

Designing a Hydrotherapy Complex on Shiraz's Salt Lake with an Approach to Physical and Psychological Health Enhancement

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ABSTRACT

The present study aims at designing a hydrotherapy complex on Shiraz's salt lake with an approach to health enhancement. The study is an applied research. 248 experts, psychologists, locals of Sarvestan County and tourists visiting Maharlou Lake were randomly selected. The results indicated that hydrotherapy sports can cause tranquility and feeling of security, happiness and cheerfulness. Also, psychological pressures are resultantly controlled and healthiness feelings are strengthened through the creation of cheerful and lively environment.

Key words: *hydrotherapy complex, salt lake (Maharlou), physical and psychological health*

1. INTRODUCTION:

Psychological and neural pressures are increased everyday by life's mechanization and the daily life stresses are consequently being heightened. These problems have made the experts and specialists use sports as a vaccine for treating the physical and psychological diseases because sports is one of the simplest, less dangerous, less costly and most natural ways of coping with physical and psychological problems [4].

Somatic diseases disorder the physical ability and performance of the individuals and lead to the reduction in self-confidence and hopefulness. Since patients cannot keep their normal physical efficiency during the somatic diseases and many of their activities are limited, they might undergo anxiety, anger and depression hence suffering psychological pressure and psychological crises. Under such circumstances, the individuals are rendered psychologically susceptible following which the infliction with psychological disorders would be quite probable. The individuals enjoying physical and psychological healthiness feel happier and the happy individuals, as compared to the depressed ones, may less frequently sustain disease and death.

Playing sports in water causes reduction in palpitation, heart's workload and amount of oxygen

consumed during the movements in contrast to the playing of sports on land. This method features preserving and preventive effects for the individuals suffering skeleton pains, joint pains, muscular pains and/or individuals who have been subjected to surgery, as well [3]. Individuals enjoying good physical and psychological health feel more happiness and the happier persons are less inflicted in contrast to the depressed individuals with diseases and the mortalities resulting thereof [2]. Hydrotherapy can exert positive effects on pain, stamina and skeletal-muscular flexibility, performance, self-confidence, balance and body fitness and reduction in diseases' relapse in such chronic ailments as rheumatism, back pain and, also, in central nervous system's diseases like MS, brain infarction and so forth [3].

In this research, measures have been taken in line with siting the hydrotherapy service centers seminally based on such indices as the land uses consistent with the hydrotherapy complexes, access to the urban passageways, closeness to the residential centers and proper distance to the industrial and workshop centers and being situated on the elevations in the city downsides for the easy discharging of surface water; then, the proposed sites were marked on the city maps considering the position of the current hydrotherapy centers as well

as the status quo of the land uses. Usually, the movement to and from the hydrotherapy centers is carried out in groups and a large population goes to hydrotherapy centers during certain days. Therefore, safe and proper access to these centers is of a great importance and, in order to accomplish this goal, the hydrotherapy complexes should be placed near the arterial routes.

In relation to the establishment locality of the hydrotherapy complexes, one of the required scales is their being away from the interfering land uses such as repair shops, industrial-workshop centers and contaminating land uses. Therefore, the present study adds to the weight of the lands suitable for the establishment of hydrotherapy complexes in respect to the distance from these centers.

Therefore, it is necessary to pay attention to this idea that the sports space should be appropriately sited along the domain of the city. The construction of new sport spaces necessitates scientific and precise siting studies and, ignorance of this issue, causes wastage of budget, time and energy besides rendering the constructed space ineffective and, more importantly, it directly influences the future performance of the complex and it, especially, adversely influences the quality of the sport programs and healthy recreations. The optimal siting tries regulating the indices and the factors influencing the decision-making and the offering of logical solution and, contrarily, consideration of these cases can assist the decision-makers and the planners in their selection of the places fitting the performing of such activities. Based thereon, the present study aims at designing a hydrotherapy complex on Shiraz's salt lake with an approach to physical and psychological health enhancement.

