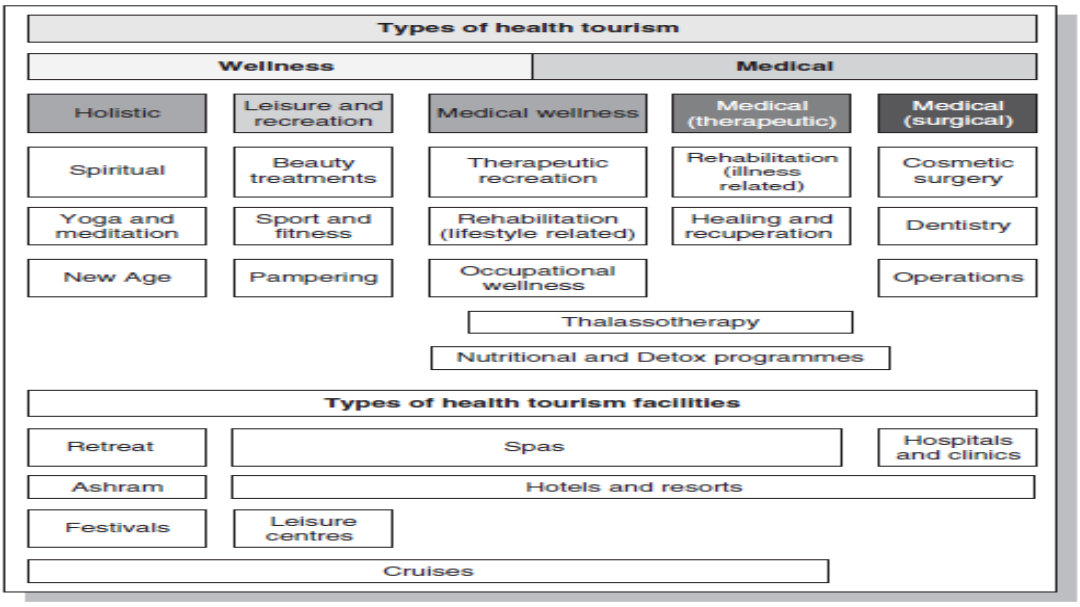
# Optimized site selection for a health themed recreational city

## Introduction

The International Union for Official Tourism Organisations (IUOTO) (1973) has defined health-care tourism as the provision of health facilities utilising the natural resources of the country, in particular mineral water and climate. Goodrich and Goodrich (Medlik, 1995) defined health-care tourism as an attempt on the part of a tourist facility (e.g. a hotel) or destination (e.g. Baden, Switzerland) to attract tourists by deliberately promoting its health-care services and facilities, in addition to its regular tourist amenities.

Health tourism includes medical, curative, and preventive tourism. Health tourism can be defined as travelling for the purpose of treatment from certain body disorders or for relaxation and recreation in natural therapeutic sources such as hot and mineral springs, salt lakes, mud, radioactive sand, herbal baths, sun and climate and a like. This is for a period of time (on average 2-4 weeks) or can be months depending on the type of disease and treatment program. The patient can be fully or partially under medical supervision and can do certain tourist sports or cultural activities if the case permits. With this definition, the goal is to correct the misconception that was held by many scholars where they mixed the concepts of health, curative, and medical tourism together (see Figure 1). It was not easy to split the concept due to all of the types of health tourism. It is worthy to refer each concept to the right definition (Harahsheh, 2002). Ironically, the failure to adapt the land development regulations and transportation facility design standards over time has resulted in the promulgation of health adverse environments as a norm and not the exception (Frank & Kavage, 2008).

Figure 1. Spectrum of Health Tourism




*Source*: Smith and Puczk, (2009)

According to World Health Organization in 2011, at least 1,018,000 people suffered from mental and spiritual problems (Irna News). Due to the high potential of tourism and health tourism in Isfahan, Iran and

society's demand to recreational and leisure places, a site selecting for health recreational city was performed. Isfahan is the third most populous metropolitan area in middle of Iran after Tehran and Mashhad. Isfahan is the capital of Isfahan province in Iran. According to Isfahan Municipality statistics (2013), Isfahan City has an area of about 550 square kilometer and includes 0.5% of Isfahan province. Isfahan is located between 32°39′08″ north latitude and 51°40′28″ east longitude.

