Modeling the Bioclimatic Welfare of Mazandaran State by Using Bioclimatic Human Models

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Abstract: In this research bioclimatic welfare bases on methods and human models, Mahoney, Evan, and Becker have been made by using the state's 5 top meteorology statistical information during 15 years. According to environmental conditions the results of this article show that the desirable bioclimatic welfare terms increase from the west to the east of the state (4 months in Ramsar and 4 months in Babolsar). Of course these terms will change by the distance of the shore in the east of Qaemshahr but it will not change in unwanted night and day hot and cold cycles. About 4 months in a year it increases in whole day and decreases through the night and in winter unwanted conditions exist through the night but it decrease during the day. Also we can conclude form three Mahoney, Evans and Becker results that all the stations are in a better condition in May than the other months. And also June and November have the potential to enter the easement range during day and night. Extreme cold climate conditions want the use of thermal system in winter and in summer unwanted warm conditions exist, and proper heating systems would be a need in order to make comfort. In some months that are out of easement range we can easily provide thermal conditions by using architectural designing principles adequate to all the time in a year and preventing from problems and environment destruction disadvantages, vocal pollutions and high use of energy.

I. INTRODUCTION

One of the important natural causes that affects human welfare and by the way it changes, the easement conditions will change is the climate alteration which is shown by great climate and also by fine climate. Mankind has different reactions to these changes too. But the meaning of human welfare conditions is situations that are proper at least for 80% of individuals when our point of view ends to the temperature. In another word, in that conditions human never feel chill or hot. Some researchers know the neutralization of temperature phrase as the more exact explanation cause human never feel the chill and heat and the discomfort of climate problems (Qobadian and Mahdavi. 2005)

In these circumstances, human organism can keep its thermic balance in the best form exists without getting defection or proliferation in energy. In formation conditions human welfare conditions have a part in the point of view of 4 temperatures, humidity, wind and radiation elements. Among these elements, temperature and humidity have more effect on human health and comfort and because of this most human welfare evaluation models establish on these 2 elements (Golabi et al. 2013). The aim of human bioclimatic is environmental conditions which are directly related to the air conditions and elements. In such a space, different climate elements, including sun shine, air temperature, humidity, airflow and rain fall affect directly on human and the only factor that separate human body from environmental conditions are clothing type and the amount of their activity. 4 elements have the major part role in the climate point of view on making human welfare conditions. These elements including temperature, humidity, airflow and sunshine. Among these elements, temperature and humidity have more effect on human health and comfort and because of this most human welfare evaluation models establish on these 2 elements. Heating feeling and human climate welfare has a direct connection with the heat of body balance related to the group environment which determines by two individual and environmental group causes. Environmental causes are the 4 basis climate factors the temperature, humidity, airflow and sunshine and environmental factors are the level of activities and clothing type. (Hosn Abadi and Lashkari. 2012)

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Knowing the climate potentials as a contest of human activities makes the basic of environmental planning and terrene logistics. Perfect urban development, construction, residential, architectural and tourism planning success assurance can be achieved when it attended by knowing the climate and the use of its various abilities. In the field of how to architect the building accordant to climate and favorable to stable development we must say that there is no wrangle about each building can connect with the natural environment that is exists in it, the challenge is the type and the quality of this connection. Nowadays the idea of stable architect have been made to answer this question, stable development means fulfilling the needs of present generation without hurting the future generation's abilities, (Safi Poor. 2013) Mazandaran's architect is one of the successful native architect which mixed in a way with nature that it seems it is a part of a root and natural environment. This intersection with field and attention to the capabilities and limitations have made Mazandaran's native architect and stable architect favorable. In a way that understanding the difference between them becomes very hard. In this way according to the research expression importance, some questions have been made:

Are most of Mazandaran's areas out of climate welfare range in summer? Are most of the areas in the climate welfare range on May and November? And in conclusion is there an overlap between the results of models in use? According to these questions the aim of this essay is checking the climate conditions related to the comfort and welfare.

