

Geotourism Attractions in the Bare Nature of Yazd Province

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Abstract: Climatic conditions governing over Yazd province have caused a situation in which the most areas covered by bare and barren lands. Relief in this province is rooted in the ancient geology history of Iran and the world. From the most ancient structures of the geology in the world (Precambrian) to the newest ones (Holocene) are seen at a distance which is less than 100 km in this province. We can rarely see very various ecotourism attractions such as deserts, salt playas, sand dunes, Qantas, glacial circuses, spring, karstic caves and kalouts in the other areas of the world in a small distance away from each other. Therefore this province can have special status in ecotourism industry because of its attractions and developing this industry will result in socio-economic advancement and an increase in the employment rate in Yazd province. This research attempts to consider ecotourism attractions briefly in Yazd province and introduce available potential abilities in this field.

Key-Words: Ecotourism, Sand Dune, Playa, Qanat; Desert, Glacial Circus, Kalout, Yazd Province.

1 Introduction

Climatic variety not only in current age, but also in various climatic periods has been very diverse in Yazd province area. Geomorphologic Figures and remained traces on rock surface and mountains slopes confirm this claim. Beautiful and attractive perspectives created by various wind and water activities have presented a very good architecture of nature in the form of bare and barren mountain slopes, deep valleys, Playa areas and sand dunes.

Yazd geology is rooted in the formation of initial living traces on the earth surface and dates back to the first geology periods (Precambrian). The conducted studies on the shapes and relief of the earth in Yazd province confirm the presence of fossils from Precambrian period (approximate age is over 600 millions years) to Holocene or the present time [13].

Regarding geological diversity, topography conditions and more climatic changes of Yazd province in comparison with the other world regions, interesting and natural perspectives of this province are very spectacular for Iran's and the world's ecotourists. In many countries, we can't observe landscapes of the nature but they are observable in Iran and Yazd province because of soil thickness and vegetation. So the most diversity of Iran's nature is observed in central provinces, especially in Yazd province.

Today, many of nature lovers and world Ecotourists want to visit attractive natural regions of Iran. So by planning properly we should take

necessary actions in order to eliminate deficiencies and attract tourists. Until 30 years ago in the world, travelling around the world and international journeys even for those had upper economical power, was considered sumptuous actions done only for amusement and fancy. But today, tourism industry has become one of the largest world industries [3]. This industry has created jobs for about 130 millions in 1992 and 200 millions in 2002[23]. By thinking about the top potential of tourism and enjoying the great civilization antecedent and lots of tourism attractions in Iran this country has been categorized among the first 10 world countries in tourist attractions [10].

Expanding this industry not only can promote foreign exchange, employment and national revenue increases, but also contributes to cultural exchanges, correlation between nations and finally international peace and understanding. In spite of enjoying high capacity, rich cultural-historical support and various social and geographical attractions, regrettably, tourism industry in this country has not achieved its own worthy position [19].

"*Ecotourism* is environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features - both past and present) that promotes conservation, has low negative visitor impact, and provides for beneficially active socio-economic involvement of local populations" [4].

Regarding the fact that more than 90% of foreign tourists traveling to Iran and this province are cultural tourists and also because of non-proper substructure, ecotourism section in Iran has not prospered. So, Yazd can achieve special position in ecotourism industry because it enjoys very diverse and beautiful natural attractions and by more attention, it will become one of the greatest ecotourist poles in Iran.

Many researches have been done about to reason such as Kamaruzaman and dahlan, Camelia and Nikos and Zouzias [2] [12] [26].

2 Objectives and Methodology

Regarding natural and environmental conditions of Yazd province, agricultural activities, and mineral and industrial programs not only can not meet present and near future requirements of the region, but also increasingly the growth of these activities, may cause destruction of current ecological systems. In addition, the wide diversity and abundance of Yazd's natural phenomena have necessary potentials and powers to use potentially and actually in order to promote natural tourism.

The objective of this research is to introduce and identify some of ecotourist attractions and landscapes in Yazd province. Also the formation and antiquity of these attractions will be regarded briefly in order to draw planners' and administrators' attention to this sensitive and young ecotourism industry having a significant role in prospering this industry in the area. The methodology is based on the field survey and author's observations and also available texts and references.