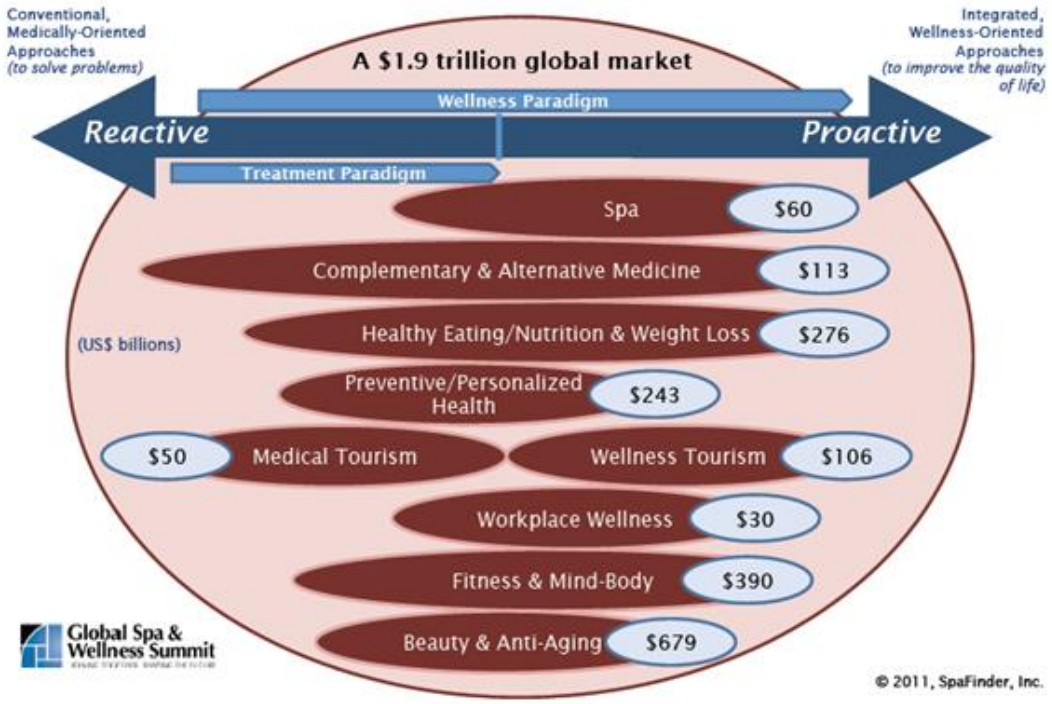
Figure 2. Isfahan Province & City


International health tourism in the world

The health tourism market is affected by the generating countries that have a profound history and experience (Pollock & Williams in Gartner & Lime, 2000). These include mainly countries that have already established health tourism industries, such as Germany, USA, Japan, UK, France, and Italy. A new study presented at the inaugural Global Wellness Tourism Congress found wellness tourism is a near half-trillion dollar market, representing 14 percent of global tourism revenues overall. According to the Global Wellness Tourism Economy report, the category is projected to grow on average 9.9 percent annually over five years, to nearly $678.5 billion by 2017, or 16 percent of total tourism revenues. The study also noted that over one-half of the growth in wellness tourism through 2017 will come from the Asian, Latin American and Middle Eastern/North African markets. India will be number one globally over the next five years, clocking a 20 percent-plus growth through 2017. Wellness tourists are higher spenders, on average, spending 130 percent

more than the typical global tourist. Wellness tourism is directly responsible for 11.7 million global jobs, which delivers $1.3 trillion in global economic impact—or 1.8 percent of world's GDP in 2012 (Global Wellness Tourism Congress, 2013).

Figure 3. The Wellness Cluster




Source: Stanford Research Institute

## Health Tourism in Iran

Based on a World Bank classification, Iran is a country with an average to high salary income, is the fourth largest country in Asia, and seventeenth large country in the world. It is located in Middle East and covers an area of 1648195 square kilometers. The World Health Organization has categorized Iran as in the eastern Mediterranean district. Health tourism is not a new phenomenon in Iran. In the past, citizens of neighboring countries, including Arabian countries around Persian Gulf, were traveling to Iran for health care services (Turani et.al., 2010).

Kazemi concluded that social security, possessing world standards in health centers and medical equipment, and visa Issuance are the most important factors of developing a health tourism industry in Iran (Nasiri Pur & Salmani, 2011). Due to advantages in health tourism, including low cost services with high quality, expert doctors, and lots of natural attractions, Iran intended to enter to this industry (Shalbafian, 2006). Health care tourism results in gaining foreign exchange, improvement the quality of life, increasing the nation's

capitation fees, increasing the mobility of production and distribution, and creating jobs and services directly and indirectly in the country. Each tourist causes eight jobs to be created, including three direct and five indirect jobs (Kargar, 2007).

