

A comparative study of tourism's climatic comfort by TCI models in GIS (Case Study Hormozgan and Kerman)

Majed Namatolahi¹, Mahmoud Reza Anvari^{2*} Masoumeh Hafez Rezazadeh³

1. M.Sc, Department of Geography and Urban Planning, Faculty of Human Science, Islamic Azad University, Zahedan Branch, Zahedan, Iran.
2. *Ph.D, Department of Geography and Urban Planning, Faculty of Human Science, Islamic Azad University, Zahedan Branches, Zahedan, Iran.
3. Ph.D, Department of Geography and Urban Planning, Faculty of Human Science, Islamic Azad University, Zahedan Branches, Zahedan, Iran.

Abstract

Tourism is an element related to climate So that the good weather and good understanding of the climatic conditions at the destination is one of the most important elements in tourism And one of the most important information is needed by the tourists to visit Utilizing climatic comfort indices in different geographical areas, can contribute to the planning of tourism in the region To tourism attractions, uses better for leisure. Therefore, in this study, Climate comfort of Kerman and Hormozgan provinces using climatic data period of 10 years (2012-2003) and employ the tourism climate indices (TCI) in different months months to determine the desirable climatic comfort tourism was evaluated. The results showed that the tourism calendar in Kerman and Hormozgan provinces varied climatic comfort. Spring and summer have respectively the best and worst conditions for tourism in Kerman province. And while the winter and fall months in Hormozgan have the best conditions and at the end of spring and all summer months have the worst in terms of climate-tourism. The results of this study other than the ground, tourism could be different in civil and urban development, health and issues relating to locate the optimum construction of hospitals, nursing homes and recreational.

Keywords: Climate, Kerman, tourism, Hormozgan, TCI.

1. Introduction

The climate is an important factor in human life. Meteorological way has been made as a scientific discipline accordingly today. One of related science to The climate that studies the interaction of the atmosphere and Earth's surface is microclimatology. microclimatology purpose is studying the climate of an area or small area that gives certain circumstances climate for the region Also check out the impact of weather on human activity and the environment in which man's life composed (Alijani and kaviani, 1992:48). Climate is important from the perspective of tourism planning, Tourists usually go in search of favorable climate or climate comfort that the person does not have any sense of dissatisfaction and lack of comfort, of heat and climate. And this factor have an important role in decision making for tourism destinations (Matsarkiss, 2001: 26). Comfort plays an important role in tourists decision-making . The weather conditions are the most important factors in a region in order to attract tourists, or vice versa. The effect of climate and weather on the lives, health, human welfare and the development of tourism in the form of one of the branches of human knowledge as biologists climatology studies. (kasmaii, 1993:298). as comfort plays an

important role in tourists decision-making, so the training and application of knowledge on climate for designers can be very valuable and useful for tourist industry in general. Also in reducing the negative effects of climate on tourism and livelihoods related economic branches play an effective role, So far, efforts in the field of empirical indicators for evaluating the thermal comfort of human beings have been developed at different scales of global to local ones. (faraj zade and Ahmadi, 2010: 54). Human comfort conditions are the conditions which thermal comfort conditions for at least 80 percent of the people are right, In other words, people in that situation do not feel cold, not feeling the heat, because the human being do not feel the coldness, heat and comforts due to climate issue. (Mohammadi, 2008:119) Maintaining thermal balance between the human body and the environment is one of the basic needs of health and safety. Climate is one of the most important geophysical factors in patterning geographical space and shaping the environmental conditions of participation, Plays an important role in the establishment of human settlements, Human being choose the settlements in which they have the highest level of climatic comfort. Tourism as one of the most important human activity in this area is not the exception . then The climate is an important criterion in the establishment of tourist centers, Study of climatic characteristics of each place can be helpful In determining areas of need for certain species of tourist activities for the planners. tourism is the industry which is heavily dependent on the weather and its changes, In terms of this industry's dependence on weather it is named Meteorological Tourism, it studies the role of climate as a resource and economic asset or attraction deals in the industry. Iran, because of the breadth and diversity of geographical environment and the numerous attractions of tourism has great tourist poles and axes, The most important of them is Hormozgan in southern province and Kerman in South East of country. Research results show that Hormozgan have a nice climate in cold weather. Warm seasons of the Hormozgan province's climate is better.