II. THEORETICAL FOUNDATIONS AND THE HISTORY OF RESEARCH

One of the effective factors of life, human welfare and health is the climate condition which nowadays is investigated by the part of science named human climate (Mohammedi. 2008) Bioclimatology is the science of studying and estimating the effect of climate on organisms including plants, animal and human. According to this tendency the aim of welfare conditions is the factors that are proper for 80% of individuals. The factors that related to the temperature. Or in the other word the conditions which human never feel chill or heat. The neutral thermal mood is the condition that human organism can keep its thermic balance at the best shape, without stricken with defect or excess of energy. Knowing the abilities and environmental potentials according to possibilities and limitations, plays and important role in the environmental planning. Also from ancient age up to now climate effects on human phenomenon's have been always in the attention of philosophers studies and researchers and even the public and in this case it has provoked their scientific curiosity which they have done some research that has explained here:

Aristotle and Ibn Khaldun both believed in the effect of climate on every activities and human efforts. Ralph the French geographer knew climate as one of the very effective factors in every geographic environment. Hun am by using the effective temperature indicator, studied the climate welfare of Alice Springs and observed that the significant part of the hot season of the year in this city is unfavorable from climate easement.

Mahoney put under consideration the welfare standard and climate architecture by using special diagrams. Olgya offered a chart which the role of air phenomena on human welfare was separately clear. Temperature and relative humidity were the most important factors that emphasized in Olgay bioclimatic diagram because of their effect on human welfare.

Giovani, specified welfare zone and climate condition in connection with 2 temperature and humidity elements and for definition the climate conditions and structural needs, the maximum average of temperature and relative humidity was used (Kasmaii.1993). Jandler (1976) identified the complicated interactions among building and its surrounded environment and investigated its dependence on climatic situations.

Evans, provided solutions for making climate welfare in his book named climate housing and welfare bases on 4 relative humidity, airflow and human activities and raiment elements, Tejurg (1968) set climatic areas with the aim of determining the climate role in human easement bases on temperature and wind speed. Barradas (1991), chose five parks in Mexico City for finding out the difference between internal park space and its environment for analyzing their thermic welfare and he observed the difference in early afternoon is more than the other day and night hours, so that the maximum difference in temperature, the steam pressure and the defect of steam pressure were 5.6 c and.06 and 1.3 Mbar.

Morillon-Galvez et al (2004) provided the stain of Mexico's climate bases on definition and determination of welfare area (Elsimsz offering equation) along with Olgays climate chart and Giovani's diagram to control the climate in the building (Tavoosi et al 2008) Bowden and Grab also burnished to investigate the thermal welfare in 5 climate area in 2 Tunisia's cities. The results of their study show the meaningful relation between thermic welfare and thermic welfare indexes. Emmanuel (2005) investigate the effect of earth cover changes on thermic welfare in Colombo Sri Lanka and he concluded that thermic welfare increases is because of ground cover changings especially buildings and roads. Toy et al (2007) started studying the bioclimatic welfare conditions in AR zoom in 3 rural, urban and woodsy areas in Turkey and concluded that woodsy areas have more compatibility with thermic indexes in use (Toy et al 2007) Sam and Cheng in Hong Kong (1997) did important investigations for using climate elements in architectural designing and building energy and they advised using local climate factors to improve climate designing and building energy simulation. Boga and Ola (2003) in Nigeria compared climate diagram and effective heat to determinate trusted

building indexes and protecting thermal pressures, including different indexes, Evans and Mahoney. Kefa (2004) in order to providing general information for using energy optimized in urban planning and building designing analyzed 25 years' climate element range for Victoria in Cyprus by using the Mahani chart and calculate the premediated strategies and offered them. Ping Lin et al (2011), in an essay with the title of "climate tourism basing on human thermic notion Taiwan and east of China" started investigating the area by using PET (physiology equivalent temperature) and TPCS (classification using thermal welfare). The results of this study showed that Taiwan and the east of China for the people who lives in moderate areas in autumn and spring seasons and for the people who lives in the nearby pf torrid, south area in spring and north in summer have desirable conditions. Also in Iran many researchers did significant acts that are mentioned here:

Aslcare and Movahedi (1988) studied the use of effective temperature in climate and welfare designing. Rezajoyan (1988) investigated the welfare and the proportional architect to the climate in different areas in Iran. Kaviani (1993) by using climate elements, like temperature, sunshine, humidity, wind and sunny hours investigated the climate of Iran and provide the pam that related to it and by using 130 synoptic station's data in have studied the effective temperature indexes which the results of this research show that effective temperature in northern, southern and eastern areas of country gets the most effect of dried temperature. Alijani (1993) has investigated the role of climate in building designing and sources management. Moaveni (2001) has studied the climate welfare of some of Iran's habitants, based on welfare scale "Steadman-Tom".