## Health Recreational City

Ophelia Yeung (SRI project manager at Science, Technology and Economy Development) believed that for decades recreation's definition was accompanied with Indulgence, which is an excess in eating and lack of adequate sleep. The result is that travelers return home with less health than before arrival. Her research showed that people are choosing destinations that help them to keep and improve their health (SRI International).

The health recreational city has natural facilities and is without need of chemical medicines and surgeries for healthy people in all age categories and sicknesses. Natural facilities include: hydrotherapy, spas, thalassotherapy, mud therapy, traditional medicine, acupuncture, solarium treatment, energy therapy, yoga, meditation, homeopathy, stone therapy, jewelry therapy, aromatherapy, herbal therapy, sand therapy, animal therapy, leech therapy, bee therapy, massage, breath therapy, music therapy, balneotherapy, food therapy, laugh therapy, etc.

## Site selection

Site selection is an action which analyzes the ability and potentials of a region about having qualified and adequate land and its relation with other urban function and facilities to choose a proper site for each action (Farhadi, 2000, 55). In geographic information system the ability of mixing the taken data from sources and overlapping the maps on each other, is one of the most important functions. With taking advantage of this system using 2 or more different subjective layer map from a unique region and overlapping them and making new layers has been possible (Haywood, 2003,118).

The basis for many of the current zoning and planning regulations and standards stem from efforts during the sanitary movement of the industrialization era of the nineteenth century. Efforts to decrease the spread of infectious diseases were rooted in the dominant view that population concentration and the proximity between businesses and homes was unhealthy (Wilson, et.al, 2008). In addition to serving as arenas for outdoor recreation, urban and near urban recreational landscapes also provide ecosystem services such as reduced noise levels and improved air quality, affecting public health (De Ridder et al., 2004). Time, motivation and mobility

are important prerequisites for people to engage in outdoor recreation. In addition, people must have access to recreational landscapes (Koppen, et.al, 2014).

Recent research has further shown that the distance or proximity to a recreational landscape affects how people perceive their own health (Van den Berg et al., 2010). Urban and near urban recreational landscapes (for instance forests, coastal areas and parks) are important as landscapes for everyday outdoor recreation, and loss and fragmentation of green space near residential areas may reduce people's access to recreational landscapes. As many cities in Europe face extensive growth and increasing parts of the populations live in urban areas, securing access to recreational areas close to one's home is rapidly becoming a challenge to urban planning. Current compact city strategies put additional pressure on green structure within the city. Although densification as a planning ideal for urban municipalities may provide several benefits for the environment (for instance reduced private car use), access to recreational areas needs to be measured and analyzed as part of planning processes in order for planners and policy makers to be able to compare the effects different scenarios. Understanding how people perceive their access to recreational areas is an important basis for urban green structure management. However, a review of how the terms access and accessibility are defined and applied in present research on outdoor recreation reveals that the terms hold several different dimensions. A main distinction can be identified between physical accessibility and cultural, social and socio-psychological accessibility (Skov-Petersen & Goossen, 2009).

The importance of access to green areas is illustrated by Matsuoka and Kaplan (2008), who surveyed 90 articles on human interaction with outdoor urban environments and found strong support for the important role played by nearby green environments in ensuring human well-being. Distance to green areas determines how frequently they are used. Danish researchers have shown a negative association between the distance and the number of visits to nature and other green areas (Hansen- Møller & Oustrup, 2004). Moreover, it is known that people living in large urban areas with the longest distance to green areas have higher probability of increased stress levels (Nielsen & Hansen, 2006).

Materials and Methods:

In this project, using the Delphi method, 30 surveys were distributed and 10 surveys returned. This process happened in three rounds. When finished, the group developed the selecting factors for a recreational health city, prioritize as shown in Table 1.