Question Research

Are tourism calendar Hormozgan and Kerman provinces different from each other or not?

1.1.The effect of climate on tourism

Weather and climate as one of the natural environment plays an important role in many activities including tourism Communication, And climate is an important factor in the development of the tourism sector, In fact, a suitable climate can provide positive responses of tourists. Tourists plan their travel plans with respect to climate and atmospheric situations (Ranjbar et al, 2010: 2). The relationship between climate and tourism is Different and complicated. Being Composed of the one hand, and polymorphism tourism On the other hand depends on the climatic effects. The effects of whether have more prominence effects Compared to other indicators of tourism. (zolfaghari, 1999:13). Climate and tourism as the main components of a system affect each other in different ways, And has raised new discussion as climatology tourism, In fact, tourists are attracted to a particular type of weather, Due to the seasonal changes Whether in hot weather or cold whether, the tourist situation has been changed. (farajzade, 2008:45)

1.2.The concept of climatic comfort

Human comfort is the set of conditions which is 80% of the appropriate in case of thermally, In other words, people under those circumstances do not feel cold nor heat. State neutrality is its another interpret. (jahanbakhsh, 68:1998). It is also said that, Thermal comfort conditions of perception in which The environment is satisfactory in terms of temperature. (zolfaghari, 2010: 72). In shaping the views of climate conditions of human comfort , 4 elements have major role. These elements include temperature, humidity. Wind. Radiation. (Abdollahi, 2007: 35)

1.3. Tourism climatic index (TCI)

The tourism climatic index consists of three words which has been presented by Micsucufski (1985) And it is a combination of seven Parameters that 3 parameters are independent from other parameters associated with the diamond Bioclimatology. Bio-clima studies the climate in relation to living things, especially human beings.

$$TCI=2[(4*CID)+CIA+(2*P)+(2*S)+W$$

In which:

CID: is the daily comfort index Which contains an average daily maximum temperature

CIA: comfort index boarding

R: rainfall in millimeters

S: The duration of sunshine

W: the average wind speed in meters per second

Unlike other climate indicators In this regard, each of the relevant parameters evaluated And any factor could reach number 5 weight, these seven variables consist of 5 sub-index in the TCI. Using a standard rating system which the amount of 5 (ideal value) to 3 (Ultra undesirable and unfavorable) provided General basis for measurement provides each index((Faraji and colleagues ,1999: 40).

2. Method of determining TCI

This method was invented by Miscofsky to assess the climate for tourism activities in 1985. In this method various elements of weather for a region has been investigated. Depending on the model, several factors are taken, The score for each month or any time that considered, calculated. The number is obtained between 0 and 100. The resulting number determines the quality of the final table looked Province Tourism, finally the tourism climate features it is obtained in that period. Miszczfski raised 12 variables in relation to the issue then fell to 7 variables, These variables include: the average maximum temperature, average temperature, average minimum relative humidity, average relative humidity, total monthly rainfall, average hours of sunshine, average wind speed. Finally, by combining a number of factors they reduced to 5 indexes. Table (2-1) to the index and its impact on tourism is mentioned.

Table 2.1 Sub-indices and ratings of TCI and its impact on tourism (Miscavscy, 1985)

Sub-index	Variable monthly climate	The impact on tourism	Points in the Model
CID	The average daily maximum temperature and mean minimum relative humidity	It shows thermal wear when tourists have the highest activity shows	40
CIA	The average daily temperature and average relative humidity	It shows thermal comfort during the hours of sleep a day that also included shows	10
p	Total rainfall	It shows the negative effect that this element does reflects on holiday fun	20
s	Total hours of sunshine	Tourism has been assessed and the risk of sunburn due to discomfort in hot day negative effect	20
w	Average wind speed	Its effect depends on the temperature element, Wind cooling effect in hot climates is positive, While the cooling effect of the wind in cold climates have been negative	10

