environmental unit is obtained by overlying the land form unit maps with soil processing map. This map has 459 units and each unit consists of four different parameters of slope, direction, elevation and soil; second, common zones are encoded; third, the table is completed by adding soil level for each common zone in the environmental unit map; fourth, the final environmental unit map will be obtained by overlaying the basic environmental unit map as well as the process map of crops and coverage density; fifth, common zones are encoded; sixth, the table is completed by adding crop levels and coverage density for each common zone code in the final environmental unit map[16].

It should be noted that, in each stage, the units less than five hectares are merged with the adjacent units based on the area of the region. Inasmuch as these overlaying units are small, they can face problems in the following steps. Besides, they do not have much effect on the evaluation and programming.

Benefiting from unsustainable ecological resources: In the case of unsustainable resources, only overlaying is used and there is no need for zoning in mapping. Specification tables and environmental units are overlaid by storing the data of the thematic map, and, therefore, each environmental unit is completed. Finally, overlaying is continued and tables are completed until the final environmental unit map is achieved. Among all the unsustainable ecological resources only those more important in modeling the ecosystem are classified and are, separately, created in this study including access route map to Lake Gahar (figure 4).

Evaluation and zoning of ecotourism capacity: Evaluation of ecological capacity. Evaluation of ecological capacity of land is the middle stage of land preparation or environmental planning. In fact, land evaluation provides the basic information for the second stage of land preparation which includes selection of the most suitable usage of the land and management. Evaluation and classification of the environment is done by comparing the ecological specifications of watershed and the ecological models[16]. Likewise, this study evaluates the ecological characteristics of the protected area of Mount Oshtoran with regard to the ecological model of ecotourism in the evaluation stage. This evaluation determines whether the area possesses the necessary ecological capacity for focused ecotourism or not. Furthermore, it can determine the degree of capacity quality of the area through capacity classification. In fact, the ecological models are designed in a way that can simultaneously evaluate and classify the capacity and the degree of excellence of the land.

Calculation of the carrying capacity of Lake Gahar basin: After mapping the focused ecotourism capacity and the related layers in the protected area of Mount Oshtoran, carrying capacity of the area is calculated. This will make the future operational plans easier to carry out. Carrying Capacity is divided into three categories:

Physical Carrying Capacity (PCC): Physical Carrying Capacity is the maximum amount of visitors that can visit a place at the same time as in: PCC. RF × A where A is length of the route or the available surface, (v / a shows one visitor per square meter), and RF refers to number of hits in one day

Real Carrying Capacity (RCC): Real Carrying Capacity means the maximum number of visitors considering the inhibiting factors, conditions of the location and the effect of these factors on the physical carrying capacity (rainy days, route curve, erosion, severe sunshine, etc.) as:

$$RCC = PCC \; \frac{100\text{- cf 1}}{100} \times \frac{100 \text{ - cf2}}{100} \times \frac{100\text{-cfn}}{100}$$

where *cf* equals correction factor.

Effective Carrying Capacity (ECC): Effective carrying capacity is the maximum number of visitors that a route of place can sustain considering the management capacities (MC). Effective carrying capacity is created by comparing the real carrying capacity and the capacity and management capabilities of the organization responsible for the protected area. Management capabilities include all the necessary requirements that are needed for a protected area to achieve its goals and functions. A number of variables – budget, human resources, laws and the existing programs, policies and infrastructures – should be taken into account in order to estimate management capacities. It is important to always remember that PCC> RCC, RCC $\geq$ ECC

Assumptions of physical carrying capacity: Route length 18000m; Space needed for each person 1m; Route width 1m; Minimum distance between each group 50 m; Maximum size of each group of 15 people; Thirty-five meters of space needed; Five hours to travel the distance; Twelve hours to cross (using daylight). Taking these assumptions into account, the route can accommodate 210 groups. And these groups will cover 7350m of the route. Therefore, the physical carrying capacity is calculated as follows: PCC = 7350m pathway× 0.7 visitor/m × 2 × visit / day = 10290 people

Calculation of real carrying capacity (RCC): Correction factors are calculated as follows:

Low season tourism months:
CF_{vm} =month ×100= 66.6% 12 months a year
(Tourism is allowed during four months of the year)

Restricted calving season month:
CF_w = share of the month × 100 = 25% 12 months a year