Arvin (2005) has done the zoning of architectural native climate and optimized the fuel and energy in Isfahan. Ismael et al (2010) in a research by using temperature's scales- average predicted physiologic (PMV) and thermal stress (HIS) – investigated the climate welfare pf Chabahar in daily measurement. The results of this research showed that the climate welfare is provided in December, Day, Bahman and March. Hashemi Nasab (2011) in a thesis with the title of "zoning the human climate in Semnan". He gets to these conclusions that most of the stations that exist in south, east and west of state on April and November and northern stations in May, June, September and October are in a welfare range. Khosh Akhlagh et al (2010) investigated the role and effect of climate changing on climate welfare of Yazd by using Evan's model and the showed that thermal process in Yazd is increasing and most of the month have thermal process.

Ismaeeil Nejad (2011) paid his time on effective climate indexes on southern tourism areas of Iran. Golabi et al (2013) did prediction about Abadan's climate welfare features by using analyzing time series and by utilization of Mahani welfare climate model, he set proper month for human physiology welfare in 6 terms in 10 years. After that by using Tenkinx-Box models, time series for 3 climate factor, maximum temperature, minimum temperature and relative humidity have been processed in a best model. Tavoosi and Sabzi (2013) did research about determination the climate welfare area of IL am by using Evan's index, and the results showed that daily welfare in spring and autumn for IL am Ivan and Dorreshahr about 5 months and for Octoberan and Dehlran about 4 months scattered in a way that April in spring and November in autumn daily welfare exists in all the state. Safaii poor et al (2013) in a research with the title of "effective climate indexes on indication of human welfare (Shirax)" welfare or discomfort of human's life in Shiraz have been investigated base on models and Backer's climate indexes, Terjon, nervous pressures, effective temperature and TCT. Investigations showed that Shiraz in a year have bioclimatic varieties and hot and extreme cool conditions. Mohammedi (2014) in a research with the title of "investigations of time acted and place condition of climate welfare in Kurdistan" by using daily data and standard effective temperature indexes and physiologic equivalent temperature. The results showed that the most climate welfare is in November, October and May. Also the highest climate welfare belongs to Zarrine station in summer.

III. RESEARCH ZONE AND RANGE

Mazandaran with a 23756 square kilometer vastness (1/46% of the country) the zone in 47`and 35 c to 35`and 36 c northern latitude and 34`and 50 c to 10`and 54 c is in the east of Greenwich and meridian and it exists in the arrangement of round clock 60, 150, 250, 70 and 50 kilometers common border with Golestan, Semnan, Tehran, Qazvin and Gilan and all over the north with a length of 30 kilometers has contact with December sea. Mazandaran in 2011 bases on estimation of population placed nearly 3013123 people in itself and bases on last the last country divisions it has 19 townships, 59 towns, 46 districts, 117 rural districts and 3665 villages. Mazandaran 's nature is effected by latitude, Alborz's height, height from the sea, far and close to the sea, the zonal and local airflow, the northern and western cumulus movement s and even woodsy dense cover because of this and although its little extent (unlike the public vision that know it as a mild climate) this district has a special diversity climate)
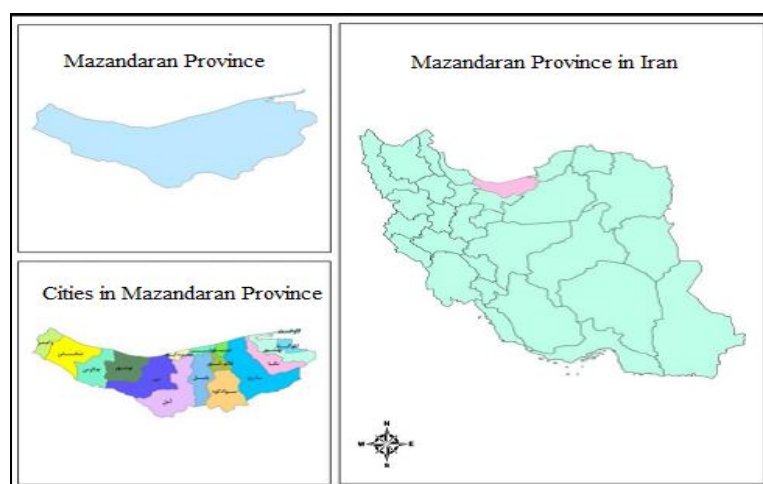
Figure 1: Location of the studied area

IV. MATERIAL AND RESEARCH METHODS

In the climate investigations of Mazandaran, we used statistics and 15 years' climate elements data including temperature, raining, relative humidity, Ramsar synoptic stations, Babolsar, Noshahr, Qarekhil of Qaemshahr, Dashtnaz which presented as maximum, minimum and average parameters and also clouding cover and sunny hours, speed and direction of airflow, number of snowing days and glacial and the number of day with dust. After gathering and averaging the mentioned parameters, related diagrams have been produced by computer software(excel) and by using climate indexes, Becker, Mahoney and Evans necessary offers for designing and architecting that relates to the climate have been set.

