

An Introduction to Mining Tourism Route in Yazd Province

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Abstract

Nowadays, mining tourism is known as a strategy for local development and an alternative economy in remote areas. Yazd province is Iran's mineral hub and has a high potential for promoting mining tourism. However, this form of tourism in the province has not been considered as it should. This paper emphasizes on recognizing the mining tourism routes in Yazd province. Field trip and observation method were used in this research, and the results identified four routes (Taft-Mehriz route; west of Meybod city; the route from Yazd to Tabas and The distance between Bafgh and Bahabad) for promoting mining tourism in the province.

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Introduction

Nowadays, mines as industrial heritage with different forms such as surface mines, underground mines, and archaeological mines strive to attract tourists, who are interested in minerals and getting experience in working in mines. Regarding this, countries try to register mine heritage as a world heritage in UNESCO and introduce mine trails and mine heritage routes for visiting. It is noteworthy that some mining landscapes are registered as world heritage. The Cornwall and West Devon mining landscapes (UK), known for their pioneering

copper and tin mining (UNESCO 2017), the Wieliczka Salt Mine (Poland), heritage of Mercury in Almadén (Spain), and Idrija (Slovenia) which includes buildings relating to mining history are well known examples in this regard (Farsani et al. 2019). In recent decades, the emergence of mining tourism is a strategy for reviving abandoned mines, local communities' development, and preserving mine heritage. Iran is a country with rich underground and mineral resources, the exploitation and discovery of mines and the smelting of minerals and the extraction of metals from them dates back to ancient times. Among the provinces of Iran, Yazd, with more than 50 types of minerals, ranks first in the country in terms of mineral diversity.

The present study aims to introduce the mining tourism routes in Yazd province. The main originality of this paper includes linking the mine heritage to tourism in Yazd province. Moreover, the results of this research can diversify the forms of geotourism and ecotourism in the province of Yazd by attracting

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tourists who are interested in mine heritage. In addition, there is no academic work regarding mining tourism in the study area.

Literature Review

Edwards and Coit (1996) introduced the tourism potential of mining areas in Wales and Spain and illustrated that this site has a high potential for creating eco-museum. Saurí-Pujol and Llurdés (1995: 36) argued that mining tourism is a tourism product, which includes the development/redevelopment of old mines for attracting visitors and tourists who are interested in mine heritage. This area offers visitors an opportunity to see and get to know mining tools, devices and technologies, minerals, ores and rocks accessible in the region, technologies applied in ore extractions, as well as technologies used to enrich the ores produced (Rybár and Hvizdák 2010). Rybár and Hvizdák (2010) believed that the tourists who travel to visit mines are curious about the miners' underground life and work. Rybár and Hvizdák (2010) demonstrated that mines as a new product in tourism apply new technologies such as virtual maps and three-dimensional images for attracting tourists. Furthermore, visitor centers, museums, mine trains, organized tours (Ruiz 2011), mining routes, and mine tours by bicycle and an underground cycling trail (Geopark Karavanke 2017) are innovative activities that attract geotourists to mines. Creating Mining Park is a strategy for attracting tourist to mines in Spain and Italy (Ruiz 2011): Riotinto Mining Park in Huelva (Andalusia), Almaden Mining Park in Ciudad Real (Castilla-La Mancha), Andorra-Sierra de Arcos MWINAS Mining Park in Teruel (Aragon) and La Union Mining Park in Murcia (Region of Murcia); Geological and Mining Park of Sardinia (Italy); Tuscan Mining Park (Italy) are good examples in this regard. Turning abandoned mines to ecomuseum is one more strategy for preserving mine heritage and promoting mining tourism (Abad 2010).

The results of the research of Vargas-Sánchez et al. (2009) in the Minas de Riotinto (Spain) towards mining tourism illustrated that the local population believed that tourism will bring more advantages than disadvantages to the municipality such as employment opportunities, and they have a positive perception towards tourism development. Conesa et al. (2008) noted that mining tourism created new economic opportunities in Cartagena—La Unión Mining District (Spain). Moreover, Conesa (2010) argued that in the La Unión Mining District (Spain), tourism acted as an alternative economic form for traditional mining sites.

Rózycki and Drygłaś (2017) believed that mining tourism offered tourists education and learning about the geology and structure of the earth and tries to understand the difficult and specific work of miners. Güreter et al., (2019) with an emphasis of Soma region, Turkey, as an excellent area for mining tourism, noted that mining tourism draws public attention to mine

heritage and strives to transform the image of the mining region from negative to positive. In addition, they argued that mining tourism shows the importance of mining activity and its difficulties.

Agustriani et al., (2020) in the case study of Balibe Hill, Bondor Village, Central Lombok, Indonesia, illustrated that turning unused surface-mined lands to tourism activities can create income for the local community and may have specific and unique identity for tourists, the data for this research gathered from community's livelihood in the study location.