Erosion Limit:
CF_e = part of the route that has high and medium erosion / total length of the path (m) = $\frac{12000}{18000}$
= 66.6% Restricted access
Cfa = Part of the route in the slope / Average and maximum of the route length (m) = $\frac{15000}{18000} \times 100 = 83.3\%$
CFs = Total hours of intense sunshine during the year / Total hours of sunshine during the year × 100 = $\frac{1020}{3060} \times 100 = 33.3\%$

Intense sunshine limitation is calculated as follows: Assuming 5 dry months = 150 days and 7 rainy and snowy months = 210 days, M12 = 2 intense sunshine hours × 210 rainy days per year = 420 Intense sunshine hours per year, M11= 4 intense sunshine hours × 150 sunny days per year = 600 Intense sunshine hours per year

Total intense sunshine hours in a year read as: Mt= 1020

$$Cfs= \frac{M1 \times 100}{Mt}$$

Precipitation restriction factor: CFr = Total number of visiting hours in a year / The number of precipitation hours × 100 = $\frac{210 \times 6}{360 \times 12} = \frac{1260}{4320} = 29 - 1\%$
Frost restriction factor: CFF = number of frost days / Total days in a year = $\frac{135}{365} \times 100 = 36.9\%$

Therefore, the real carrying capacity is calculated as follows:

$$RCC = 10290 \; \left(\frac{100-66.6}{100} . \frac{100-83.3}{100} . \frac{100-33.3}{100} . \frac{100-33.3}{100} . \frac{100-36.9}{100} . \frac{100-29.1}{100}\right) = 43$$

Conclusion

Based on the ecotourism zoning maps, reproduced from the analysis of ecological resources of the protected area of Mount Oshtoran, and on the modeling and evaluation of the area according to the national and international criteria, this hypothesis is proven that many of the specified areas in the zoning map are potential ecotourism units. It is possible to have a balanced and sustainable utilization of the ecological capacities of Mount Oshtoran basin and, especially, in the investigated area of Lake Gahar basin[9, 14]. The topographic map of Lake Gahar area created with high accuracy proves that the balance curves of 2320^m have the smallest distance from one another on either sides of the lake bed exit. Therefore, they can make the best place for beginning the foundation actions.

A proper introduction of all natural values to the local people highlights the necessity for preserving for the future generations. To this end, it is necessary that the Department of Environment, as the authority responsible for the area takes the initiative by: organizing tourism and conducting detailed ecotourism studies in the area while observing all environmental and wildlife considerations[19, 20], training and promoting healthy use of resorts and avoiding activities that only aim to exploit the area regardless of considerations for nature[20], paying particular attention to the conservation of the area so that ecotourism becomes secondary to this concern[21], providing anti-fire equipments and stations and mapping vulnerable areas to fire in the region, constructing locations for renting animals that are used for transportation along the roads to take the tourists to the spots[19], building platforms for setting up tents, public rest rooms, restaurants, traditional teahouses, camps and stores on both sides of the lake for the visitors[19], creating special locations for dumping trash and devising methods for collecting trash effectively within the lake area[19], establishing Lake Gahar rural cooperatives funds administered by the residents of the lake area and stakeholders[20,21].