V. MAHANI CLIMATE INDEX

In 1970 Karl Mahoney et al offered a method which paid attention to the human welfare. At first, Mahani schedule according to the average temperature in a year of studied place and the average of relative humidity of that month identifying the welfare range of relative humidity of that month identifying the welfare range (United Nation. 1970). The way of working is like that by paying attention to the Mahani offered schedule in average yearly temperature, we compare the average of yearly relative humidity with the amount of chart, in order to identifying in what range we are living .Now for investigating the thermal statues in a day we compare the content of maximum monthly temperature with the amount of chart, if this measurement was more than the chart's amounts, it is in a warm range and of it was less than these amounts it is in the cold range and between these amounts is the welfare range and for investigating the night thermal situation at night we use minimum temperature for comparison. Mahani diagram determines the night and day welfare area by paying attention to the yearly average equal of the studied place and the coequal of humidity of that month. For evaluating a place's thermal condition by this schedule we should act the instruction below:

1. Set the yearly temperature equal and minimum and maximum temperature equal of each month of every area or place.
2. Counting the relative humidity equal of each month.
3. By using temperature yearly equal and relative humidity of each month with the help of diagram number 1, recognizing climate studied group and then extracting the day and night welfare area of that schedule.
4. Measuring the maximum (minimum) temperature equal of each month with day (night) welfare zone.
    If the maximum (minimum) temperature equal
a. Is nigger than the overhead of night (day) welfare zone, the days (nights) of that month are warm.
b. Are in two welfare ranges, the days (nights) of that month are moderate.
c. Is smaller than the lower limit of welfare zone, days (nights) of that month would count as cold.

Table 1: Table Mahani day and night to determine the comfort zone

The Climate Group	The average relative humidity in percent	The average annual temperature					
		More than 20		15-20		Less than 15	
		Day	Night	Day	Night	Day	Night
1	30-0	34 26	25 17	32 23	23 14	30 21	21 12
2	50-30	31 25	24 17	30 22	22 14	27 20	20 12

3	70-50	29	23	28	21	26	19					
		23	17	21	14	19	22					
4	100-70	27	21	25	20	24	18					
		22	17	20	14	18	12					

VI. EVAN'S WELFARE INDEX

Evan in the housing book, climate and welfare for determining the welfare zone the dried air temperature welfare zone relation with:
1. Relative humidity in 4 groups, 0-30 %, 30-50%, 50-70 %, 70-100 %
2. Airflow, from invisible = (1,0 meter in second) to visible (1 meter in a second)
3. Activity, resting or domestic works
4. Identified wear, light summer clothing and winter clothing in a house and showing the results in schedule
 For estimating the thermal situation of a place by Evan's method we should:
1. Per each month minimum relative humidity equal extent, the welfare ranges of days of that month from the chart.
2. Per maximum relative humidity equal of each month, determine the night welfare humidity equal of each month, determine the night welfare range of that month from the chart.
3. Compare the maximum temperature equal of each month with welfare zone of a day.
4. Compare the minimum temperature equals of each month with night welfare zone.

Table 2: different scales used in the model Evans

Scale	Thermal conditions	relative humidity	Daily temperature	Night temperature
A	Groups comfortable air flow per area of 1 meter per second	30-0 50-30 50-70 100-70	5.29-5.32 5.28-5.30 5.27-5.29 26-29	5.27-5.29 5.26-29 26-5.28 5.25-28
B	Area rugs comfort zones per summer dress or a subtle style in the night air flow (0/1 meters per second)	30-0 50-30 50-70 100-70	5.22-30 5.22-28 5.22-5.27 5.22-27	20-5.27 20-5.26 20-26 20-5.25
C	Per ordinary clothes and warm and comfortable area of thick blankets at night	30-0 50-30 50-70 100-70	18-5.22 18-5.22 18-5.22 18-5.22	16-20 16-20 16-20 16-20

