

STUDY OF THE CONVERSION OF HAZARMERD CAVE SITE INTO NATURAL TOURIST PLACES BY LANDSCAPING

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ABSTRACT:

The research was conducted during the period from March 1, 2021 to March 1, 2022. with the aim of transforming the archaeological cave of Hazarmerd into a natural tourist place. Which is located 13 km south of the city of Sulaymaniyah at a longitude(35°29'39.22"N) and latitude(45°18'37.66"E). and an altitude of 1200 m above sea level, and it is one of the oldest Archaeological caves dating back to the Stone Age. and in which traces of Neanderthal man were found, on an area of agricultural land 10 km located in front of the cave, information for research was collected through personal observations. and through several visits to the site and personal interviews with experts, academics, designers in this field and experts in tourism, as well as conducting a questionnaire process to know the opinions of the population and the demands of their recreational needs in design. However, the research reached several results, conclusions and recommendations in this regard, the most important of which is the suitability of the cave to turn into a natural tourist site according to many criteria. Among the favorite recreational activities for visitors are cable cars with a rate of 88%, children's games by 85%, sports stadiums by 79%, camping 76% and other family gatherings and tours in nature, and at the end of the research, based on the results, conclusions and recommendations, and according to the desires of visitors, recreational and environmental needs, and the standards adopted in this regard, an appropriate design for the site was developed.

KEYWORDS: Cultural Landscape, Ecological Landscape, Nature Tourism, Hazarmerd Cave.

الخلاصة :

أجري البحث خلال الفترة من 1 مارس 2021 إلى 1 مارس 2022 بهدف تحويل كهف هزارميرد الاثري الى مكان سياحي طبيعي والذي يقع على بعد 13 كم من جنوب مدينة السليمانية وعلى خط الطول وخط العرض (خط الطول 35 ° 39.22'29 N وخط العرض 45 ° 18'37.66'E) وارتفاع 1200 م عن مستوى سطح البحر وهي احد اقدم الكهوف الاثرية يعود تاريخه الى العصر الحجري ووجد فيها اثر انسان نياندرتال ، لذلك بوضع تصميم لمنتزه على مساحة 10 كم من الاراضي الزراعية ممتدة امام الكهف. وتم جمع المعلومات الخاصة بالبحث من خلال الملاحظات الشخصية خلال عدة زيارات للموقع والمقابلات الشخصية مع خبراء والاكاديمين والمصممين في هذا المجال وكذلك خبراء في السياحة , أجري الاستبيان لمعرفة اراء السكان وطلبية احتياجاتهم الترفيهية في التصميم . وتوصل البحث الى عدة نتائج والاستنتاجات والتوصيات بهذا الخصوص، اهمها ملائمة الكهف لتحويل الى موقع سياحي طبيعي حسب كثير من المعايير ومن الانشطة الترفيهية المفضلة لدى الزوار هي التلفزيون بنسبة 88% والالعاب الاطفال 85% والملاعب الرياضية 79% والتخييم 76 % وغيرها من التجمعات العائلية و الجولات في الطبيعة. وفي نهاية بالاعتماد على نتائج واستنتاجات وتوصيات البحث وحسب رغبات الزوار واحتياجات الترفيهية والبيئية والمعايير المتبعة بهذا الخصوص ثم وضع تصميم ملائم لموقع.

الكلمات الرئيسية: ، المشهد الثقافي، المناظر الطبيعية البيئية، السياحة الطبيعية، كهف هزارميرد.

INTRODUCTION:

The World Cultural Heritage approach has changed from the unifying implicit activities of modernist organizations, which are bounded by cultural relativists[1]. design in a historical context or fill design not only keeping the situation the same, but giving the character of the place by respecting the old character in a new form, and meeting the needs for the convenience of its users[2]. It provides guidelines for the conservation and management of places of cultural interest, and is based on knowledge and experience[3]. And tourism can grow in places that were mainly used for other purposes in the past. Transforming the site of Hazarmerd Cave into natural tourist places through development and landscaping. We perceive the tourism landscape according to the total physical and visual environment used by all tourism activities. Landscape architecture is often called a problem-solving practice, invested in the production of systems to help the ecological project of eco-efficiency. This expanding field of reciprocity between design and science allows for a better understanding of the formative processes and interactions of the designed landscape. However, the problems are increasing with the development and expansion of cities as a result of the increase in housing units in most cities of the Kurdistan Region, especially the Sulaymaniyah Governorate, where it has expanded abnormally recently with the lack of tourist and recreational areas and despite the availability of many components for the Sulaymaniyah Governorate to transform the site of Hazarmerd Cave into tourist places Natural through development and afforestation to attract and attract tourism demand and tourism investments, and there is a lack of a comprehensive and clear economic and environmental plan in the Kurdistan Region in general. However, the study is represented in the government's lack of planning for the establishment of parks and public parks, and the lack of recreational services, in addition to