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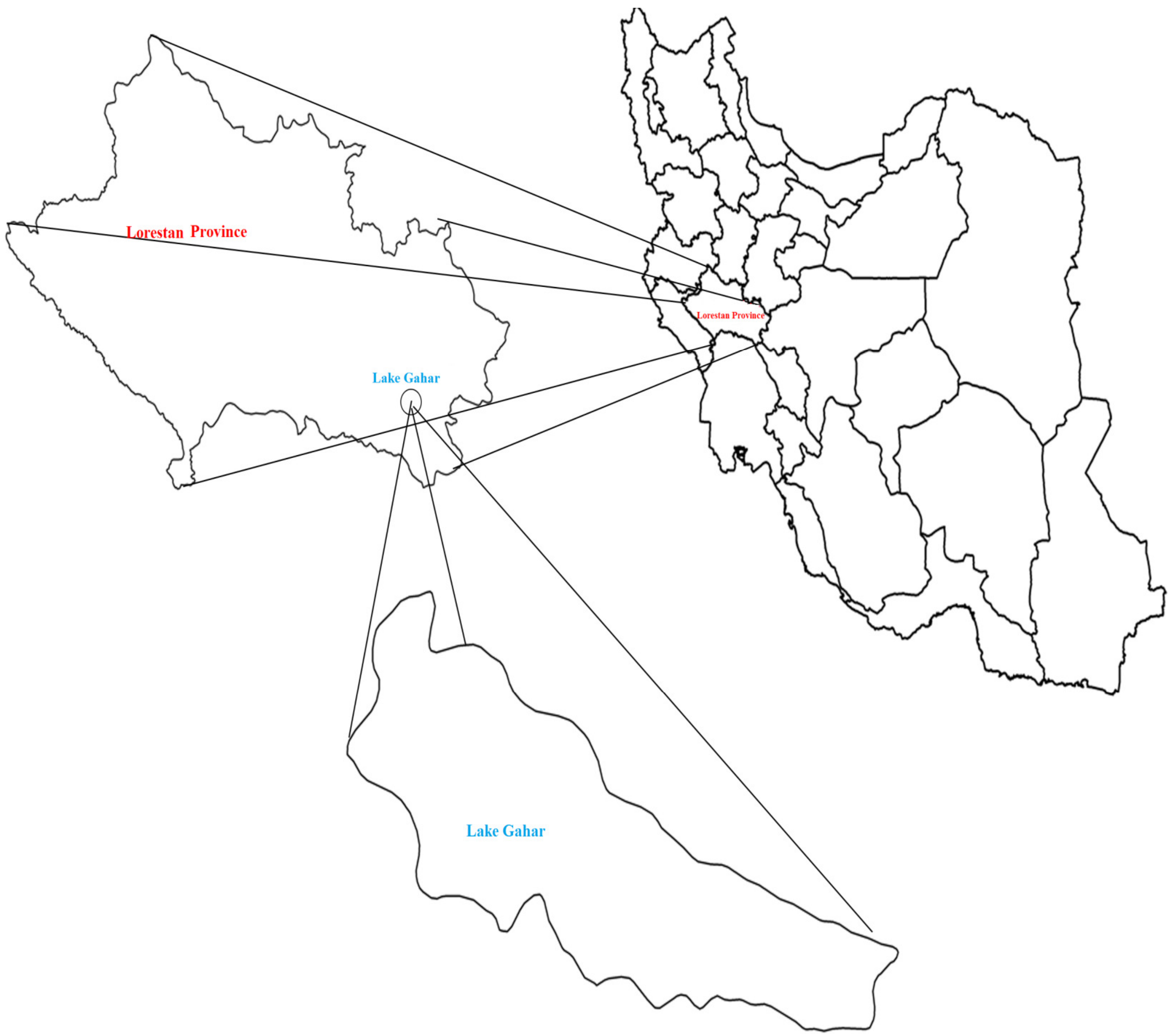

