

The Zonning of Human Bioclimatic Comfort for Ecotourism Planning in Gilan,iran-south Western of Caspian Sea

Dr. Bahman Ramazani Gourbi,

Associate Prof. Of Geography, Islamic Azad University, Rasht branch, Gilan, IRAN

Abstract: The recognition of Human Bioclimatic Comfort in geographical area is an important for planning of Ecotourism. It also, could helping to planning of Building and housing, Architectural patterns and using of natural attraction of Ecotourism in Environment planning, such as, Integrated Coastal Zone Management and Integrated Mountainous Zone Management (ICZM,IMZM). The aim of this paper is recognizing of monthly human bioclimatic comfort by climatologically data and submit its map by GIS (Geographical information system). Biker is model for recognition of Human Bioclimatic Comfort and for this research Project has used of this method. The result of this research has shown that Eastern area has more Comfortable from Western area. Rasht has 4 month and Lahijan has 6 month and with distance from coastal area to ward plain this factor reduced. In all area has about 4 months warm conditions in summer and 3 months cold in winter that Analyzing data focuses on Anzali wetland And Anzali Meteorological Station. it could help to planners for timing uses and environmental capability of ecotourism.

Key words: Biker, Bioclimatic, Caspian Sea, Gilan, Human Bioclimatic Comfort

INTRODUCTION

Bioclimatology or Vital Climatology, is a science for studying and evaluation of the weather and climate effects on the life creature consisting botanic or zoological creatures (Jahanbakhsh, 1998, Page: 67). Human Comfort Bioclimatology is a collection of those conditions that the human feel comfort in 80% in the view of environmental conditions (heat, humidity, wind, sunshine), in such a way that the relation between human and atmosphere (relation between blood and air-pressure, relation between heatstroke and water vaporization from the skin of the body) is naturally is geographical and regional that is classified in the human climatology science (Kaviani,1993, Page: 78). With consideration to the wide researches among the climate facts, temperature and humidity have the more important roles on human health and comfort, and in examination models for human comfort, these two facts have been used more (Alijani,1994, page 63). In touristy plannings, especially in ecotourism plans that relaxation and comfort of human is the main objective of the planning with consideration to environment preserving, determination of time and place limitations in using of the considered locations, is one of the most important aspects in echotouristic plans.

With consideration to this point that the ecotourism attractions are from the unique resources of each geographical boundaries, and nowadays, most of the tourists have been attracted (in the year 1990, sum of 450 million persons have had environmental tourism through expenses in sum of 257 billion Dollars in the world (Iaft,1978, Page: 3). it is predicted that at the end of the future decade, numbers of these tourists have been more than 20% of the entire tourists (Ramezani, 2006, page: 11). Also in a field inquiry in the northern side of Iran, about 57-80% of all responders, have replied that they repeat nature touring, especially visiting the coasts and the wetland, every year. Also, with consideration to this point that annually, about 4-5 million local and foreign tourists enter to Gilan province, generally in the warm period of the year, from all parts of the country, and generally they visit the nature (coasts, mountains, wetland and rivers). Necessity of favorite time planning for attractive regions has a high importance and this planning may make the environmental potentials of tourism safe by decreasing the environmental damages arising from human attacks in coasts and mountains (Ramezani, 2007, page: 160).

Nowadays, in order to recognition a favorite sample from Human Comfort Bioclimatology of different models such as psychometric Tables (Kasmaei, 1990 and Bari, 1992, page: 345),Olgay (1976 and 1973), Givoni (1977, 1969), Avanz (1980), Beiker, Lankester, Karsten and so on are used that the results of these models may be leaded to planning for Integrated Management of Environment (IME). The present research is an attempt for planning in Integrated Management in Gilan wit focuses in Anzali Wetland. It is necessary

Corresponding Author: Dr. Bahman Ramazani Gourbi, Associate Prof. Of Geography, Islamic Azad University, Rasht branch, Gilan, IRAN
E-mail: bahman @ iaurasht.ac.ir,bahmanr2000@ yahoo.com

to mention that without an accurate evaluation, tourism may be developed in an irrational aspect and cause to destructive the same thing that it has formed for it (Hosseinzade Dalir, 2003, Page: 3 3-47). Objective of the present research is recognition of favorite time limitations for regional life comfort, on the basis of Beiker and Lankester-Karston Bioclimatic Method. Such a way that with consideration to these time limitations (maximum and minimum of comfort), required planning for usage of the potentials of the wetland may be performed with consideration to preserving the environmental facts and elements. The results of this research may be used a primary important strategy for designing the environmental planning with the ecotourism objective.