It is noteworthy that mining tourism is a current consideration in Iran, and there is no solid research work in this regard. At present mining tourism in Iran focuses on only some mines such as Nakhlak and Muteh mines in Isfahan Province (Farsani et al. 2019) and Neyshabur Turquoise Mines in Khorasan Razavi Province. Meanwhile, provinces such as Yazd are also has a high potential for promoting mining tourism. For example, Iron ore mining of Chogart Mine, Bafq (Bafgh), Yazd Province is one of the well-known mines in Iran. This study aims at the introduction of mining tourism route in Yazd Province. Lastly, this research has a look at the challenges of the mining tourism boom in the province.

Mining Tourism Potential in Yazd Province

Iran, and especially Yazd province, is a land with rich mineral resources and many advantages in the field of mineral industries, which allows the growth and development of the economy at high speed.

Yazd province has the oldest geological formations (Precambrian) to the youngest Holocene. Precambrian formations are composed of metamorphic rocks in various forms and igneous rocks in which even layers of gypsum can be seen. Permian, Devonian, and Carboniferous formations on a more limited scale often exist as limestones and red sandstones, conglomerates to dolomite rocks, and finally marl and shale. Cretaceous and Eurasian, which make up the bulk of the province's geological formations, include limestone, marl, chile, sandy, sandstone, granuloma, quartzite, and igneous rocks (granite). Triassic formations are limited and often include dense, calcareous, shale and delumite dark limestones. Paleogene formations (Eocene, Oligocene and Paleocene) are composed of sedimentary rocks and igneous rocks (basalts). In some cases, along with salt domes, gypsum provinces are also present. The presence of these salt domes has caused groundwater pollution and surface sediments. Finally, it increases the intensity and extent of the desert range. Sediments related to Neogene formations (Pliocene and Miocene) include sandstone, marl, conglomerate with layers and lenses of gypsum and salt, so that wherever Neogene sediments are located, we often face salinity of water and soil

resources in the area under our influence. We see the Quaternary, which in the first place covers all the ponds (Aghanabati 2007).

So far, nearly 32 different types of minerals have been identified in Yazd, the most prominent of which are iron ore, lead, and zinc reserves. Yazd, despite the unfavorable weather and biological conditions, has large mineral reserves and is the second-largest mineral heart in the country. Yazd province is the fourth industrial province in the country and is at the top in terms of storing lead and zinc mines in Iran. At present, more than 33 types of minerals exploited in 565 mines with an annual extraction capacity of more than 60 million tons. The employment rate of the mining sector in Yazd is more than 11,800 people (Madandaily 2018), and the Chadormalu mine, the Bafgh iron ore, the central plateau (Chah Gaz and North Anomaly) and the Mehdiabad lead and zinc, which are among the country's largest mines, are also in the Yazd province. These mines are of great importance at the macro and national levels (Madandaily 2018).

There are about 2 billion tons of proven mineral reserves in the province, which is the result of the exploration of a large area of the province. The province enjoys 1.3 percent of Iran's population and 4.4 percent of the country's industrial investment, along with 17.3 percent of the country's metal reserves and 6 percent of the country's non-metallic reserves (Madandaily 2018). Yazd province has 2 billion tons of mineral reserves of Iran (Madandaily 2018). The mining sector has a 1% share in gross domestic product and the mining industry has a 5% share (Madandaily 2018).

Up to now, 554 mining licenses have been issued in Yazd province, of which 3 are mines on a global scale, and more than 11,000 people are working in this direct sector. The official continued: "As you know, on average, each unit of value-added in minerals causes 3 units of value-added in the national economy. 45% of the world's gross domestic product is related to mineral resources and related industries (Madandaily 2018).

It is noteworthy that lead and zinc mines of Kushkak, Bafgh's Esfordi phosphate, Aliabad Robat iron ore, and Smalmon iron ore are among the medium mines in Yazd and these mines are located in the villages and districts of the province.

Mining Tourism Route in Yazd Province

This study mainly used qualitative methods relying on a field trip, experiential activities, and observation. Accordingly, four mining tourism routes recognized in four geographical directions of the Yazd province are as follow:

The First Proposed Route of Mining Tourism with a Focus on Building Stones: Taft-Mehriz Route

Taft – Mehriz is the first identified mining tourism route (Figure 1) in the province. During the route of about 100 km, 10 km of which is dirt and around the Great Batolite of Shirkuh, and returning from Mehriz city and while visiting the historical, cultural and rural attractions of these two cities, the tourists can visit all kinds of marble, granite and travertine mines. The most important of them are visiting the mines of Turan Posht region and enjoying watching the geotouristic attractions of Takht-e Rostam travertine areas. There are also a crocodile bed, a turquoise bed, etc., as well as domes and limestone springs, and in the meantime, one can visit one of the borough mines, Borg, Baghbid, and the Nayr marble mine, and in the north of the Nayr marble mine, the granite areas of Nayr. When tourists visit the route Sakhvid to Tang Chenar, they can observe metal mines and old works, including barberry valley copper and abandoned downstream mines. Some old and underground mines of Taft city such as abandoned Islamic mine, lead, and zinc valley of Zanjir and Mansour Abad will be considered for each of them along the main route of the designated route with an approximate distance of approximately 15 km.