Figure-1

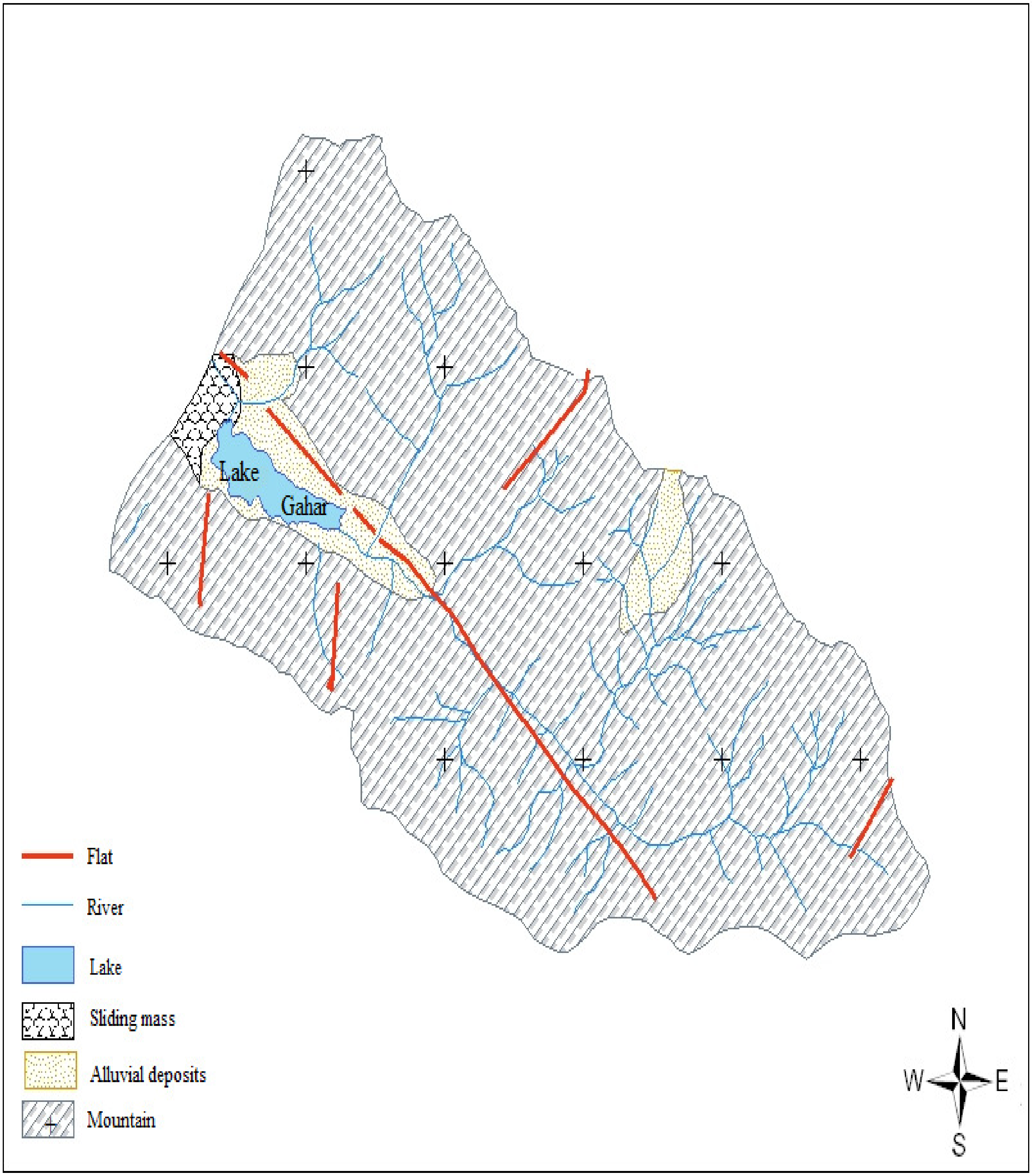
Lake
Gahar
Flat
River
Lake
Sliding mass
Alluvial deposits
Mountain
N
W
E
S