To calculate the The tourism climatic index, one Must calculate this 5 component index, Then put in the formula. Ultimate formula to calculate the tourist region is as follows:

$$TCI=2[(4*CID)+CIA+(2*P)+(2*S)+W]=?$$

After obtaining a primary factor for each of the indicators, The tourism climatic index factor places in the final formula then the index is calculated.

$$TCI=2[(4*CID)+CIA+(2*P)+(2*S)+W]=?$$

After calculating the final formula, Value of between 0 and 100 for the index is obtained, Any amount reflected the quality of the region's tourism climate. The final result is determined from the following table. The final value obtained with matching table finally, tourism is an area characterized by climate quality. As you can see in the table, the score of 100 is ideal conditions. To lower values, the level of dissatisfaction and unfavorable climatic conditions for tourists added. (Table 2-1).

Table 2-

1

TCI descriptive value	TCI rating	Code
Ideal	90 t0 100	9
Excellent	80 t0 89	8
very good	70 to 79	7
Good	60 to 69	6
acceptable	50 t0 59	5
Fringe	40 to 49	4
Undesirable	30 t0 39	3
Very poor	20 t0 29	2
Extremely unpleasant	10 t0 19	1
Unbearable	0 to 9	0

classification system TCI (Miscavsky, 1985).

Summary calculation of The tourism climatic index for a month or a long period is as follows Statistics relating to the average climatic parameters are extracted.

To calculate the coefficient of each element, There are special a chart or graph, Each factor is an element extracted . Coefficients obtained are inserted in the formula and the formula of tourism's climate is calculated. A number between 0 and 100 is calculated. The resulting number determines the quality of the final table looked Province Tourism, Finally, tourism and climate characteristics of the area in that time is calculated.

3. Meteorological stations under study

In this study, the calculation and classification of tourism climate Weather in Kerman and Hormozgan provinces of Statistics 8 synoptic stations in Kerman and Hormozgan 7 synoptic stations During the ten-year period (2012-2003) were used, Which characterized them as separate provinces in tables (3-1, 3-2) is given

Table 3-1 specification weather stations studied in Kerman

Station name	The latitude	Longitude	The height (m)
Kerman	30/15	56/58	1753/8
Bam	29/6	58/21	1066/9
Jiroft	28/35	58/48	601
Kahnooj	27/58	57/42	469/7
Boft	29/14	56/35	2280
Rafsanjan	30/25	55/54	1580/9
Sirjan	29/28	55/41	1739/4
Shahrehabak	30/6	55/8	1834/1

Source: Meteorological Department, Kerman Province, 2014

Table 3-2 Profile of meteorological stations studied in the province

Station name	The latitude	Longitude	The height (m)
Bandarabbas	27/13	56/22	9/8
Hajiabad	28/19	55/55	931/2
Roodan	-	-	-
Minab	27/6	57/5	29/6
Bandar Jask	25/38	57/46	5/2
Qeshm	26/55	55/55	6
Bandar lenge	26/32	54/55	22/7

Source: Bureau of Meteorology province of Hormozgan, 2014

4. Analysis of research findings Analysis of research findings

4.1. Status climate Country tourism of Kerman Province

First, we will investigate the situation tourism region of Kerman province in different

May-year . And suitable areas and improper for tourism across the province is determined. In April, the cities of Rafsanjan climate, Babak, Sirjan, Kerman West and the northern half texture have ideal conditions, Bam and Kerman in the West and the northern and western

edge of the southern half of Jiroft and texture are with excellent condition. And central parts of Jiroft and North West of Kahnuj has a very good situation. Kahnuj cities in the North West and the southern part of Jiroft have good conditions for tourism. Terms of tourist climate in April is divided into 5 floors, As can be seen: Rafsanjan stations, Shahr-e Babak, Sirjan, Kerman tissue and the western half has ideal conditions, and Kerman and Bam station and the South East has very good conditions, And part of the Regan city and jiroft, are of a good condition, and the southern part of Jiroft and Kahnuj station have acceptable conditions.

In June, the northern part of the Bofit city has excellent conditions, And the its central and The city of Sirjan in Kerman city, Babak and parts of the West are very good conditions, Rafsanjan station and parts of central and northern provinces to the south tissue have good condition. Bam and Jiroft station north and central parts have acceptable conditions. And Kahnuj city and the south and southeast of the city of Jiroft have poor marginal conditions .