2. Theoretical Foundations:

2.1. Hydrotherapy:

Hydrotherapy means treating the diseases by means of water and it has been a method also used by the primitive tribes as well as the civilized nations. This subject has been exaggerated and drinking of a lot of water has been recommended in medicine for certain diseases like renal calculi, diarrhea or heatstroke and it only causes the compensation of the lost water and dilution of urine. Even wild and domestic animals have figured somehow out that they should drink more water when becoming sick. Correct consumption of water not only can keep us healthy but it can also return health following its loss or emergence of disorders through cleansing the body residues.

The world tourist organization defines health tourism as the use of services that lead to the improvement or enhancement of health and individual spirits (through the use of minerals, water and air, natural factors and environmental availabilities or medical interventions) and that are provided in places outside the residence places and last for more than 24 hours. In other words, "health tourism" is the providing of cost-effective medical facilities and services in balance with tourism industry to the individuals who travel to the other countries for surgery, recreation and relaxation and/or other treatments. Of course, it has to be asserted that health tourism is a topic that goes beyond medical tourism and includes such other topics as relaxation of the body and soul, use of natural facilities and hot and mineral waters, as well.

2.2. Physical and Psychological Health:

WHO (2004) defines psychological health as a state of wellbeing in which the individual can recognize his or her abilities and use them effectively and generatively for being useful to his or her immediate community. In general, psychological health is the creation of healthiness by preventing the infliction with psychological diseases, controlling the factors giving rise to the ailments, early diagnosis, prevention of factors contributing to the relapse of the psychological diseases and creation of healthy environment in which proper and correct human relations can be established [6].

Health includes the enjoyment of complete physical, psychological and social comfort and it is not just being not inflicted with any disease and disability (John Lest). Interestingly, Hakim (Sage) Nezami has applied such a figure of speech as brachylogy in his book of Panj Ganj to summarize WHO's long definition of health and healthiness in two words, i.e. healthiness in a land brings comfort about (healthiness=comfort). WHO's definition is rather idealistic and it is not practically achievable because no person can be found considering the definition that can be completely healthy in all three physical, psychological and social aspects. In the meanwhile, no border can be set between health and disease in practice. In fact, this definition is like a very elevated apex that cannot be conquered by anyone but every individual should be endeavoring to reach it and, on the other hand, a spectrum should be specified for health level [7].


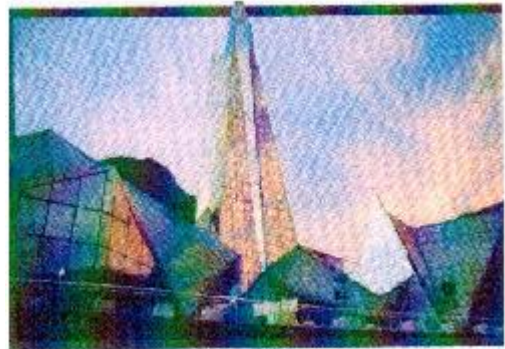

Nowadays, sports have drawn a lot of attentions from sport medicine and psychotherapy experts for the treatment of the psychological and mental disorders. Psychological and neural pressures that


are being increased everyday with the mechanization of life as a result of which daily stresses are also increasing have caused the experts and specialists to use sports as a vaccine for treating the physical and psychological diseases because playing sports is one of the simplest, less dangerous, less costly and most natural ways of fighting with physical and psychological problems [5].

Based on the studies by the national psychological hygiene association, individuals with good psychological health have the following properties: they feel comfort, they accept themselves the way

they are, they enjoy their talents; they feel little anxiety, fear, worry and envy and they are self-confident; such individuals' value system originates from their own personal experiences; they feel good about the others; they pay attention to the others' interests and they feel responsibility for them; they do not try to dominate the others; they face the problems and feel responsibility for their own actions. They shape their own environment as they want to the maximum possible extent and they try to become consistent with it to the required rate [1].