VII.   BACKER'S BIOCLIMATIC INDEX

This method is a part of practical methods in a way to determine the human climate, which has made by Backer that is well known as environmental cooling power index (Backer, 1972) and counted from this formula (Ramezani, 2009 from Jahan Bakhsh, 1998, Kaviani, 1992).
Formula number (1):
$CP = (0.26+0.34V0.622) (36.5-t)$ mcal/cm2/sec
V: The average wind speed of m/s
CP: The environment power for cooling mcal/cm2/sec
t: The daily temperature equal c
Estimating the power of cooling index and human climate welfare by Becker's method is explained below:

Table 3: Environmental cooling power degrees and bioclimatic thresholds bases on Backer's method

sign	The type of conditions	Human bioclimatic conditions	Environmental conditions	amount
A	Unwanted warm	Bioclimatic pressure	Hot and humidity and undesirable	4-0
A	Unwanted warm	Bioclimatic welfare	Warm and tolerable	9-5
B	Desirable	Bioclimatic welfare	Desirable moderate	19-10
C	Unwanted cold	moderate	Cool	29-20
C	Unwanted cold	Moderate to extreme	Cold and a bit restrainer	39-30
D	Unwanted extreme cold	Restrainer moderate	Very cold	49-40

D	Unwanted extreme cold	Extremely restrainer	Extreme cold	59-50

VIII. WELFARE ZONE

The human feeling to the environment cannot be explained just by investigating one of the clime elements like temperature, relative humidity or airflow, because the combination of these elements effects on human and have a connection with their physical welfare. For example, if we consider the airflow, stable, and ignore the sunshine (means people stay in shadow and internal space) most of the individuals are comfortable in 21-26 temperature physically. Now if we change the air condition in this room, means the humidity increase and the temperature decreases, then these individuals feel discomfort. Therefore, the relation between temperature and relative humidity is effective in making human welfare feeling. Of course body reaction to the climate conditions is an experimental phenomenon and it is different in various cultures and geographical areas. For example, in Germany the temperature is 69/5 ° F (20/81 c) and the relative humidity is 50%. Whereas in Britain it is preferred a temperature between 58-70 ° F (21/1 – 14/4 c) and in USA preferred the 69-80 ° F (26/7 – 20/8 c) temperature.

These statistics are air conditions determinative which human are comfortable physically in these situations. If we trace the limit of these statistics changes in a chart that the relative humidity on horizontal axis and the temperature showed on vertical axis, arrange obtained that called "welfare range". This range, is an identifier of situations that an individual feels comfort in it. Of course because of the comparison among air desirable temperature in a specified zone is different for people with different gender and age, and it depends on activity's type and clothing type of individual.

Also, the desirable air temperature is different for a man in summer and winter. Scientific investigation and condition CMP and human climate welfare returns to the 50, and 60 decades of 20th century. In that moment scientist's efforts absorbed to this question that by using mathematic terms, statistical, schematic and also by using the climate parameters like temperature. Airflow and… it would have paid to human welfare conditions.

IX. DISCUSSION AND CONCLUSION DETERMINING THE WELFARE ZONE RANGE BY USING MAHANY INDEX.

Babolsar station

In the investigations of Babolsar's statistics station by using Mahani model these conclusions extracted:

In the first years (1997 to 2001) in spring by sequence in April at night it has discomfort of cold type and in a whole day is in welfare zone. In May at night and in a day has same conditions in a way that they're both climate is in welfare zone and in June in a day has climate welfare and at night has discomfort from the type of warm. Investigations of temperature parameters and the humidity of summer in this station show that June, August, September are in forth humidity group and bases on Mahani model at night and in a day has the same discomfort warm welfare and also it is suggested to use heating systems in these situations.

In autumn by sequence on October at night and in a day there is similar welfare climate welfare conditions and on November and December has the discomfort from cold type. Also in winter in this station at night and a day there are the same conditions and have discomfort welfare and this discomfort easement is cold and because of that it needs heating systems in order to make welfare conditions.

In the second statistical year (2002-2006) the statistical investigations basing on Mahani index show that in spring by sequence at night and in a day the discomfort conditions is cold and on May and June at night and in a day the similar welfare conditions exist.

Also in summer on June and August and September at night and in a day this range is living in a discomfort warm conditions and need cooling system. Investigations in Autumn show that on October in a day the discomfort conditions are warm and at night it has welfare and On November at night it is in discomfort (cold) situation meanwhile it has climate welfare in a day.