MATERIALS AND METHOD

At first, regional normal of the required climate parameters for Beiker and Lankester-Karston Bioclimatic Method, consisting of temperature, wind velocity and relative humidity, has been prepared. Then with usage of Beiker and Lankester-Karston model, bioclimatic comfort limitations and bioclimatic stimulations were determined and presented in the aspect of climogram. Beiker Method (Kaviani, 1992, page: 63 from beiker-1972) was used. Selection of this method is because of this point that wind and temperature are more comprehensive and suitable among all regional parameters, related to the human bioclimatology stimulations (Jahanbakhsh, 1998, page: 68). In this method the following relation has been used:

$$cp = (0.26 + 0.34 * v^{0.63}) * (36.5 - t) \text{ mcal/ cm}^2 \text{ /sec}$$

In aforesaid relation:

V: Wind velocity (m/sec)

T: Daily average temperature (degree C)

CP: Cooling power of the environment, cooling power of the environment in this relation is the difference between body and air temperatures (micro calorie/ square cm per sec). Becker presented the cooling power of environment and human bioclimatology combination limits, as the following table: (table No.: 1)

Table 1: cooling power of environment and bioclimatic limits on the basis of Becker study

Environment cooling power	Air situation	Type of bioclimatic stimulation
Cp = 0-4	Hot, warm, humid and undesirable	Bioclimatic pressure
Cp= 5-9	Warm, tolerable	Bioclimatic comfort
Cp= 10-19	Moderate and desirable	Bioclimatic comfort
Cp = 20-29	Cool	Moderate stimulation
Cp = 30-39	Cold	Middle to intense stimulation
Cp = 40-49	To cold	Presser in middle aspect
Cp = 50-59	Undesirable cold	Intensively presser
Cp = 660-70	Intolerable too cold	Intolerable

Reference: (Kaviani, Geographical Researches Journal, issue No.: 29, page: 49-72)

RESULTS AND DISCUSSION

According to Beiker study, if cp will be less than 10, will cause the bioclimatic pressure and undesirable conditions that is because of high temperature. If cp will be more than 20, because of high coldness, will cause the mild stimulation, bioclimatic pressure and lack of human comfort Table 2 is showing of H.B.C in mountly for Gilan Stations . (table No.: 2).

Table 2: Evaluation of cooling power of Gilan Stations, on the basis of Beiker Bioclimatic Method in the regional period 1951-95, C=Comfort

Station	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rshat						C	C	C	C			
Roudkhan						C	C	C	C			
Kasma						C	C	C	C			
Hashtpar						C	C	C	C			
Espiely							C					
Astara			C	C	C	C	C	C	C			
Lahejan						C	C	C				
Anzali				C	C	C	C	C	C	C		
Asalm			C	C	C	C	C	C				
Ramsar				C	C	C	C	C	C	C		
Paroudbar					C	C	C	C	C	C		

With consideration to the table, has showed that the maximum comfort is in eastern area of Gilan and the minimum comfort is in central area of Gilan .for more explanation of this phenomena ,for example in Anzali Wetland Station has a calm stimulation and bioclimatic pressure in Jan., Feb., Mar. and Dec. months, and a moderate and desirable weather with bioclimatic comfort in Apr. May until to Oct. months. June is on the boundary condition of bioclimatic comfort (numbers of those days that are in human bioclimatic comfort conditions). July and Aug. months have a little warm and tolerable weather together with bioclimatic pressure. Figure No.: 1, indicates the status of Anzali Station in the view of bioclimatic stimulations conditions through Becker method. Limitation of Between 10-20 in Beiker index is human bioclimatic comfort conditions (figure No.: 1).