Table 1: hydrotherapy samples

Row	Complex's name	Image
1	Baden Baden Hydrotherapy Complex, Germany	
2	Calda hydrotherapy complex	
3	Hot Water Spas, Ardabil Province, Iran	

4	Shabil Hydrotherapy Complex	
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3. Study Method:

This study is an applied research that has been carried out through library investigations and field observations. Moreover, the study is categorized as descriptive research in terms of the nature and method thereof. The study population included the experts, psychologists, locals of Sarvestan County and tourists who were visiting Maharlou Lake. 40 patients have been considered in every center on average and 6 of these centers were selected for this study so as to reach the intended study sample volume. Thus, the study sample volume includes 248 patients who have been selected based on Cochran's formula using a simple randomized method.

Library research has been the method of choice herein for gathering information about the study background and the study literature. Referring to the accomplishments and documents, articles, dissertations as well as internet database, the required data were collected. Furthermore, field observation was used for collecting the intended information from the study population; several techniques and tools like questionnaire, interview and observation are also utilized for gathering information. In this research paper and for collecting information from the study sample volume, use was made of questionnaire.

In this research and in order to investigate the questionnaire's reliability, use was made of Cornbach's alpha coefficient. Based on the study results, the amounts obtained for Cronbach's alpha coefficient are equal on average to 0.842 which is larger than 0.7 indicating the confirmation of the questionnaire's reliability. As for the validity, experts' ideas were inquired through questionnaire so that the validity can be increased to an optimum level. The inferential analysis of the findings has been conducted based on inferential statistics

through such tests as Student's t-test, binomial test and variance analysis. Friedman's method has been applied herein for prioritizing the effective factors related to the physical-psychological revitalization approach.

3.1. Study Area:

Maharlou is a village in Kouhanjan District of Sarvestan County. Maharlou lake, named after the village and located in its vicinity, is the most important natural attraction of the region and one of the most fascinating natural attractions of the country. The hot water spas, Khadijeh Banou holy shrine, Shah Abbasi caravansary, eastern heap, the castle of Shahrokh, son of Timur, the lame and Bibi Sharifeh Khatun's mausoleum are amongst the most beautiful tourism attractions of the village. Amongst the other tourism fascinations in Maharlou Village, Maharlou hot water spas can be pointed out. They are situated in the southern section of the village and the water of them is mostly healing for skin diseases. Chenar Mount, positioned in the southern section and within several kilometers from the village amidst the mountains of Maharlou, is covered by old buttonwood trees granting a special landscape to the region. Bagh Heidar is a garden in the southwestern side within one and a half kilometers from the village. Abkhuni aqueducts are in the southwestern side of Maharlou region enabling the irrigation of the gardens on the western side of the region. Abbarami is on the southern section of the village. Abdangaki is situated on the southern section of the village. Amongst the springs with low water, Abbaghak in the southeastern, Gharjegheh in the south, Shamsu'e in the middle of the mountain and Muhammad Khalu in the west can be pointed out.

Maharlou Lake, also named Mahlou, Mahlouyeh and Mahlouyeh, was previously called Jankal or salt lake. It is in Sarvestan County, one of the lakes in

Fars Province, Iran. Maharlou Lake is positioned in N2927 E5248 in Fars Province, Iran. It is located within an 18-km distance in the southeastern side of Shiraz. The lake is 1460 meters above the sea level and it is three meters in depth at most. Due to the same reason, the evaporation rate is very high and part of its ground is covered with a layer of salt consequently and there is water only in the northern and central sections which are very shallow (50cm at most) with the water being very salty. The water of this lake is supplied by rivers and waterways that are discharged therein from northwest and southeast. Its area is different during the various seasons and it is a function of the precipitations. Apart from the large deal of evaporation, the gypsum sediments of Sachun Formation and the two salty domes on the east of this lake play a considerable role in the extreme salinity of this lake. Sultan Abad and Khoshk are the two rivers that feed Maharlou Lake. Water also pours from several springs into this lake mainly from the western and northern sections.

The water of this lake is of sodium-magnesium chloride and sodium sulfate (2MgCl, NaCl and SO_2N_4); this lake's salt is used for petrochemical industries. In the meanwhile, the high amount of potassium and, particularly, magnesium in the brine water of Maharlou Lake has made it economically feasible to extract magnesium salts as the main produce and potassium as the secondary produce.