In December at night and in a day it has discomfort cold discomfort conditions too. This station in winter and in January and Bahman and March at night and in a day has the similar conditions and has discomfort cold conditions which it needs heating system in order to make resolve this irritation.

According to Mahani model in the third 5years of Babolsar's station, years (2006-2011) in spring by sequence on April the discomfort conditions are cold and on May and June the conditions are the same too and in both of them there is also a climate welfare. On June at night and in a day there is welfare and in August and September in a whole day there are discomfort warm conditions and it has welfare at night. In autumn on October at night and in a day it has welfare and airflow. On November at night and in a day it is in climate welfare conditions and at night discomfort is overbearing that this conditions are cold type. On December at night and in a day it has cold discomfort and in buildings there is a need for using materials with high thermal capacity and proper heating systems for making welfare. In schedule number 4, the situation of Babolsar's climate welfare station bases on Mahani index has shown.

Table 4: climatic comfort items Babolsar based on Mahani index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night													76-80
Day													
Night													80-85
Day													
Night													85-90
Day													

Ramsar station

The investigations of climate parameters show that Ramsar station in the first 5 years, years (1997-2001), according to Mahani model in spring by sequence at night and in a day experience cold discomfort conditions and on May in a day it has discomfort cold condition and at night it is in the welfare condition. On June at night and in a day this range is also in welfare range. By the beginning of summer air temperature increases amazingly in a way that in each 3 months it has warm discomfort conditions at night and in a day. On October by decreasing the temperature, air gets a little cold which at night and in a day it has climate welfare and on November and December and winter's months the air temperature decreases and cold discomfort conditions overcome to all zones and heating systems for making proper welfare would be a need.

In the second statistic term (2002-2006) Ramsar's station on April, May, November, December, January, Bahman, March is in the similar cold discomfort conditions and October in both night and day conditions has the same climate welfare. Also in summer on June and August and September at night and in a day it has warm climate and needs proper cooling systems of course on June at night by decreasing 1 c of air temperature enters from temperature to welfare zone, also sleeping in a free space is one of the ways for resolving this discomfort.

In statistical term (2006-2011), also according to Mahani diagram, April, May, November, December, January, Bahman and March the maximum temperature's equal and its minimum is less than the welfare zone's lower limit and it can be concluded that days and nights of these months have discomfort conditions and this discomfort is also cold. As well as in June and October this station stays in welfare conditions and it has moderate nights and days. In June, August and September also the maximum and minimum of temperature's equal is bigger than the overhead of Mahani chart welfare zone then days and nights of these months are in a warm discomfort conditions. In the schedule number 5 the climate welfare of Ramsar's station are shown according to Mahani index.

Table 5: climatic comfort items Ramsar based on Mahani index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night													76-80
Day													
Night													80-85
Day													
Night													85-90
Day													

Noshahr station

In statistic the term (1997-2001), Noshahr station in winter's months and April and December has the similar cold discomfort conditions and also there is need for using warm cloths and heating systems. In

May and June and October also the maximum and minimum temperature of this station is in 2 ranges of Mahani chart welfare because the nights and days of these months are moderate therefore the are in welfare conditions.

In summer on June and September in a day it is in a warm discomfort zone and at night it stays in a climate welfare but in August temperature increasing makes warm nights and days for this area.

In the statistical second 5 years of this station (2002-2006), according to Mahani diagram these results extracted that in spring the discomfort conditions are cold and they are in a night range and daily range of April and May experienced the cold discomfort conditions meanwhile it has climate welfare in day but June has moderate conditions at night range and it is in a welfare.

In the whole summer all months at nights and day have similar discomfort conditions which this is a warm discomfort and it needs cooling systems. In autumn by sequence in day and night and November a night have climate welfare and at November's nights and days and nights of December there are discomfort (cold) conditions in Noshahr station. By the beginning of winter and the decreasing of maximum and minimum of this area's temperature this zone experienced the cold discomfort in every month.

Mahani index thorough the years (2006-2011), showing Noshahr station that has cold discomfort in winter also April, November and December are in the same winter's terms and the cold discomfort exists everywhere. May and June in day and night have welfare conditions too and there is also an airflow but little by little by the beginning of summer to the ends of September and through day and night warm discomfort climate conditions is dominate in the zone. In autumn by sequence on October in day and night there is similar welfare conditions and on November nights getting cooler and enters to the cold welfare zone but it is in welfare in days. In December and January, Bahman and March there are discomfort conditions in station range which is really cold. In chart number 6, the Noshahr station climate welfare situation shows according to Mahani index.