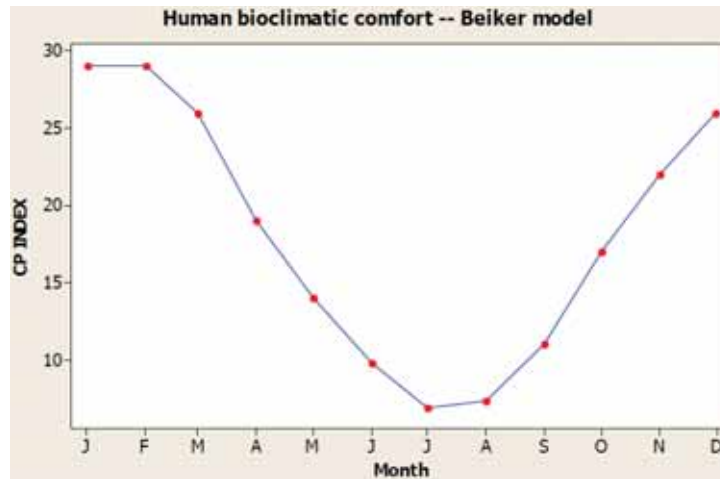


Fig. 1: Monthly conditions of human bioclimatic comfort in Anzali Station through Beiker Method

The effect of regional conditions on human organism and feeling of comfort conditions depend on the collection of heat effects on human organism that with consideration to this point that human body temperature is 37 degree centigrade and when the temperature is more, it will be with high humidity (as Anzali Wetland), cause to heat beating. It causes to increase the blood pressure and sweat glands start to ooze and we feel humidity. Visa versa, in the case of high coldness, because that blood transportation to the external layer of skin would be limited and we feel intense tremor for recovering the lost heat. With consideration to this point that the heat limitations in different geographical widths are as table No.: 3. With consideration to statistic data, Anzali Station temperature that is indicator for Anzali Wetland, it is clear that this region is cold in winters and does not have the winter desirability temperature (20 degree centigrade). Considering to the average temperature of winter, average of the minimum temperature equal to 4.8 degree centigrade and average of maximum temperature equal to 10.2 degree centigrade can be seen that heat requirement in winter is not provided, and even considering to average temperature, in the current regional normal conditions that is 7.5 degree centigrade, this important view would not be provided.

In summer, considering to average of minimum temperature that is 21 degree centigrade, and maximum 28.1 centigrade, conforms with desirability degree (22 degree) that indicates that summer temperature of the Wetland is at heat limitation of human comfort that may be planned. If this desirability will be compared with the other seasons, it can be seen that spring has a high temperature desirability but autumn is cold conditions (table No.: 3).

Collection of the Effects of Sunshine on Human Organisms:

Sun’s light shines on the earth surface in three bands of ultra violet, visible radiation and infrared radiations that ultra violet radiation has a lot of bad effects although it has a little intense. One of these two effects in (0.28-0.315 micron) wavelength cause to intense sunburn and the other effect in (0.315-0.4) micron cause to be brown of the skin and may cause irritation and pressure for body.

Reflex radiation from the atmosphere has an effect on temperature comfort feeling in the body. This reflex radiation is fulfilled from water vapor and Co2 molecules that have an important role for recovering the energy lack in body through metabolic processes of body.

Table 3: Heat limitations for human comfort

Latitude/D	Max.	Desirable	Min.	Season
50-60	2	17	14	Winter
	22	18	-	Summer
25-50	23	20	15	Winter
	26	22	18	Summer
Tropical	27	25	22	-

Reference: Zahidi, 2006, page: 74

Different status and internal changes of human against reduction and increase in temperature is as table No.: 4:

Table 4: Different status of human and its internal heat changes

Heat status	Temp.	Different status of human body
Warm	More than 43	Mental irreparable problems
	40-42	Felling of dizziness and epilepsy
	37-39	Start sweating
Desirable	37	Normal status
	34-37	Felling of coldness-start shivering
Coldness	29	Lack of speaking ability
	25	Muscles flexing
	15-17	Death start and minimum