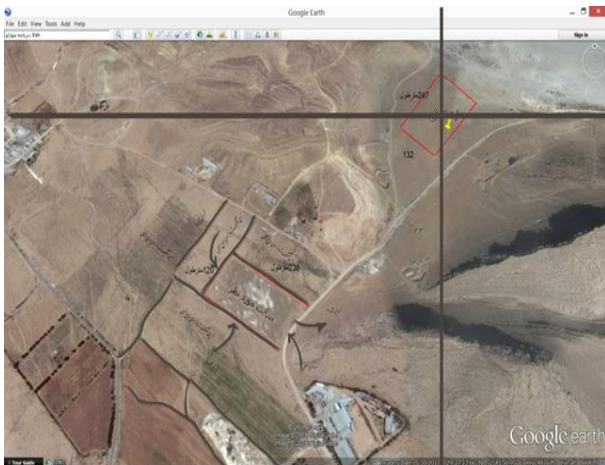


Figure (1): the position of the studied site

4. Findings:

The results indicated that the study sample volume is comprised of 97 women (39.11) and 151 men (60.89). 31 to 35 was the highest frequency of age range. Based on the observations, 70 individuals (28.23%) fall in this age category. The recreation has been found as the highest frequency for the reason why attending the region. In order to investigate the normality of data distribution, use

was made of Kolmogorov-Smirnov test the results of which have been given in table (2).

Table 2: results of Kolmogorov-Smirnov and Lion tests

Index	Kolmogorov-Smirnov Test	
	Statistics	Significance level
Hypothesis One	1.071	0.201
Hypothesis Two	0.863	0.446
Hypothesis Three	1.201	0.112

Considering the test results' insignificance for all of the studied variables ($P\text{-value} < 0.05$), the data distribution normality is affirmed.

Hypothesis One: it seems that hydrotherapy sports can cause tranquility and feeling of security, happiness and cheerfulness and, on the other hand, the psychological pressures are resultantly controlled and healthiness feelings are strengthened through the creation of cheerful and lively environment.

Table 3: the results of one-sample t-test for investigating the first hypothesis (scale mean=3)

Mean	Standard deviation	t- statistic	Degree of freedom	Significance level
3.1309	0.74331	3.450	383	0.001

Based on the findings in table (3), the mean value of the studied index is 3.130 ± 0.743 . The t-statistic is equal to 3.450 and the significance level is 0.001 and, considering the fact that it is smaller than 0.05, the test is significant in 95% significance level meaning that there is a significant difference between the index's mean value and the scale's mean value. So, according to the fact that the index's mean is larger than the scale's mean, it can be stated that the present hypothesis is confirmed as also approved by the study participants. This means that the hydrotherapy sports can cause tranquility and feelings of security, happiness and cheerfulness and, on the other hand, the muscular pressures are released and looseness and boredom are diminished and the psychological pressures and stresses are curbed by the creation of a lively and happy environment thereby to cause a feeling of healthiness.

Hypothesis Two: it seems that noises account for the largest share of bioenvironmental pollution. A calm environment away from the noises around Maharlou Lake's region in Shiraz can be an effective factor for confirming the construction hydrotherapy complex.

Table 4: results related to the one-sample t-test for the investigation of the second hypothesis (scale mean=3)

Mean	Standard deviation	t- statistic	Degree of freedom	Significance level
3.7461	0.81471	6.107	383	0.000

Based on the findings in table (4), the studied index has been found equal to 3.746 ± 0.814 with the amount of t-statistic being 6.107 and the significance level being 0.000; so, considering that it is smaller than 0.05, the test is significant in 95% level meaning that there is a significant difference between the index's mean and the scale's mean; hence, considering the fact that the index's mean is larger than the scale's mean, it can be stated that the present hypothesis is affirmed as also opined by the study participants meaning that it seems that noises account for a large quotient of the bioenvironmental pollutions in large cities. So, a calm environment away from the noises around Maharlou Lake's region in Shiraz can be an effective factor for confirming the construction hydrotherapy complex.