Table 6: climatic comfort items Noshahr based on Mahani index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night													76-80
Day													
Night													80-85
Day													
Night													85-90
Day													

Qaemshahr station

In Qaemshahr station in the first 5 years' term, years (1997-2001) these results has made that April, May, October and November have the same climate welfare conditions which they have welfare conditions in a whole day and cold climate at night. June and September also at night have welfare and they experience discomfort (warm). Also investigations show that on June and August there are discomfort warm conditions in the zone and the want cooling system for resolving the problems. On December and the months of winter at night and in a day there are cold discomfort conditions. Also on November in a night range discomfort (cold) and in a day it has moderate temperature and welfare conditions.

In the second statistical investigation (2002-2006) with Mahani index it seems that April and May and November in a day and night have cold discomfort and in a day have airflow and welfare. Also the maximum temperature of June. June and October is bigger than the overhead of Mahani welfare range and these months experience a warm climate in a day and at night by decreasing the air temperature welfare conditions provided. August and September are in the top of temperature which by sequence they have the maximum temperature of 32/1 and 29/6 c.

These months in day and night have the similar warm discomfort conditions and for resolving this discomfort using the cooling systems in a day and wearing comfortable clothes is recommended.

In the years (2006 and 2011), Noshahr station on April and May and November have the same terms which there is cold discomfort at night and it has welfare conditions in a day. On June and September also at night it has welfare conditions and in a whole day the air temperature is high and they are in a discomfort of warm type, also ON June and August the warm discomfort exists in the whole day and night and it need cooling systems for making welfare. On December, January, Bahman and March also they have cold discomfort

conditions and for resolving this problem wearing warm cloths and using heating system recommended. In schedule number7, the situation of Qaemshahr station climate welfare according to Mahani index has shown.

Table 7: climatic comfort items Qaemshahr based on Mahani index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night	blue	blue	green	red	red	green	blue	blue	blue	blue	blue	blue	76-80
Day	green	green	red	red	red	red	green	blue	blue	blue	blue	blue	
Night	blue	blue	green	red	red	red	blue	blue	blue	blue	blue	blue	80-85
Day	green	green	red	red	red	red	red	green	blue	blue	blue	blue	
Night	blue	green	green	red	red	green	blue	blue	blue	blue	blue	blue	85-90
Day	green	green	red	red	red	red	green	blue	blue	blue	blue	blue	

Dashtnaz station

Dashtnaz's station in the first 5 years (1997-2001), has experienced winters with cold discomfort through day and night also in April and November and December conditions are the same in winter on June and June and October in day and night there are similar welfare conditions in this station and it is noteworthy that on May in a day it has discomfort(cold) and at night it has more moderate air and welfare conditions and on August also it has the similar warm welfare conditions and On September it is in welfare in a day but it will be in warm discomfort at night.

In the second statistical term years (2002-2006), On December, January, Bahman and March the maximum and minimum of the temperature of this station is less than the Mahani chart climate welfare lower limit and they are in the cold discomfort. The welfare conditions on April and November are the same in a way that there is cold discomfort at night and welfare conditions in a day. On June, September and October there is a kind of welfare and temperature moderation in a zone and in a day warm discomfort exists in this zone. On June and August temperature increasing makes days and nights with warm discomfort for this station's zone but on May it seems that in day and night the similar conditions and airflow are exist.

In the third statistical term (2006-2011) from December to the end of winter the similar cold discomfort conditions exists in the zone and On April and May it enters to the welfare zone in days but it will stay in discomfort conditions at nights. On June it seems that it has climate welfare through the night and it has warm discomfort in a whole day and step by step by the beginning of summer and by increasing air temperature days and night with warm discomfort have been made in the zone. On October by decreasing the temperature it achieved to the welfare conditions in day and nights. The climate welfare situation of Dashtnaz station is taken in the chart number 8 bases on Mahani index.