The Second Route -West of Meybod city

The route is about 60 km, which is 14 km from the ground. The lead and zinc mines have recently been licensed to operate underground and open and were started by Yugoslavs about 60 to 70 years ago by digging a tunnel. One of the characteristics of this mine compared to other mines is the existence of a natural cave that can be entered from the middle of the mine. There is a natural path in the heart of the mountain. The name of the cave is Selghun, which has beautiful and unique phenomena, including the existing deposits of Stalactite. Stalagmite, Helmite, Rimstone Basin, etc. There are excavations on the floor of the cave that the locals say they were looking for Treasure, but it seems to have been a mineral exploration route. It was used to carry water, and there are a number of lithographs.

Other mines, which can visit, in the region are travertine ore mines. Tourists can also visit geotourism and hydrogeological attractions in the area (Figure 2).



Figure 1. Taft-Mehriz mining tourism route (Photo by Seyed Abolghasem Mirzaei)



Figure 2. West of Meybod mining tourism route (Photo by Seyed Abolghasem Mirzaei)

The Third Mining Tourism Route: The Route from Yazd to Tabas

The access road to Tabas, between Yazd and Kharanagh, one can visit lead and zinc mine on Anjireh, which is currently active and was extracted in different periods; through a side road that is dirt. One of the features of this mine that distinguishes it from other mines in the province is the existence of numerous and relatively long shots that have been used to transport minerals and waste. Made with materials available in the area, another important point is the existence of numerous canvases near the mine, which were used separately for the residence of miners

in the past centuries, which is currently abandoned and unused. The mine is mostly underground and one part is open (Figure 3). The effects of the old smelting furnace and its slag are obvious.

It is noteworthy that there is an access route to this mine, which is possible from desert camps to Shah Abbasi Anjireh Caravanserai and then to the mine, and it is generally dirt and some difficult conditions, which passing should be done with a sport utility vehicle (SUV) or in a form of Off-Road Tour.

The next part of the route is towards Chadormalu iron ore, which is the largest open iron ore mine in Iran. In this route,

tourists can see the attractions of Pir-e Sabz: Chek Chek. The historical village of Khoranagh.

One of the most important features of the region is the presence of one of the largest sands in Central Iran, which illustrates the effects of strong effects and melting of metals on the margins of quicksand (Figure 3).

The height of some sands is up to 300 meters above the ground and the length of quicksand from Mongolia to Hajiabad road is

about 70 km. around these sand dunes, there are several mines of industrial soils, including feldspar, kaolin, and general wing, which are mostly used in the Meybod tile industry.



Figure 3. Yazd to Tabas mining tourism route (Photo by Seyed Abolghasem Mirzaei)

The Fourth Route of Mineral Tourism (Golden route of Yazd): The Distance between Bafgh and Bahabad

The valuable route of mineral tourism with a distance of about 70 km is asphalt. The advantage is that most of the important mines along the asphalt road are important metal mines, including the Choghart iron ore.

Abandoned Manganese Nargangan Mine and lead and zinc mines—which can be mentioned as one of the oldest and most special lead and zinc mines in the world due to the variety of extraction and mining methods from ancient times to the present day—are located in this area.

The existence of building stones such as Bisheh marble in Bafgh and the peacock marble of Bahabad are important in this direction. The existence of Choghart Mining Museum and Bahabad Museum of Natural Sciences, especially its mineral crystals section, can be included in the mining tour program.

Accommodating in Karakal Desert Camps and Sand play are other activities, which can offer to tourists. Deh Arous Bahabad, which is underground, as well as the Nikan Grand Hotel in Bafgh, is one of the advantages of this valuable mineral route in Yazd province.

Discussion and Conclusions

Yazd province has been Iran's mineral hub for a long time and the traces of ancient open and underground mines can be seen in the corners of the province, so it has a potential for mineral heritage and mining tourism in the country and the world, which, can attract tourists and geologists to this area.

On the other hand, Yazd is the only city in Iran, which registered on UNESCO World Heritage List and includes unique and intangible cultural, natural, historical, and religious cultural monuments that can visit as integrated tours along with the proposed mine tourism routes.

In this research, four mineral tourism routes introduced in four main geographical directions of Yazd by combining open and underground mines, old and new. Lastly, it can be said that Yazd has a high potential for the development of mine heritage tourism. However, the necessary tourism infrastructure should be developed in terms of financial and human resources.

However, mining tourism in the Middle East is still in its infancy stage. To date, little attention has been paid to the nature and scope of mining tourism in the Middle East countries in the geotourism literature, therefore, tourism marketers, managers, planners and policymakers in Yazd province should pay more attention to mining tourism. Regarding this, mine tourism travel packages should be prepared and their marketing and advertising activities should be done through travel agencies in

the country and the world.

Furthermore, organizing mine tours in Iran especially in Yazd province needs cooperation between the Ministry of Cultural Heritage, Tourism and Handicraft of Iran, Geological Survey & Mineral Explorations of Iran (GSI), travel agencies, and tour guides.

Our research suggests several areas for future researches. It suggests a study on providing mine tourism map for Yazd province. Moreover, the investigation of tourists' demand towards mine heritage recommended for future study.

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