Reference: Zahidi, 2006, page: 76

Table 5: regional facts and bioclimatic stimulations limitations of the environment on the basis of Becker study (1972)

Environmental facts	Fairly presser	Comfort	Stimulations				Scale
			Weak	Mild	Average	Strong	
Coldness power	>10	10-19	20-24	25-29	30-35	>35	Mcal/square cm per sec
Average Temp. in July	>17.5	16.7-17.4	16- 16.6	15.3-15.9	14.5-15.2	14.5>	Centigrade
Wind velocity	1.5>	1.6-2.7	2.8-3	3.1-3.5	3.6-4	>4	m/sec Water vapor
pressure	>10.6	10.4-10.6	10.1-10.3	9.8-10	9.7-9.8	9.4>	mmHg

Reference: (Kaviani, 1992, page: 63)

In order to determination of the comfort limitation and human bioclimatic irritations, recognition of the following items has vital importance, such a way that collection of the effects of air combination on human, is Oxygen that its ratio is suitable on the sea surface but in high levels, its lack cause some problems. Another item is ozone, that if its day increasing destructive would be continued, it cause to increase dermatological diseases. The other exist combinations in the air is natural and artificial Aerocells, such as salts, ions and dusts can be names as natural type, that salts are originated from the sea surface and is effective for pulmonary and thyroid diseases at coasts. But artificial Aerocells consists of types of pollutions that enter to the atmosphere and cause pulmonary, vascular and cardio diseases, asthma and heart attack (Sefidi, 2004, page: 124). Physicians have classified the bioclimatic irritations items of regional stresses in three classes (Kaviani, 1992, page: 61-2):

A-Bioclimatic Irritation Facts:

- 1-Increase in coldness power (calculated by the present research) and its daily intense fluctuation.
- 2-High intense of radiation, especially violet radiation
- 3-Partial decrease in Oxygen, as from 1000 meters and more than it.
- 4-Intense daily fluctuation of temperature.

B-Bioclimatic Pressure Facts:

- 1-Conditions of humid weather because of high temperature and humidity.
- 2-Long-time lack of sunshine especially in the ultra violet limitation.
- 3-Continuous of air pollution.
- 4-Cold, wet and foggy weather.

C-Bioclimatic Comfort Facts:

- 1-Balanced amount of coldness power of the environment in temperature conditions, between 15-25 degree centigrade and weak to mild wind between 1-4 m/sec.
- 2-Balanced radiation especially in a condition that may be provided because of a tree shadow.
- 3-Weak fluctuation of temperature during a day, season and year.
- 4-Clean air without dust of industrial nucleons and pollution arising from traffic.

In order to the map for the region stimulations and considering of meteorological, climatologically and

medical researches, the bioclimatic stimulations limitations may be presented as table No.: 5 that demarcation of stimulation degrees on the basis of temperature and wind effects is more suitable than the others (Kaviani, 1992, page: 64).

Examination of the Humidity Amount and Bioclimatic Comfort Limitation of Anzali Wetland:

Weather specifications of the region are together with very low changes in daily and annual temperature, high moisture, local and sea intense winds and high rainfall (Monavari, 1990, page: 56). In summer, because of high air temperature and moisture in coastal regions of the sea, humidity phenomena happen that causes bioclimatic intense stimulations. In order to examination of the months with humidity phenomena and air desirable limitations, Bert Lankester and Kaseton Climogram was used (Kaviani, 1981, page: 52). Study of the humidity phenomena in Anzali Wetland and its Bioclimatic Comfort during a 44-year period are as follows.

Humidity phenomena that is with high temperature and humidity, and it accompanies with decrease in physical and thermal power of human and has undesirable effect on those people who have blood circulation and cardio problems, therefore this type of weather has bioclimatic pressure. Examination of this amount, on the basis of climogram of Bert Lankester-Karseton method in Anzali Wetland, indicates that in June, Aug. and Sept. months, it is in humidity limitation and in May and Oct. months is in humidity boundary (days with humidity phenomena), and in Jan., Feb., Mar., Apr., Nov. and Dec. months, it is in desirable limitation.

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