3 Desirable backgrounds in developing of Yazd's ecotourism industry.

3.1 Mountain perspectives

3.1.1 Shirkuh high mountains

These mountains with glacial circuses, springs, caves, waterfalls, peaks, attractive and pretty valleys, are one of the most beautiful areas in the central Iran. Shirkuh Mountain located in the western part of the province has a peak that is at an elevation of 4075 meters [19]. This mountain area divided into three zones, Pishkuh, Miankuh and Poshtkuh. They are considered as the most leading focus of Yazd's natural attractions (Fig.1). These high mountains have been formed from granite substructure that its age is always argued between geologists [9].

In Shirkuh region, the pure air of the country-houses and villas in summer and snow in winter make it a suitable and attractive place for skiing and climbing mountains.

When we move from Shirkuh peak toward Siahkuh Playa, first we will observe glacial circuses, moraines and mountain glacier of Tezerjan .then, there is a dried mountain area continued to Taft.



Fig. 1 Shirkuh high mountains in Taft



Fig. 2 Sand dunes and ripple marks in Ashkezar

From Taft to Ashkezar and Zarch an alluvial plain with mild slope, sand dunes and barkhans are observed (Fig.2). In this area, we observe watershed management activities such as mulch-scattering and tamarisk-cultivation in order to prevent the movement of flowing sands which gives a beautiful shape to the wild nature . After passing through Meybod and Ardakan, we will reach Siahkuh Playa which present rare phenomena in a short distance and nearby together, (less than 100 km). It creates the rarest interesting areas of the world that can be unparalleled in terms of ecotourist attractions.

3.1.2 Glacial cirques and U-shaped valleys

U-shaped Valleys can be found in various regions of Shirkuh and the role of ice bits in giving shapes to them is significant. Only, in Miankuh, more than 30 large and small glacial cirques are recognizable (Fig.3). The operation of these glaciers has been resulted in making very desirable underground water resources in slopes of these regions. The traces of 7 ice terminals in southern and east-southern basin of Fakhrabad reaching Ibrahimabad plain are observable. Here, relatively large granite rocks with finer materials of wandering moraines (Fig.4) have been accumulated in the main passage of natural floodway. It indicates the lowest penetration limit of ice bits (1800 m over sea surface) in the most ancient phase of glacial advance [17].

3.1.3 Ice sheet.

One of the largest glacial resources which is rare in Iran in terms of ecotourists attraction has been formed in Fakhrabad region. Its external opening has been closed by under ground dam of Mehriz (Mehriz fault).



Fig. 3 Glacial cirque in Miankuh region



Fig. 4 Glacial moraines and scattered moraines in Shirkuh

3.1.4 Caves and karstic springs.

One of the beautiful phenomena which can have a significant role in attracting ecotourists is the presence of caves and karstic springs. The abundant and interesting karstic caves such as karstic caves of Nodushan, Yazdan Ashkaft in Aghda, Firooz Mobedan (in the south of Taft's Tamehr spring), Ala (in Abarkuh), Chak Chak (in Ardakan) with a stalactite and stalagmites and their cauliflower crystals are among the other attractive natural landscapes in this province [25]. They have been formed as a result of limestone dissolution during the colder and moister periods than today. We can mention Gharbalbiz springs in Mehriz, Tamehr in Taft and Masih in Harat among the other important and main karstic springs in the province.,

3.1.5 Tafoni

The operation of dissolution over relatively very sloping or vertical limestone, granite or some of the sandy rocks produce some cavities known as Tafoni which has been created very interesting landscape over Oghabkuh slopes in Taft.

3.1.6 Karstic valleys (canyon).

These valleys are considered as the interesting natural landscapes in the province. One of these beautiful canyons has been Dare Gahan canyon which has been formed as a result of dissolution of mass limes in Cretaceous period related to Taft formation during cold climatic periods [3]. Dare Gahan's waterfall located at the end of this valley can be very attractive for tourist attractions.

3.1.7 Zoroastrian temples

The most important holy religious places for Zoroastrians probably are the temples located near Aghda, Ardakan and Mehriz (Fig.5). Presently, these holy places provide some locations in the nature for gathering together and praying God. These temples have been built over limestone formations related to Cretaceous period [16].

These places that most of them have been located in mountain slopes are used for gathering Zoroastrians and attracting national and foreign Zoroastrian tourists yearly.

3.2 Desert and playa landscapes

3.2.1 Desert and playa

Desert has three large attractions (sunshine, interesting views and ancient places) for tourists [24]. The desert area of Yazd (without Tabas) is about 1,800,000 hectares [6], (Table 1). The natural phenomena of Yazd's desert and playa regions are considered as the very important ecotourist attractions.