the lack of recreational places and natural tourist places due to the increasing number of residents and their recreational needs. Thus, this study examines the transformation of the Hazarmerd Cave site into natural tourist places through development and afforestation.

In addition to object of study the transforming Hazarmerd Cave site into natural tourist places through development and landscaping in Sulaymaniyah province for research. And providing an engineering survey of the area map to provide the necessary information to the competent authorities for the purpose of planning and drawing policies on how to preserve the environment and provide a complete natural tourist area in terms of all recreational activities in Sulaymaniyah Governorate at the level of Iraq and developed countries .and the presenting conclusions and suggestions on how to transform places into natural tourism in a precise engineering and agricultural way and we applied criteria such as original diversity in use, size or tourist attraction to people.

Gather requested information about the site, including:

Produced by humans: such as governmental, geographical, private, and public easements. Likewise, constructions such as buildings, bridges, and others, particularly those of historical and archaeological value[4]. In addition, there are streets, paths, and other forms of transit, as well as utility lines for gas and electricity. Moreover, land uses for industry, recreation, and agriculture.

1- Nature's resources: includes information about the terrain, geology, soil types, water features, fauna, and vegetation in the park's designated areas. However, plants are living organisms[5]. Of particular importance is the environmentally friendly landscape design, as it has been proven to us through research that the use of the same region's plants in the design is more suitable for the environment of the region

and the plants depend on themselves to obtain their requirements to live in the region.

- 2- Forces of nature: include the temperature, sun angles, wind directions, and kinds of precipitation as well as the macro- and microclimate of the park site.
- 3- Qualities of perception: includes perspectives of the location from both inside and outside, as well as the lines, shapes, textures, colors, and scales that give the place its unusual appearance.

Object of Study:

- 1- Transforming Hazarmerd Cave site into natural tourist places through landscaping in Sulaymaniyah province for research.
- 2- Providing an engineering survey of the area map to provide the necessary information to the competent authorities for the purpose of planning and drawing policies on how to preserve the environment and provide a complete

natural tourist area in terms of all recreational activities in Sulaymaniyah Governorate at the level of Iraq and developed countries.

- 3- Presenting conclusions and suggestions on how to transform places into natural tourism in a precise engineering and agricultural way and we applied criteria such as original diversity in use, size or tourist attraction to people.

Case Study:

Hazarmerd site has an ancient culture and history, as it is close to the city of Sulaymaniyah (about 13 km). It is located at N35° 29'39.22' latitude and E45° 18'37.66' longitude, at an altitude of 1200 m from sea level, figures (1, 2, 3, 4). As we know, park planning and design always begins with the identification of the site, and the figure (5,6) indicate the historical and cultural significance of the site.



Fig (1) hiking recreation activite



Fig (2) authors at data collection



Fig (3) cave room



Fig (4) clambing recreation activity



Fig (5) research site



Fig (6) shows a stone hand-axe

Data Collection and Information:

A study was conducted accurate information about the site sample, from (March 2021 to March 2022), It was continued to collect information by visiting the sample location. Collecting this data entailed four different steps, which involve observation, questionnaires, personal interviews and analysis of the architecture plans.

1- Personal note:

Many different times were spent at the sample site. The following results were obtained after trying to study the reality of the caves and the places surrounding the caves, their components and their impact on the complexes:

- a) Access to water and natural water
- b) Soil type for cultivation
- c) Native plants, open spaces and green areas are all important.

However, plants are living organisms and their importance in landscape design is supposed to be taken into account for their suitability. The appropriate plant for the chosen design must account for a set of important determinants such as soil, rain, heat cycling, wind, etc. Therefore, it is necessary to use plants that are native to the site that is being developed into the landscape. The plants in the lower table (1) are a sample of the natural plants found in the research area.