Table 1. Selection Factors for a Recreational Health City

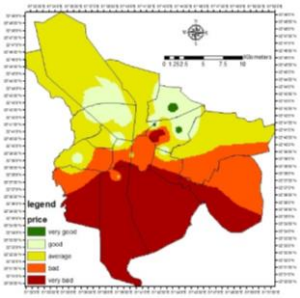
| |
|---|
| 1- Land use function |
| 2- Site's price |
| 3- Compatibility (neighborhood) |
| 4- Utilities |
| 5- Capitation |
| 6- Distance from critical point of pollution |
| 7- Efficiency |
| 8- Availability |
| 9- Comfort |
| 10- Access from main road network |
| 11- Topography |
| 12- Security |

Recreational Health City site selection

In order to reach to this goal, these layers according to expert's opinions were used: the layer of prices in each region of Isfahan, roads (distance from network passage grade 1 and 2), capitation, distance from industrial sites, air quality index, distance from Zayanderud river, distance from recreational places, distance from public transport stations and distance from hospitals.

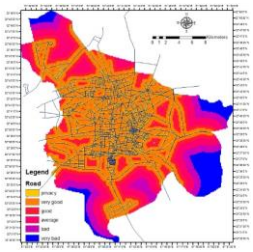
Price layer. With field information given from trading firms in Isfahan city data in 5 class in this map were classified. The price classes are from (cheapest about 295 $) to more than 2205$. In this project places with lower prices are in priority.

Figure 4. Price Layer



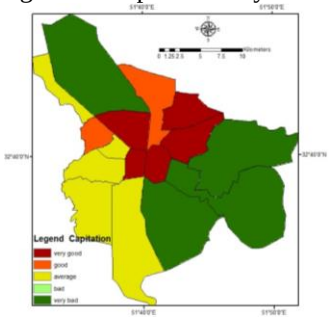

Road layer. In this layer main roads and sidetracks has been classified in 6 classes: first layer as privacy with 100 meter width (preventing the construction in this layer), second layer up to 500 meter, third up to 1000 meter, forth up to 2000 meter, fifth up to 3000 meter and sixth more than 3000 meter.

Figure 5. Distance from Roads and Passages



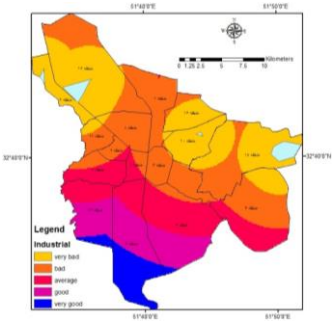
Capitation. In this layer with information taken from area of each region (square meter) divided to number of population on each region, capitations were provided. The five layers include: first up to 150 square meter per person, second up to 250, third up to 350, forth up to 450, and fifth more than 450 square meter per person. The best places are regions with lower capitation and a higher density.

Figure 6. Capitation Layer



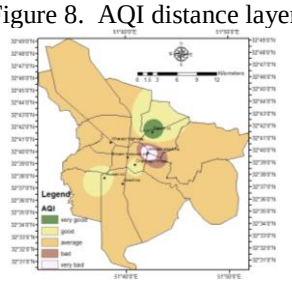

Distance from industrial regions. In this layer, four industrial and polluted areas of Isfahan had shown in the GIS map and were classified in five distance layers: up to 4000 meter, up to 8000 meter, up to 12000 meter, up to 15000 meter and more than 15000 meter. Obviously, more distance is better in this classification.

Figure 7. Distance from Industrial Places



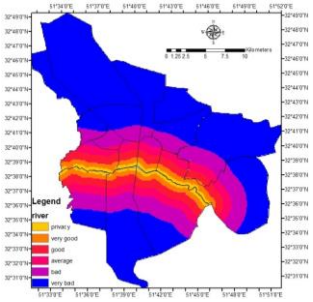

Air quality Index (AQI). For this layer, seven polution evaluation stations include: Azadi square, Ahmad Abad square, Rudaki street, Charbagh Khaju, Kharazi highway, Emam Hossein Square, and Parvin Street that their AQI are as follow: 85, 91, 83, 82, 86, 85 and 80. Layers in map were classified in five classes: first AQI up to 82, second up to 84, third up to 86, forth up to 88 and fifth more than 88. The first layer had the best quality of air in Isfahan.

Figure 8. AQI distance layer



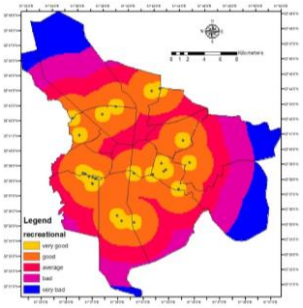
River layer. In this layer, six classes have classified: first layer is river privacy up to 400 meters to prevent construction, second up to 1000 meters distance from river, third up to 2000 meters, fourth up to 3000 meters, fifth up to 5000 meters, and the sixth layer is more than 5000 meters. The best layer with the highest priority is the second layer from 400 to 1000 meters distance of river because it is the preferred area for taking advantage of the river lanscape, the fresh environment, and greener lands.