The presence of natural landscapes such as sunny days with cool and bright nights of playa, sand dunes and flowing sands, salt lands, waterways, special bushes for dried lands with especial geomorphologic phenomena such as subsidence, desert pavement (Fig.6). Ripple - Marks and other phenomena resulting from wind erosion are the important and playa attractions of Yazd province. They can provide appropriate field in order to attract scientific and research tourists to the province.

In Yazd province, we can observe some kinds of clay and salty playas with very beautiful landscapes. The extents of Yazd's playas reach 1.000.000 hectares [5], (Table 2).

The barest and saltiest playas are observed within the playas of the province such as Marvast, Dranjir, Saghand, Siahkuh, Abarkuh and Hajiabad.

In addition to exploiting minerals resources of playas, they can be used for performing rallies.



Fig. 5 Pir Naraky (Zoroastrian temples of the country)



Fig. 6 Desert pavement in Ardakan (the west of Tooth)

Within Yazd's playas, we can see some kinds of features such as polygonal surfaces, viscous moist and dull swamps, salty inflated surfaces and hard clay surfaces with bruising lands.

3.2.2 Kalouts

One of the very interesting and unparalleled phenomena in Yazd province is *Kalout*. Kalout is the name of remote dunes in the north of Yazd province and it is the most interesting natural area of Iran in the warm and dried region. A collection of anticlines, synclinals and salt domes are known as Kalouts in the north of Ardakan . Kalout dunes have been surrounded by deserts, Playas and mountains [15]. Very interesting and beautiful natural landscapes existing in Kalouts and salt domes attract many ecotourists and researchers (Fig.7). Geomorphologic tourism can also be attended in Iran [21].

3.2.3 Qanats

Qanat is an Iranian's invention and it dates back to ten centuries ago. Qanat has been spread in a wide area of the world from Japan to Chile. The largest center in which Qanat is known as the main source for providing water, is around Iran's Playas. In alluvial fans located in slopes around central playa Qanat is emerged [18].

Gaining access to underground water resources in a traditional method is a general wonder of Qanats [20].

Table1. The dispersion of deserts and sand dunes in Yazd province, (Figures in Hectare) [5].

Row	City	Desert level	Sand dunes level	Total
1	Abarkuh	200000	1900	201900
2	Ardakan	741000	173000	914000
3	Bafgh	383975	143650	527625
4	Taft	4825	150	4975
5	Sadogh	196000	121000	317000
6	Mehriz	205000	2800	207800
7	Meybod	15000	2000	17000
8	Yazd	54200	25500	79700
9	Total	1800000	470000	2270000

Table 2. The playas of Yazd province and their level[5]

Row	Name	Level in Hectare	Row	Name
1	Siahkuh	55250	7	Abarkuh
2	Taghestan	5625	8	dranjir
3	Harat and Marvast	3500	9	Bahadoran
4	Saghand	9400	10	Hajiabad
5	Zarin	30500	11	Alahabad
6	Scattered	559125	12	Total
Row	Name	Level in Hectare	Row	Name
1	Siahkuh	55250	7	Abarkuh
2	Taghestan	5625	8	dranjir

According to the latest information and statistics, there are 2949 operative qanats in Yazd province. Most of them are located in Taft. The most ancient qanats of Yazd is Yaghobi qanat dug about 900 years ago [7].

The average debit of Yazd's qanats is 4.08 liters/se and their total debit is 12037 liters/se and their total annual withdrawal of water is near 380 millions m³ [23]. The length of total operative qanats in Yazd is about 2663.4 km [25]., (Table 3).

This very interesting phenomenon in plains and slopes can be considered as the natural attractions for attracting foreign ecotourists and authorities should invest on it.

Table 3. The position of the operative qanats and some qanat specifications of Yazd province.

City	Quantity of operative qanats	The length of total qanats (km)
Yazd	46	459.6
Sadogh	145	101.2
Meybod	19	154.4
Ardakan	197	177.6
Taft	1743	924.6
Abarkuh	39	143
Bafgh	252	298.7
Mehriz	508	404.3
Total	2949	2663.4

3.3 Dune landscapes and sandy areas

3.3.1 Kuhrigs

The people of Yazd call dunes of mountain slopes as kuhrigs which include the accumulation of sand in the mountain slopes and dunes. The depths of accumulated materials in some of the kuhrigs in the province reach over 150 meters. There are many kuhrigs in this province. The most well-known ones are in Mehriz (Fig.8), Taft and Ardakan. These kuhrigs which are proper places for skiing and rallies can be used to attract ecotourists.