Table (1) Plants Found in Hazarmerd Researchers Work

Tree	<i>Ficus carica</i> cultivated, <i>Crataegus monogyna</i> , <i>Juglans regia</i> , <i>Ficus carica</i> , <i>Morus alba</i> , <i>Montpellier Maple</i> , <i>Periploca graeca</i> , <i>Pistacia khinjuk</i> , <i>Populus nigra</i> , <i>Quercus infectoria</i> , <i>Salix acmophylla</i> , <i>Prunus microcarpa</i> , <i>Loranthus europaeus</i> , <i>Prunus amygdalus</i> .
Shrub	<i>Paliurus spina-christi</i> , <i>Prunus mahaleb</i> , <i>Prunus arabica</i> , <i>Rhus coriaria</i> , <i>Pyrus syriaca</i> , <i>Solanum nigrum</i> , <i>Rubus sanctus</i> , <i>Lonicera arborea</i> , <i>Rosa canina</i> , <i>Rosa elymaitica</i> , <i>Celtis australis</i> , <i>Punica granatum</i> , <i>Prunus brachypetala</i> , <i>Vitis vinifera</i> .
Herb	<i>Adonis microcarpa</i> , <i>Achillea aleppica</i> , <i>Allium akaka</i> , <i>Allium atrovioleaceum</i> , <i>Allium phaneranthum</i> , <i>Anthemis pseudocotula</i> , <i>Colchicum kotschy</i> , <i>Geranium stepporum</i> , <i>Lepyrodiclis holosteoides</i> , <i>Muscari neglectum</i> , <i>Silene commelinaefolia</i> , <i>Rosularia sempervivum</i> , <i>Thymus eriocalyx</i> , <i>Pterocephalus scpyrethrifolius</i> , <i>Delphinium kurdicum</i> , <i>Veronica anagallis-aquatica</i> , <i>Tulipa systola</i> , <i>Xeranthemum annuum</i> , <i>Chaerophyllum crinitum</i> , <i>Punica granatum</i> , <i>Veronica polita</i> , <i>Verbascum</i> , <i>Veronica bozakmanii</i> , <i>Silene montbretiana</i> , <i>Anthemis cf haussknechtii</i> , <i>Adonis aestivalis</i> , <i>Portulaca oleracea</i> , <i>Rheum ribes</i> , <i>Portulaca oleracea</i> , <i>Delphinium micranthum</i> , <i>Veronica orientalis</i> , <i>Veronica bozakmanii</i> , <i>Puschkinia scilloides</i> , <i>Anoplon coccineum</i> , <i>Epilobium hirsutum</i> , <i>Ornithogalum iraqense</i> , <i>Tripleurospermum microcephalum</i> , <i>Tragopogon porrifolius</i> subsp. <i>longirostris</i> , <i>Hyoscyamus reticulatus</i> , <i>Veronica macrostachya</i> subsp. <i>Pterocephalus</i> sp nov aff <i>kurdicus</i> , <i>Papaver cylindricum</i> , <i>Alcea kurdica</i> , <i>Papaver armeniacum</i> , <i>Anemone coronaria</i> , <i>Orobanche anatolica</i> , <i>Ammi visnaga</i> , <i>Prunus argentea</i> , <i>Rhamnus kurdicus</i>

Source: Researchers Work

2. Analysis of the Architecture Plans:

For the purpose of creating and studying the landscape, it is necessary to have architectural plans for each site [7], although there are no previous plans or designs for the study site, it

is necessary to create an appropriate planning and design for the study site.

But traces were found in the area of part of the caves as human weapons (hunting weapons) as shown in Figure (6) showing a stone ax dating back to the Paleolithic era that was

found in Hazarmerd Cave now and is in the Sulaymaniyah Museum in Iraq as a result of tracking work in Cave by researcher Dorothy Carrod in (1928).

3. Personal interviews:

The study invited research on the opinions of many architects, surveyors, tourism professionals, tourists and people who love the site, and I met with specialists in Sulaymaniyah Municipality.

4. Questionnaire:

Is a direct method of communication and a crucial tool in design studies since it guarantees that the questions asked are answered clearly[6]. Four basic methods exist for submitting questionnaires:

1-Postal: due to the fact that the essential questions are delivered directly to the target respondents, surveys are both simple and economical.

2-Online: are a passive kind of communication that may be available to the majority of any community.

3-Telephone: Interviews provide participants the opportunity to ask questions quickly and carefully regulated.