Hypothesis Three: it appears that the therapeutic properties of Maharlou Lake in Shiraz can be as a bioenvironmental ground effective in improving the physical diseases and create a strong potential in the economy cycle of the region hence it can be an effective factor convincing the designing of a hydrotherapeutic complex in Maharlou Lake's region in Shiraz for curing the psychological and physical diseases and enhancing the psychological and physical health.

Table 5: results of one-sample t-test for the investigation of the third hypothesis (scale's mean=3)

Mean	Standard deviation	t- statistic	Degree of freedom	Significance level
3.1576	0.76238	4.050	383	0.000

Based on the findings in table (5), the studied index has been found equal to 3.156 ± 0.762 with the amount of t-statistic being 4.050 and the significance level being 0.000; so, considering that it is smaller than 0.05, the test is significant in 95%

level meaning that there is a significant difference between the index's mean and the scale's mean; hence, considering the fact that the index's mean is larger than the scale's mean, it can be stated that the present hypothesis is affirmed as also approved by the study participants. Thus, it seems that the therapeutic properties of Maharlou Lake in Shiraz can as a healthy bioenvironmental ground be effective in recovering from the physical diseases and economically create a strong potential in the region's economy cycle. So, it can be considered as a factor convincing the designing of a hydrotherapeutic complex in Maharlou Lake's region in Shiraz and bringing about physical and psychological health for everyone.

The rates and weights of the studied sites have been given in the following table based on adjacency, providing overview from and over the site, access, noise and topography.

Table 6: the final weights of the Site One

Site selection factors	Indices' weights for site one	Indices' weights	Results of multiplying the indices' weights by the relative weights
Adjacency	0.199	0.117	0.014
Overview from the site	0.227	0.116	0.026
Overview to the site	0.448	0.213	0.095
Access	0.561	0.242	0.135
Noise	0.248	0.152	0.038
Topography	0.517	0.161	0.083
Sum	3.003	-	Final weight: 0.391

Table 7: final weights of the Site Two

Site selection factors	Indices' weights for site one	Indices' weights	Results of multiplying the indices' weights by the relative weights
Adjacency	0.678	0.117	0.079
Overview from the	0.246	0.116	0.029

site			
Overview to the site	0.240	0.213	0.051
Access	0.305	0.242	0.074
Noise	0.381	0.152	0.058
Topography	0.209	0.161	0.336
Sum	2.059	-	Final weight: 0.324

Table 8: final weights of the Site Three

Site selection factors	Indices ' weights for site one	Indices ' weights	Results of multiplying the indices' weights by the relative weights
Adjacency	0.212	0.117	0.0248
Overview from the site	0.476	0.116	0.0552
Overview to the site	0.311	0.213	0.0662
Access	0.133	0.242	0.0202
Noise	0.334	0.152	0.0507
Topography	0.275	0.161	0.0442
Sum	1.741	-	Final weight: 0.261

Based on the obtained results, Site One is in the highest rank amongst all the three studied sites.

4.1. Designing Process:

The land is 87.55×213.140 meters in dimensions and it has access from two sides to the street and from two sides to the mountains. Following the recognition of the climate and the lands' natural factors and the dominant wind direction, the designing was commenced. The total area of the land is 18660 square meters some ten percent of which has been considered as the occupied surface area. The ground floor would be 1760 square meters, the first floor 2438 square meters and the second floor 2194 square meters. The slope of the selected land is 1.5m from the beginning of the site to its end.

The air is circulated in the public places twice an hour. The temperature limit in these spaces ranges between 18 and 25 degrees centigrade with the relative humidity being from 20% to 70%. The pool section and wet space of the complex is constantly subjected to air circulation and fresh air replacement because the hot water contains sulfur and it is harmful for the health. The complex's stairs are 18cm in height outside it and 17cm in height inside it. The stairs are cm in surface area. The internal stairs serve access to the first floor and they are double sided. The minimum dimensions of the windows are 2×1.5m. The doors' are dimensions are 1×10 and they open outward in the highly crowded places. The lobby is situated on the ground floor in such a way that it surrounds the ground floor's space. The stairs on the ground floor are in a rotation state and there are two entrances; one towards outside and the other towards the suits. The waiting hall is along the lobby and it accommodates 80 persons. Coffee shop is directly accessible from the hall.