3.3.2 Sandy areas and villages buried under running sands

Without calculating Tabas, the area of dunes in Yazd province is about 470.000 Hectares [5], (Table 1). The general view of sand



Fig. 7 Salt kalouts of Ardakan



Fig. 8 Kuhrigs of Mehriz

Dunes are like a sand sea. Asrabad village located near Yazd has been buried under running sands as a result of sand storms. The remains of the village can attract ecotourists.

3.3.3 The collection of dunes (Ergs)

The presences of sand dunes (ergs) around Yazd province are very attractive for ecotourists. This collection covers about 11 percents of the province. The extent of the ergs in Yazd is 27000 Hectares in which some kinds of sand dunes such as crescent, pyramidal, longitudinal and sword-shaped dunes are seen [3]. The other famous ergs of the province

(except around Yazd) are Zarin dunes, Halvan of Tabas and Dranjir playa of Bafgh. They can be used in various aspects in terms of ecotourists such as camel-ride, motoring, kite flying and scientific visits.

3.4 Landscapes of the preserved regions.

The preserved regions have added more attractions to the enormous ecotourist attractions of the province and have attracted supporters of the environment and researchers for wildlife. Because of the presence of significant wild animals and important international rare birds, we can see the environmental diversity in the preserved region of Kalmand-Bahadoran in Mehriz and it can be changed to a scientific-promenade attraction by the methodical planning in future.

One of the interesting and unparalleled wild-life areas of the world is in Bafgh mountains and

Drangir playa where inhabited by various animals such as Asian panther which their numbers are decreasing. The areas of "Beraric" are the rarest areas among the others in the world.

Hot sunshine, night views, the mountains and entertainments such as camel-ride, horse-ride and kite flying can provide the maximum attractiveness and enjoyment for ecotourists and it creates a good occupation source for the area.

The other ecotourist attractions of the province is Ghotrom area in Bafgh where we can see the tropical and cold-region trees settled side by side and very beautiful views of walnut trees and date palms in the area.

There are many old cypress trees in Abarkuh. One of them is called The Ancient Cypress of Abarkuh that is among the rare interesting places in the world. It dates back to 4000 years ago.

4. Conclusion and proposals

The relief and geology of Yazd province are rooted in the most ancient geological periods (Precambrian). Researches accomplished on relief of this province show the presence of fossils from Precambrian periods to the current periods (Holocene).

Interesting and beautiful landscapes created by climatic diversity and various water and wind activities have exhibited very attractive architecture of the nature in the shape of mountain slopes without vegetation, Playa and desert lands, sand dunes and deep valleys. Regarding climatic changes,

topography conditions, and more geological diversity of the province in comparison with the other world regions, its natural landscapes are very interesting and spectacular for many of ecotourists.

The areas of Pishkuh, Miankuh and Poshtkuh constitute the main natural attractions of the province.

From Shirkuh peak to Siahkuh playa, we observe that all the natural phenomena and landscapes such as mountain glacier of Tezerjan, glacial moraine, alluvial plains, sand dunes and playa have been placed near each other.

The variation of the geomorphological phenomena and other natural landscapes gathered around in short distances and the presence of the very interesting and beautiful perspectives in many of the natural landscapes (especially in kalouts and salty dome, kuhrigs, sand dunes, valleys, caves and karstic springs) attract ecotourists. The Glacial moraines, scattered moraines (1800 meters above sea level), the cirques and glacial valleys have presented Shirkuh region as the most attractive natural museum in the world.

Also, the presence of the very beautiful natural desert and playa landscapes, salty lands, Zoroastrian temples located in slope of the high mountains, qanats and other natural attractions in this province provide proper basis for attracting scientific tourists.

So as to develop and enhance the ecotourism industry in Yazd province, the following guidelines are suggested:

Introducing the ecotourism attractions of the province and using the world internet network in order to familiarize foreign tourists with these attractions.

- Constructing a natural museum for moraines and scattered moraines in Fakhrabad and Manshad.

- Constructing a touristy camp in Shirkooh region and developing the Zoroastrian temples.

- Constructing a proper ecotourist path from Shirkuh peak to Siahkuh Playa.

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