In July in (the city of Babak, Baft and Bardsir) have very good conditions, And in (Sirjan, Rafsanjan, Zarand and Kerman and much of South-East stations and bass and Fahraj) acceptable conditions, (Jiroft) have very good conditions, And part of the (East Jiroft and Kahnuj) poor conditions of border-important loss.

In August the Bofit city has excellent condition, Shahr-e Babak and Bardsir have a very good condition And the cities of Sirjan, Zarand, Kerman Kuhbanan and good conditions And South-East Region (bass and Fahraj Reagan and Castle Treasure) have acceptable conditions Southern Region (Jiroft and Kahnuj) conditions are poor.

In September, much of the West is in excellent condition, The stations Shahrbabak, Rafsanjan, Sirjan, Zarand, Kerman tissue included, some range of Kerman city has very good conditions . And stations in the South East Region (Bam and Fahraj and Reagan has good conditions and parts of the southern province (and the time and treasure castle) have acceptable conditions. And southern regions of the province of Jiroft Kahnuj marginal conditions are poor

In September many parts of the area have ideal conditions, ncluding stations Zarand, Rafsanjan, Shahrbabak, Sirjan, and the northern half of Baft. Stations of the South East Region Bam, Kerman Fahraj and have excellent condition. Jiroft and Ghalee Ganj has very good conditions and good conditions are Roodbar and Kahnuj.

In November, stations Bam, Jiroft, Kerman province Kahnuj and Fahraj eastern half of the total have excellent condition. Rafsanjan stations, Shahrbabak, Sirjan, Zarand Bardsir texture and are very good conditions. (Figure 4-10)

In December, the southern half of the province Kahnuj stations, Jyrvft, Fahraj and Ghalee Ganj, Bam and South East of Kerman have excellent condition. And the center of Kerman and Baft have very good condition. Rafsanjan station, Shahrbabak, Sirjan, Zarand Bardsir tissue conditions are good.

In December in the parts of Kuhbanan, Zarand, Rafsanjan and Anar climatic conditions have excellent comfort. And in the Southeast Region (Bam, Fahraj and Kahnuj) have a very good tourist climate condition. Western half of Raver Kerman have suitable climate conditions for tourism. Also part of the (Baft and the northern city of Babak) has good condition, In Baft, Sirjan, Shahrbabak southern half of climatic conditions and their comfort is acceptable.

In February, Bam stations, Fahraj, Kahnuj and Ghalee Ganj in the south of the province have excellent condition. North East part of Kerman and Jiroft have very good condition. The western half of Kerman, Rafsanjan, Sirjan and Bardsir good condition, Boft has acceptable conditions and Shahre Babak has adverse conditions for tourism in this month. (Figure 4-13).

Also in March, Bam, Fahraj, Kahnuj and Ghalee ganj have climate of great comfort, Shahre Babak and parts of the western half of Jiroft in Kerman have Very good condition. Also in the cities of Anar, Zarand and Koohbanan conditions are acceptable.

4.2. Status climate Country tourism of Hormozgan Province

Then, we will attend to Status of climate Hormozgan Province, in different months of year.

In April, the northern parts of the province, Haji Abad and also a small part of northern Roodan and Bandar Abbas have Very good condition, The rest of the province, including the cities of Bandar Abbas and Jask and Minab have a good climate.

In May, most of the province of Jask, Haji Abad and Roodan have acceptable conditions, And Bandar Abbas, Qeshm and Kish have good conditions. In June due to the extreme heat over the whole province is dominated by a small margin in all provinces .

In July large parts of the province, Haji Abad, Roodan, Bandar Abbas and Jask are in small margin requirement, And southern parts of Qeshm and Kish and Jask have adverse climatic conditions.

In August the whole province of Roodan and Bandar Abbas, Minab, Qeshm ,Kish, Hajiabadi have adverse climatic conditions. And part of the south of Jask have minimal margin requirements.

In September the city of Haji Abad and Roodan and parts of Jask have unsuitable conditions, And city of Minab and Abbas as well as the islands of the province conditions is in negligible margin.

In October the majority of province have acceptable conditions, Jask station and HajyaBad in this month have good condition.