4-Face-to-face: typically, interviews include visiting a carefully chosen sample of the target population in their homes. Therefore, to improve these areas and turn them into natural tourist areas with recreational services, opinions and information should be taken through a questionnaire. The research required the distribution of 100 questionnaires collected between March 1 and August 1, 2022. After collecting and analyzing data from architectural plans, survey answers, visual analysis of observations and visiting and conducting research at the Hazarmerd site.

A - Studying the environmental factors of the site:

Including climatic factors and soil - Climate: The majority of research show that green spaces can actually be cooler than non-green ones. Urban materials and green space are

distinct from one another in terms of irradiation, temperature, and humidity[8]. Urban environmental design uses the ability of green space to create shade, lower air temperature, and enhance air quality. Evapotranspiration, which cools the leaf and the air temperature around it through energy consumption during the phase shift of water, is the primary method of greening an area that lowers temperature. In addition, it can intercept solar radiation and lower surface and air warming by shadowing[9]. Climate information has been completed The study site was collected from the Weather Forecast Department in Sulaymaniyah, which included data Years (2000-2019) temperature, humidity, precipitation and wind. (table 2).

- **Temperature:** The most suitable environment has moderate temperatures and relative humidity, averaging 12-25 degrees Fahrenheit (degrees Fahrenheit) and 40-60 (percent) humidity. Table (2) indicates that there are significant variations in the average monthly temperature, which are evident from month to month.

- **Relative Humidity:** with an average temperature of 12-25 degrees Fahrenheit and a humidity of 40-60 percent. Table (2) indicates the impact of the study area on the Mediterranean climate, which is characterized by mild winters and hot summers. The research region is distinguished by a significant change in relative humidity rates, which peak at 91.4 percent in January and fall to 39.8% in July. The humidity rates change according to the seasons, and are acceptable for the activity in both winter and summer.

- **Wind:** is described as the passage of air in either a vertical or horizontal direction. In the summer, the primary direction is northwest, whereas in the winter, the predominant direction is northeast. A negative component that influences the temperature of

areas and the rise in air temperature if they are from hot regions.

- **Rain and Precipitation:** is a significant climatic feature in the studied area. The northwest winds, which fall in abundance, especially on the mountain slopes, create the cyclonic showers. The flow of rainwater in the valleys also contributes to the area's

spectacular landscapes and seasonal water springs.

- **Solar Irradiance** the longest day in the year is in June (14.25 hours) and the shortest day is in December (9.85 hours). In November and February, direct solar radiation in the city reaches its lowest point, while in August it reaches over 720 Wh/sqm..[10].

Table (2) Monthly Average Maximum Temperature for The Study Area 2000 – 2019

Months	Maximum Temperature	Minimum Temperature	Relative Humidity	Wind Rates	Rain Rates/mm
Jan	9.5	4.6	91.4	1.8	84.7
Feb	11.8	5.6	88.8	2.6	63.22
Mar	16.6	9.5	81.5	1.9	52.31
Apr	23.6	14.3	79.9	2.4	63.98
May	27.7	20.1	68.1	2.8	45.38
Jun	35.4	26.4	45.5	2.7	0
Jul	39.3	28.2	39.8	2.5	0
Aug	39.2	27.7	41.6	2.5	0
Sep	35.4	22.4	42.1	1.6	63.22
Oct	28.3	18.6	58.7	1.8	63.42
Nov	19.8	11.3	77.5	1.4	43.8
Dec	12.5	7.5	83.7	1.6	63.22

Source: Data of The General Authority for Meteorology for The Sulaymaniyah –Iraq

- **Soil Characteristics of the Site:** The park site's soil features include: The research site is distinguished by its difficult terrain and the presence of high mountains. Most mountains have a complicated curve with a steep slope of their surfaces, as well as deep joints and fissures, frequently near to buckling, that aid in the broadening of mountain blocks, causing the valleys that separate them to grow steep and narrow at the same time. The geography of the mountains of the study area for the mountain-building alpine motions between

the folds of the rocks, there are numerous fissures and fractures, as well as caverns and caves.

- **Soil Testing:** The soil acidity (pH) in Sulaymaniyah region is between 7.6 to 7.8 and the amount of calcium carbonate is between 169.5-228.2 g/kg, the degree of electrical conductivity is 1.65-1.54 Dis Siemens/m. Despite the fact that the soil's class and texture are both clay and that its organic matter content ranges from 2.1 to 7.77 grams per kilogram, table (3)[11].