Figure 9. Distance from the Zayande Rud River



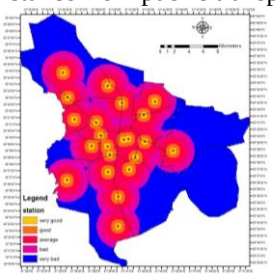

Recreational layer. In this layer, the recreational centers in Isfahan were classified in five classes: 1) up to 1000 meters distance, 2) up to 3000 meters, 3) up to 5000 meters, 4) up to 8000 meters, and 5) more than 8000 meters distance. According to compatibility rules, the first layer near to the recreational centers (up to 1000 meters) was chosen as the best.

Figure 10. Distance from Recreational Facilities



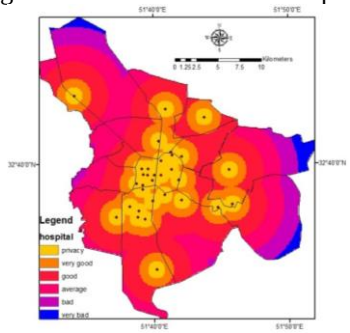

Public transport availability. This layer was chosen because of making fair accesses for all to reach the town. Five layers include: 1) up to 500 meters distance as the best availability for reaching to the stations by walking, 2) up to 1000 meters away, 3) up to 2000 meters away, 4) up to 3000 meters away, and 5) more than 3000 meters away. The shortest distance to walk is preferred.

Figure 11- distance from public transport stations



Hospital layer. Due to importance the existence of medical tourism near the wellness tourism in some countries and the importance of this based on expert oponion, this layer was included in the model. The visual proliferations of hospitals within 1,000 meters were identified. After this layer, five layers were classified as follow: 2) up to 2000 meters distance, 3) up to 4000 meters, 4) up to 6000 meters, 5) up to 8000 meters, and 6) more than 8000 meters away. The second layer of within 2000 meters distance from hospitals chosen by the expert panel as the best one.

Figure 12. The Distance of Hospitals




Prioritize in the AHP Model

The expert's opinions and viewpoints were consolidated. Pair comparision and weighing criterions were applied, generating the following results (see Table 2).

Table 2. Pair Priority

| | Station | Capitation | Aqi | Hospital | River | Recreation | Road | Price | Industrial |
|---|---|---|---|---|---|---|---|---|---|
| Station | 1 | 0.166 | 0.25 | 2 | 0.333 | 0.5 | 0.125 | 0.125 | 0.2 |
| Capitation | 6 | 1 | 3 | 7 | 4 | 5 | 0.333 | 0.333 | 2 |
| Aqi | 4 | 0.333 | 1 | 5 | 2 | 3 | 0.2 | 0.5 | 0.5 |
| Hospital | 0.5 | 0.142 | 0.2 | 1 | 0.25 | 0.333 | 0.125 | 0.111 | 0.166 |
| River | 3 | 0.25 | 0.5 | 4 | 1 | 2 | 0.2 | 0.166 | 0.33 |
| Recreational | 2 | 0.2 | 0.333 | 3 | 0.5 | 1 | 0.166 | 0.142 | 0.25 |
| Road | 8 | 3 | 5 | 8 | 5 | 6 | 1 | 0.5 | 3 |
| Price | 8 | 3 | 5 | 9 | 6 | 7 | 2 | 1 | 4 |
| Industrial | 5 | 0.5 | 2 | 6 | 3 | 4 | 0.333 | 0.25 | 1 |