Figure-2

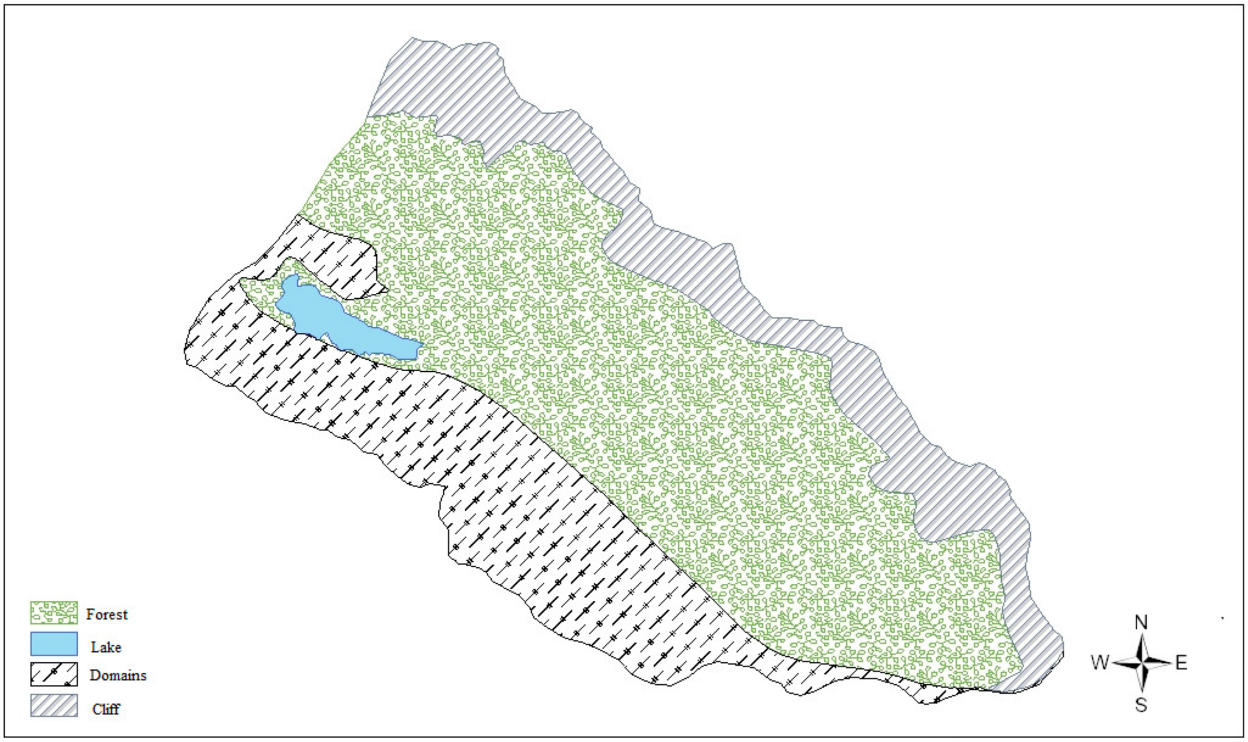

Figure-3

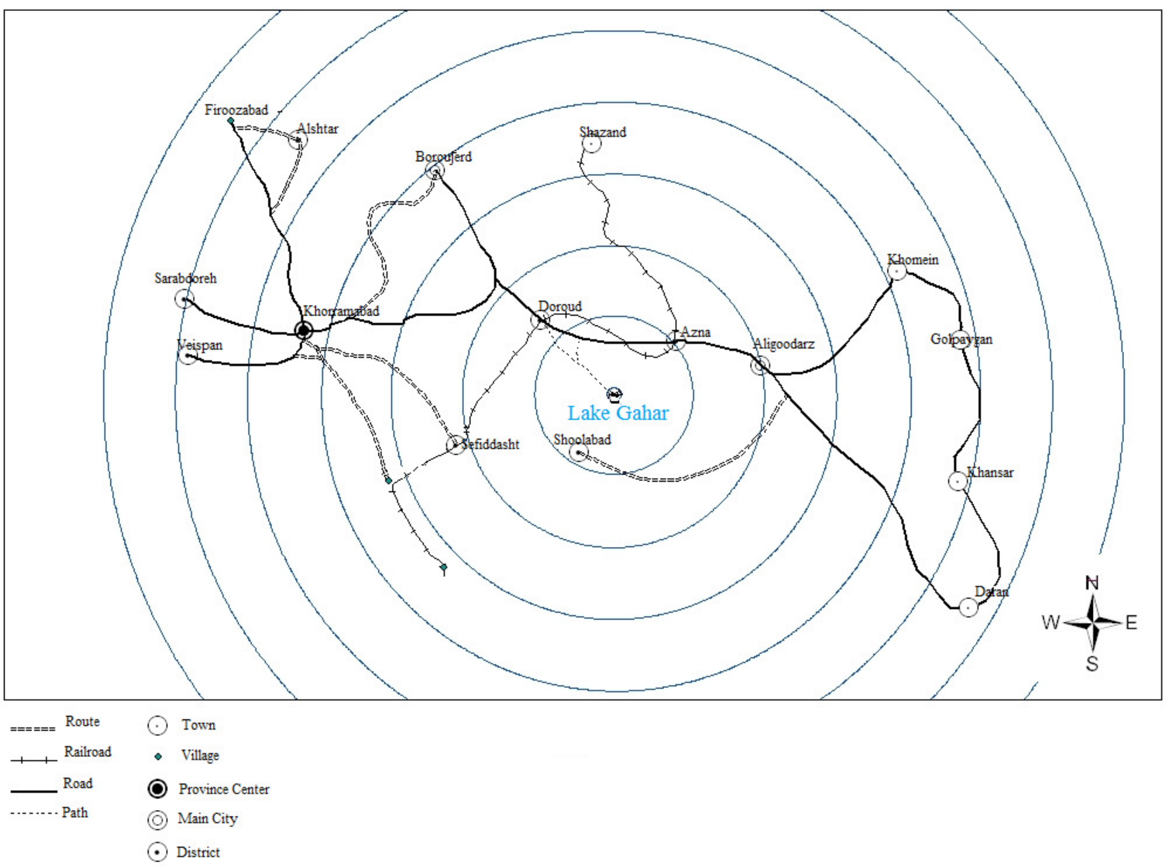

Figure-4