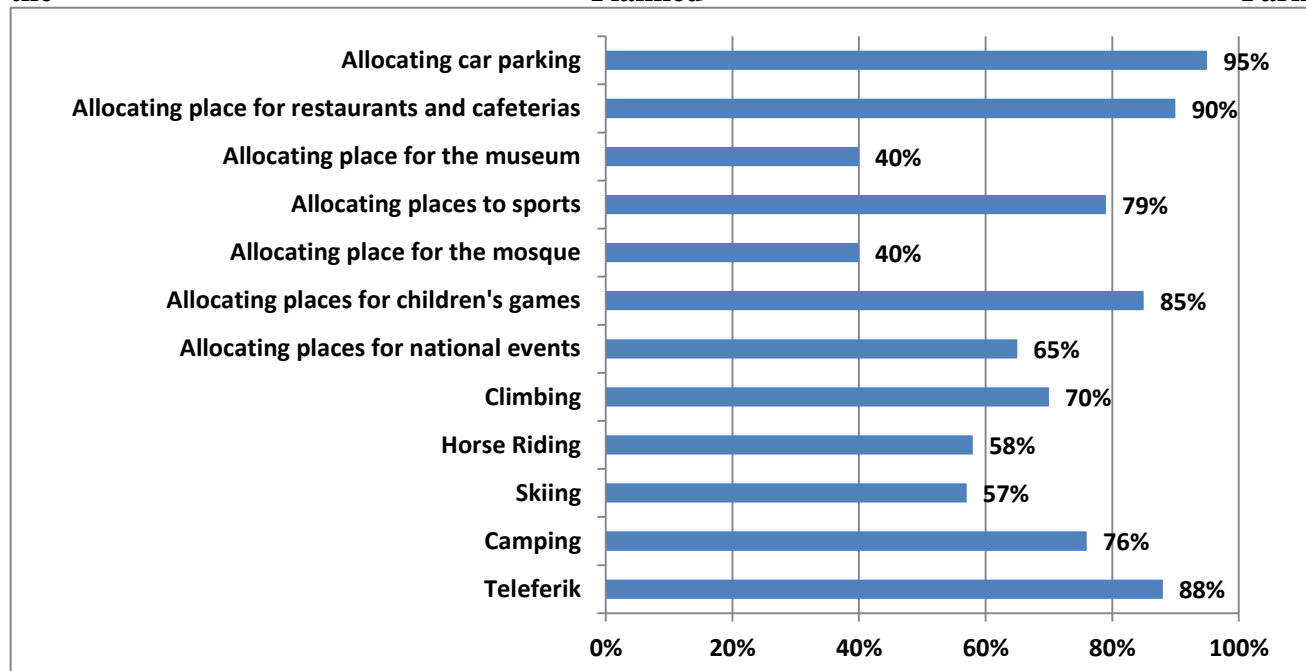
Table (3) The Results of Soil Analyses of Hazarmerd Location

PSD gm kg ⁻¹			Text clas s	P H	Ec2 dSm ⁻¹ at 25°C	Type of structur e	O.M. (g/kg)	CaCO ₃ %	Soluble cation meq/L			
San d	Silt	Cla y							Ca ⁺ 2	Mg ⁺ 2	Na ⁺	K ⁺
1.38	36. 7	61.9	SiC L	7.7	0.69	Ang. Blocky	2.28	24.8	5	3	0.2 2	0. 1

Source: researcher work

B- Recreational needs for heritage Hazarmerd: nowadays, most of the successful open spaces designs are those that cater to the recreational needs of their visitors. for the open spaces The design to achieve its goals the needs of tourists and nature lovers and the historical cultural places[12], some interviews were conducted and opinions were taken . And the questionnaire was conducted on a random sample of a certain percentage of the population of the city of Sulaymaniyah in this way, more than 150 questionnaires were distributed to citizens, and from this number,

the answer reached about 100. After the process of collecting the forms, I immediately began to unload the information and extract the necessary data for research and transfer it in the proportions as shown in table (4). The sample of the respondents consisted of 47.5% females and 52.5% males, and the majority of them were educated and working people. College graduates by 40.7%. The comments of respondents about the inclusion of elements and recreational activities inside the planned park.