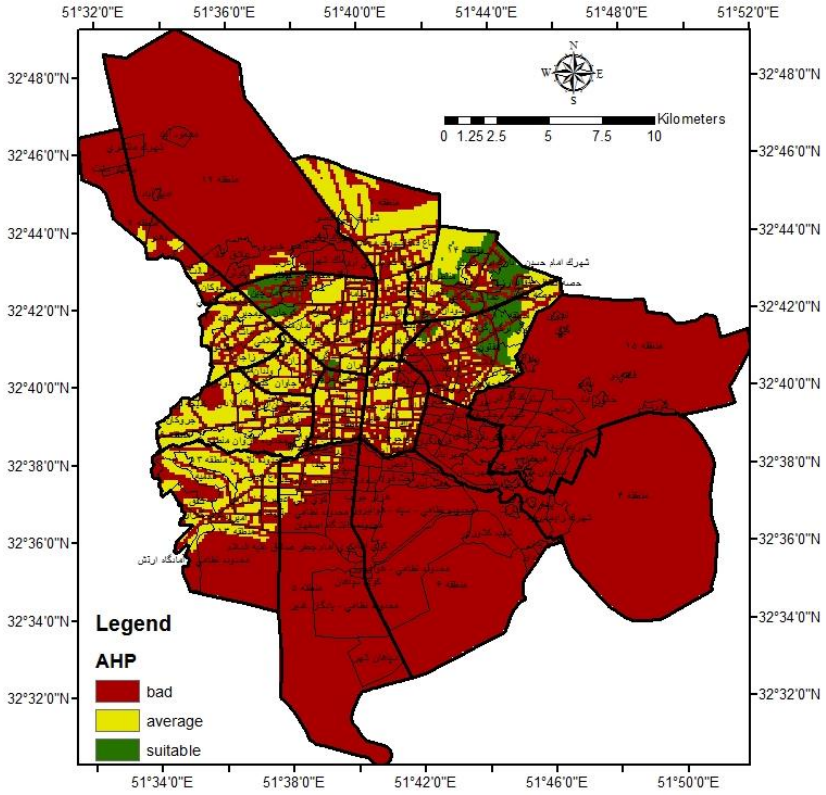
The Consistency Ratio (CR) that was computed from this data is zero (zero is less than 0.1 C.R.). Thus, this result is acceptable and there is no need for the table's recontrol.

Table 2 -Final factor weights with priority in AHP model.

| Final weight | Main factors | Priority |
|---|---|---|
| 0.3071 | price | 1 |
| 0.2432 | road | 2 |
| 0.1475 | capitation | 3 |
| 0.105 | Industrial areas | 4 |
| 0.071 | pollution | 5 |
| 0.0497 | river | 6 |
| 0.0344 | recreational | 7 |
| 0.0239 | station | 8 |
| 0.0181 | hospital | 9 |

In the last phase, by using overlaping analyze of the layers in ArcGIS 10.2 and AHP model in this space, a final map was developed.

Figure 13. Final Map for Construction of the Best Places for a Health Recreational City in Isfahan



This map, based on expert opinion in the study, has three classes including: 1) class from 2 to 6, 2) up to 7.19, and 3) quanitities more than 7.19. The first class is the best target places marked with green color in the map. It includes these districts in Isfahan: 1) Bahram Abad, Khane Esfahan, Marchin, Kujan and Dastgerde in Region 8 of the Isfahan municipality, 2) from Khoram to Jami in Region 1, 3) Sheikh Tusi, Garakan, Haftun and Kuye Narges in Region 10, and 4) Doteflan, Shahpasand, Batun, Oman Samani, Jelvan, North Hasse and Dark in Region 14. The primary reasons of these selections is based on the cheapest land price in this region, the populous areas, distance from industrial centers, and the less polluted areas because of open land spaces.

## Results and Disscusions

The increasing importance of health and people's demand to spend some time for their mental, physical and spritual care were the primary drivers of this study. People also desire time for tranquility and leisure, far away from machine life concerns, pollution, hallabaloo, fast foods, etc. The site selection for health recreational city in Isfahan was therefore performed and the process described. Health tourism has three times the exchange value more than mass tourism and has four subsets including: wellness tourism, medical tourism, curative tourism, and preventive tourism. Medical and curative tourism is related to ill people and wellness and preventive tourism belong to healthy people. The most important factor for constructing health recreational center identified in this study was the availability and fair access for all people of society.

The final map (Figure 13) showed the best places for constructing this city. Information of the Isfahan health center layer, located on Agha Babai highway, had implied areas in AHP and showed points in the neighbor as the best places (Haftun and Kuye Narges). This indicates the vialability and currency of this project. As this experience demonstrated, it can beapplied in many other countries where health tourism projects are to be constructed like in a health town in Dubai. A health recreational city for healthy people and medical centers for the ailing has been considered. Leisure time is important for the healthy over any amount of sorrow and grief. Preventing contagion from the ill to healthy people is important plus having these centers in neighborhoods make it possibile that caregivers can enjoy the accommodations and leisure facilities, too.

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