In the outside area, a beautiful and recreational place has been considered but with an elevation difference for walking. The vegetative cover in the complex has been planted through being inspired by Sarvestan County.

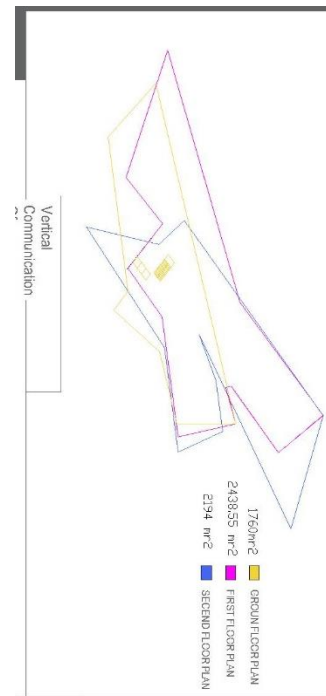


Figure (2): the plan of the spatial connections

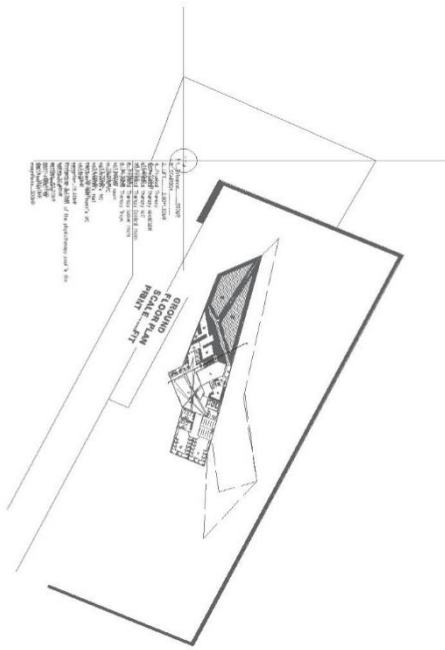


Figure (3): the ground floor's plan

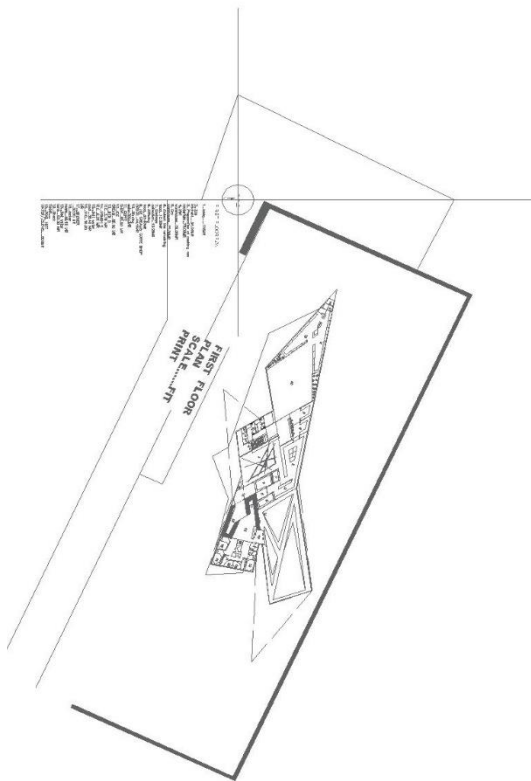


Figure (4): plan of the first floor

5. Conclusion:

The present study aimed at designing a hydrotherapy complex near Maharlou Salt Lake, in Shiraz, with an approach to the enhancement of the

physical and psychological health. Based on the results in regard of the second hypothesis, the studied index's mean is 3.130 ± 0.743 ; the t-statistic is 3.450 and the significance level is 0.001. So, considering the fact that the significance value has been found smaller than 0.05, it means that there is a significant difference between the index's mean and the scale's mean. The index's mean has been found larger than the scale's mean; thus, it can be stated that the first hypothesis is confirmed as also pointed out by the study participants so hydrotherapy sport can cause tranquility and feeling of security, happiness and cheerfulness and, on the other hand, it is in such cheerful and lively environments and use of hot water that the muscular pressures can be released and looseness and boredom can be diminished thereby to harness the psychological stresses and achieve healthiness in the physique and psyche.