Chart (1) The Respondents About the Inclusion of Elements and Recreational Activities Inside the Planned Park

Source: researcher work

Results and Discussion:

A-Park Site: the site chosen to build the proposed park is very suitable for its proximity to the city, ease of access, and the location of the park is high relative to the city level of Sulaymaniyah at the city level (882) meters above sea level and the level of the park is (1100) meters above sea level and the park road is surrounded by beautiful farms in front of the site two villages (Hazarmerd Village, Deacon Village) In the background of the park is the Brannan mountain range, and the environment of the site, which is why the park site meets most of the criteria used in the selection of park sites[14].

there are a group of archaeological caves including (Treka, Balkan, Hazarmerd,). The environment of the city will change in the future for the abundance and diversity of plants[13], which has a significant role in lowering summer temperatures and improving the environment of the region by giving fresh air to the site, in addition to using water in various forms (such as fountains, aquariums, and waterfalls that fall from passers-by). From the top of the caves to the bottom they play a good role in improving



Fig (7) location of Hazarmerd
<https://www.google.com/maps>



Fig (8) location of Hazarmerd
<https://www.google.com/maps>

B- The Environmental Factors: while studying the weather factors at the park site, appear that the continental climate is hot. Also dry during the summer and cold and wet during the winter there is a big difference between the relative temperatures and humidity during the summer and winter, so you must choose a native plant that is tolerant to a wide range of high and low temperatures and tolerant sometimes in winter times it is in cold waves the temperature reaches (4.6) as shown in the table (2) and the use of this type of plant reduces the water need of the plant. Now the original plant type is adapted to the weather and the lack of water in the summer. This must be taken into account, so it is preferable to take advantage of most trees and

shrubs.[9] Indigenous plants or plants resistant to environmental conditions in the site[15].

C- Recreational Needs of The City Residents: through the results of the questionnaire (Table 3), it was found that 90% of them prefer to develop and design the site of Hazarmerd Park and take care of it and turn it into a heritage and natural area, as 66% of them who have previously visited the area, and 88% would like a family visit to a park and (50 %) of them like to visit the park with their friends, and these visits are distributed according to the seasons, so that they are more Desirable seasons to visit are spring and autumn, with rates of 74.76% and 13.6 percent. They like to visit the park in all

seasons. This data indicates the need to equip the park with plants whose beauty will appear during the spring and autumn, because it is the most frequent season in which visitors visit the park. through results Analysis of the questionnaire forms in table (3) shows the sequence of recreational activities preferred by the residents of the region and the city, so that a special place for parking is 95%, then there are places for restaurants and cafeterias for 90%, and then the cable car comes in 88% that it ranks third, and they must take into account the design process. Also the city games, a place for families and a place for cycling are ranked fourth. The place for teaching and mountaineering ranks fifth. Thus, the recreational activities were arranged such as the place A place for roaming and walking, yards of lawns and flowers, a place for daily exercises and fitness, places for running, comfortable and nature tours. These results will be taken from the desires and needs of the leisure time of the population Consideration when designing the park, in order for the design of the park to represent the views of the city's residents and meet their recreational needs and desires, so that the citizen feels that he is participating in the construction process even with his voice[16].

Conclusions:

- 1- The intention behind creating the park is one of its success aspects.
- 2- Parks take their developments from the needs and activities appropriate to the park and its users.
- 3- parks play a major role in climate adaptation and treatment of many modern environmental problems and psychological and physical diseases. All members of the community can use the open scape and benefit from each and fulfill their hobbies.
- 4- The first criteria for choosing a park site is to study the human and cultural elements,

the natural and environmental sources of the site, as well as the sources related to the cognitive and visual characteristics of the site.

- 5- Sulaymaniyah is one of the beautiful cities, and it is famous for its picturesque space, as well as its lively residents, who live life and live in luxury, and this is what the results of the survey showed.
- 6- The influence of the site and its surroundings on the environment must be taken into account while developing landscape. Factors, recreational demands of inhabitants, local customs and traditions, and building costs
- 7- The multi-activity park's (18 recreational activities) design is suitable, and the region has a tradition of historical natural spaces. The design is in the modern style.