In November, the city of Jask Haji Abad Roodan and part of the West is in very good condition, The central province of Bandar Abbas, Minab, Qeshm and Kish have good condition.

In December, the northern part of the province, Haji Abad which is in a good condition, and some parts of the north of Bandarabbas have good condition, In the city of Jask, Roodan, south of Bandar Abbas and Qeshm and Kish has excellent condition.

In January the northern part of the province have acceptable conditions, Much of the province has a good condition and the South East Region (Jask) have very good conditions.

In February, also north of the station Hajiabadi have good condition, some parts of Roodan and the northern parts of the stations of Bandar Abbas have very good conditions. Counties margin Persian Gulf and South-East region has excellent conditions.

In March, the situation in the city of Jask, Bandar Abbas, Roodan and Minab are great, And only Haji Abad city has very good conditions.

5. Conclusion

In this study, the tourism climate of TCI (TCI) was used for two provinces , The index is analyzed seven meteorological elements, that includes: 1. The average maximum daily temperature, 2. The average daily temperature, 3. The daily minimum relative humidity, 4. Average daily humidity, 5. The monthly precipitation (mm), 6. Total sunshine, 7. average wind speed. This seven elements of the TCI, conclude Five sub-indices (cdi-cia.pws), that is working with Using a standard rating system that rates from 5 (ideal) and zero (extremely poor) is working, Therefore, climate data eight synoptic stations and seven stations in Hormozgan province, which has a joint ten-year period (2012-2003) have been used. After obtaining the data needed to analyze climate data , the Excel was used, Using Geographic Information System (GIS) maps of zoning TCI (TCI) on monthly basis for the of Hormozgan province and Kerman was prepared, And results of indicator for calendar was proposed (Table 6-1). According to a survey conducted in the province as well as the resulting map in studied mounths, April, October, November, December and January are the greatest level of tourism conditions. According to TCI good condition and ideal is in these months on the region, Tourists without the need for heating or cooling can be fun in the province, July, August and somewhat February conditions are not very good, And the situation is not favorable for the tourists, The best months for tourism in the province between April and onerous month is July. The results also indicate that the Hormozgan province, this province has a variety of small-scale climate-location, But in the timescale has been more diversity, Climatic conditions in autumn and winter tourism is provided, And can be a good plan to attract more number of tourists in this season. While high temperatures and humidity in summer is a negative factor for tourism in the province. And the months of March, April, November, February and April have the highest favorable conditions for tourism in this province , June and the summer months and also have the least favorable conditions. Other months on average and acceptable placed in some parts of the province.

Table 5-1 Calendar tourism climate comfort of Kerman and Hormozgan provinces

Hormozgan province				Kerman province			
The mounth	suitabl e	avarag e	Inappropriat e	The mounth	suitabl e	avarag e	Inappropriat e
April				April			
May				May			
June				june			
July				july			
August				August			
Septembe r				september			
October				october			
November				Novembe r			
December				December			
January				January			
February				February			
March				March			

Source: Research Findings, 2014

6. Guidelines and recommendations

Climates considered as one of the criteria influential tourist sites, So the provinces of Kerman and Hormozgan with a high potential to attract tourists, by paying attention to it, right planning to manage tourist sites, the arrival time of tourists to the region, Can be a very good source of income for their areas to residents, That's why these areas are needed to evaluate the tourist Climates. To show good capabilities and potentials of tourism.

Therefore, it is necessary to travel planner, The organization of Iran tours, Especially tourism operators, Considering the weather conditions carefully and more sensitive at the time of their tourism to satisfy the tourists and encourage them to travel to these areas

Recommended in the Hormozgan province create some activities as surfing water sports, water and skiing, to expand tourism in the season (spring) due to suitable climate.

Recommended in Kerman province and rally racing cars in desert sand be held due to suitable climate to attract tourists.

-Exhibition and conference dedicated to the recognition of the capacity of the regional and international level, And notifying the appropriate time for tourists Climate, For tourism and festivals and fairs in the ideal climate in this province.

Permanent publication of books, articles, and catalog photos of tourist attractions, tourist maps, Brochures containing tourist Climate information Climate for tourists.

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