Based on the study findings in regard of the second hypothesis, the index's mean has been found equal to 3.746 ± 0.814 ; the t-statistic is equal to 6.107 and the significance value is 0.000. so, considering the fact that the significance value is smaller than 0.05, the test is significant in 95% confidence level meaning that there is a significant difference between the index's mean and the scale's mean. Considering the fact that the index's mean is larger than the scale's mean, it can be stated that the second hypothesis is affirmed as also stated by the study participants. This means that noises account for a large share of the bioenvironmental pollutions in the large cities. A calm environment away from noises around Maharlou Lake in Shiraz is convincing enough for the construction of hydrotherapy space.

Based on the results regarding the third hypothesis, the studied index has been found equal to 3.156 ± 0.762 ; the t-statistic is equal to 4.050 and the significance value is equal to 0.000; so, considering the fact that this significant value is smaller than 0.05, the test is significant in 95% confidence level meaning that there is a significant difference between the index's mean and the scale's mean. So, it can be stated according to an index mean larger than the scale mean that the third hypothesis is affirmed as also mentioned by the study participants. This means that therapeutic properties of Maharlou Lake in Shiraz can as a healthy and sound bioenvironmental ground be effective for recovering from the physical diseases and creating a high economic potential in the region's economy cycle. Therefore, such therapeutic properties should be viewed as factors influencing the designing of

hydrotherapy complex in Maharlou Lake's region in Shiraz for even the sole reason of the physical and psychological health enhancement.

Nowadays, sustainability has been extensively accepted as a fundamental approach for any sort of development, including tourism development; in social and environmental discussions, sustainable recreation has been posited as a novel concept for fighting with the devastating effects of the inconsiderate tourism development. Sustainability of touristic landscapes in recreational regions and resorts entails the systematic paying of attention to the technical, cultural, political, economic, historical and bioenvironmental dimensions in a move towards the use of tourism attractions in match with the today's needs and preservation of these resources for future. The resort around Maharlou Lake, as well, possesses tourism-recreational attractions and a high ecological power to fit the fascination of the tourists. It is evident that the recreational amusement of the environment in the periphery of the lake necessitates the protection of the natural resources, minimum harm to the nature and observance of the principles of sustainable development in tourism.

Therefore, considering the special potentials of Maharlou lake as well as the elimination and diminishment of the problems and challenges related thereto are strategies for development of the recreational landscapes in this region but with careful consideration of the ecology and vernacular conditions thereof. These strategies are expressive of such fundamental concepts as the use of unique and native abilities and signs of the site, creation of interaction between the site and the users, revitalization of the agricultural landscapes and paying attention to the ecology and the vegetative cover of the region that all form the primary sustainable grounds of tourism in Maharlou region.

Forghani et al (2009) investigated the concentration of the heavy metals in the sediments of Maharlou Lake. Their results indicated that, amongst the other heavy metals, the concentrations of such metals as nickel, chromium, zinc, lead, copper, cadmium and arsenic are high and respectively equal to 78.3 mg/kg, 12.8 mg/kg, 38.2 mg/kg, 37 mg/kg, 29 mg/kg, 4.4v and 2.26mg/kg. They also expressed that the northern sections of the lake are a lot richer in terms of the heavy metals' concentrations. The primary reason for such a concentration increase, they say, is the entry of the urban and industrial wastewater from Shiraz into the northern sides of the lake through the stream of Shiraz's Khoshk River. The results obtained from the comparative

study of the concentrations are indicative of the low level of metals' concentration in the salt of the lake in contrast to the sediments thereof. However, their investigations' results demonstrate that the concentrations of these metals are larger except for nickel in the northern sections than the central and southern parts.

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