Recommendations:

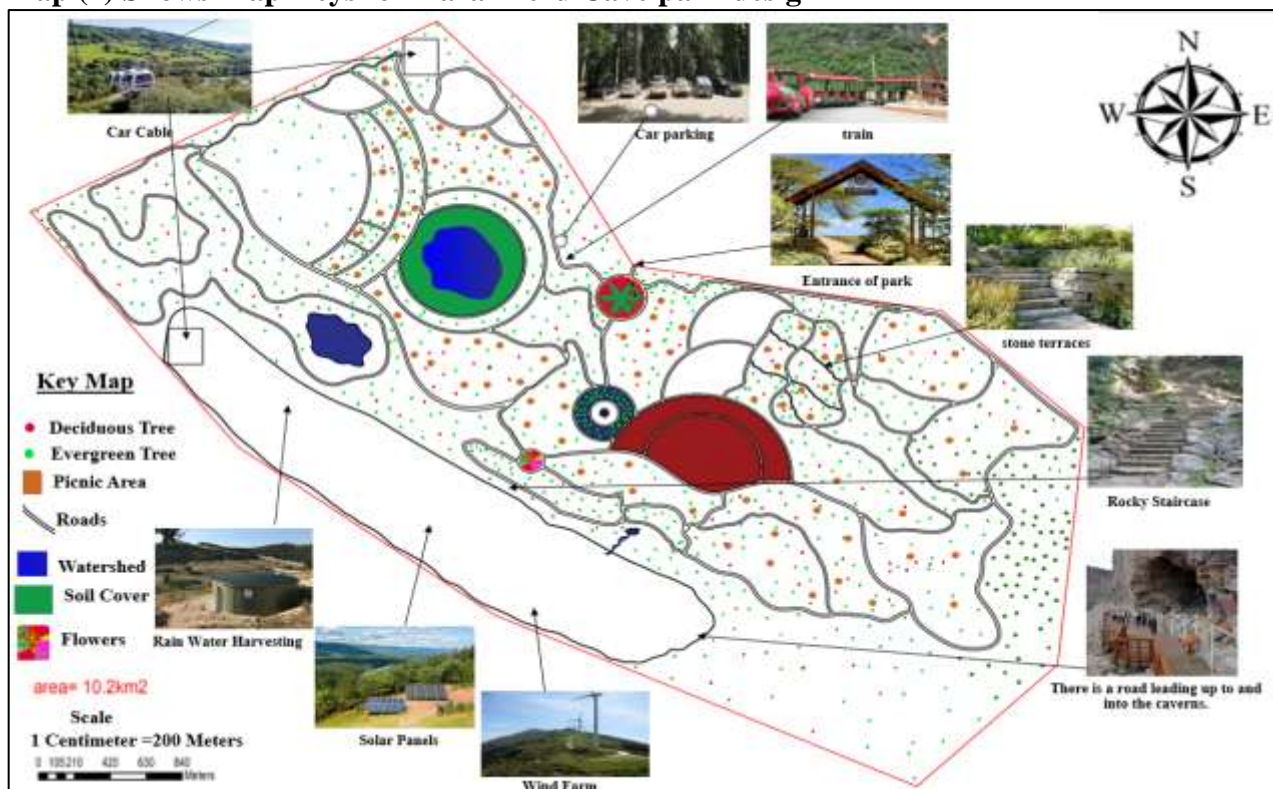
- 1- Supposedly when setting up parks in places outside cities but close to cities to be a source of breathing and entertainment for all segments of society, and this is done through careful study of climatic conditions and designing them in proportion to the desires and recreational needs of the population.
- 2- The necessity of studying the harsh environment of the country and its problems, paying attention to the selection of national plants in designs, and paying attention to the use of fans that generate electricity. This leads to rainfall and rainwater is used again for watering plants in the hot and dry months.
- 3- As landscape designs are the civilized face of any nation, we also advise conducting more scientific research on the natural cultural archaeological places, creating appropriate designs, analyzing the locations, and turning them into readily accessible natural tourism destinations.

D-Suggested design for Hazarmerd cave Park

In the last stage of the research, the results, conclusions and recommendations of the research were translated, and the results of a number of field visits and repeated observations of the park site were taken into account to take the necessary measurements. On the basis of scientific research,[17] one of the best cultivation of native plants due to its many benefits and its tolerance to all harsh conditions of the climate, from extreme heat in

summer and freezing in winter, the plants that selected in map (2) To search so that the research reached a detailed proposal design under the name Hazarmerd cave Park shown in Map (1). And based on the questionnaire and the opinions of the specialists, recreation activates suggested that the recreation in the parks is the necessary part and the aim of the tourists in visiting the parks to have an enjoyable time, map (3).

Map (1) Shows Map Keys for Hazarmerd Cave park design



Source: researcher work

Map (2) Shows Hazarmerd Cave park design for Trees and Plants



Source: researcher work

Map (3) Shows Activities in the Hazarmerd Cave park design



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