Table 8: climatic comfort items Dashtnaz based on Mahani index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night	blue	green	green	green	red	red	green	blue	blue	blue	blue	blue	76-80
Day	blue	blue	green	green	red	green	green	blue	blue	blue	blue	blue	
Night	blue	green	green	red	red	red	green	blue	blue	blue	blue	blue	80-85
Day	green	green	red	red	red	red	green	blue	blue	blue	blue	blue	
Night	blue	green	green	red	red	red	green	blue	blue	blue	blue	blue	85-90
Day	green	green	red	red	red	red	green	green	blue	blue	blue	blue	

X. DETERMINING THE WELFARE ZONE BY EVAN'S METHOD

Babolsar station:

Through the years (1997 to 2001) the cold discomfort in every month of winter and November and December and autumn exists in a way that for making welfare it need warm clothing and heating systems, this cold situation continues until the end of April and May's nights also experienced a cold climate. Generally, there is climate welfare conditions in 4 months in a year at night that these months by sequence are June, June, August and September. Also the welfare conditions in a day on May, June and October are provided and citizens with comfortable cloth would be in a complete welfare. In the whole terms of summer in a day this station's range exists in warm discomfort and it needs proper cooling systems.

In years (2001-2006), Babolsar station range in spring by sequence on April, has cold discomfort in each 2 terms of day and night and on May the increasing of temperature causes welfare for the citizens but through a day temperature's increasing causes welfare conditions for the citizens but at night there is still cold conditions. On June the welfare conditions has provided at night and continues until the end of summer but in a day there is warm discomfort. On October by decreasing the temperature cold nights and days with climate welfare are exist for this zone but this temperature decreasing continues until the end of March and makes the cold discomfort.

In years (2006-2011), the climate conditions of this station has been like 2 statistical previous terms and hasn't changed a lot. Cold climate in whole of the summer there is warm discomfort conditions but enters through the night to the welfare range. Also June's months at night and October in a day are in a welfare zone. According to the schedule number 9, the situation of Babolsar's climate welfare station has been shown bases on Evan's index.

Table 9: climatic comfort items Babolsar based on Evan's index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night													76-80
Day													
Night													80-85
Day													
Night													85-90
Day													

Ramsar station

The investigations of Ramsar that taken by Evan's index for years (1997-2001), explained this fact that in spring on April and in day and night and on May at night it has cold discomfort. Step by step On June welfare conditions provided in this area which continues until September but this climate welfare is just through the night and in a whole day citizens experience the warm welfare. In autumn by sequence of December to March there are similar conditions in a day and night and it has cold discomfort too.

In years (2001-2006) and years (2006-2011), the statistical investigations base on this index show that April, December, January, Bahman and March have cold daily climate through day and night and October and June stay in climate welfare and permanent airflow already exist. Also in summer there is warm discomfort in a day but at night the welfare conditions provided for this zone according to chart number 10, the situation of climate welfare of Ramsar's station has shown bases on Evan's index.

Table 10: Climatic comfort items Ramsar based on Evan's index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night													76-80
Day													
Night													80-85

													Period
Day													
Night													
Day													85-90

Noshahr station

Noshahr station through the statistical term (1997-2001), in winter and April of spring is in C scale (comfortable area per simple and warm cloth and thick blanket at night), of Evan's index and has cold discomfort which need heating systems for providing welfare conditions. Of course it is mentionable that May, October and November have the same conditions as these months at night. Also welfare conditions for citizens on May, June, October and November in a day and for June, August and September provided through the night. On June, August and September warm climate exists in the zone and discomfort has made for the citizens.

In statistical term (2001-2006), these results achieved that cold climate from December to April stays in the zone and even at nights of May and October and November in autumn also these conditions exist. But little by little by the temperature's increasing from May welfare conditions have provided for this area. In a way that June, June, August and September at night and May, June, October and November have climate welfare through the day it means in scale B (comfortable zone per summer clothing or a light blanket at night with the insensible airflow (0.1 m/s) stays in Evan's index. But in summer the climate of this zone enters to the warm discomfort area and it need cooling systems in fact discomfort is just only exists in a day and welfare conditions provided at night.

In years (2006-2011), Noshahr station in winter is in the C scale range (comfortable zone with normal and warm clothing and thick blanket at night), of Evans's index and has cold discomfort and this situation continues to May in spring. The welfare conditions of this zone begin from May in which way that experience moderate climate in days and on June by temperature increasing it has warm discomfort in days but at nights it stays in welfare. Bye the beginning of summer and more temperature increasing and humidity on June, August and September it has warm climate through day and night and exists in discomfort. Step by step from September the temperature decreases at night and enters to welfare zone. In autumn by sequence October is in welfare conditions in a day but it experiences cold climate at night but by 1 c increasing of temperature enters to the welfare zone. Also November and December in a day and night experience the similar cold discomfort conditions which have shown in schedule number 11.

Table 11: Climatic comfort items Noshahr based on Evan's index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night													76-80
Day													
Night													80-85
Day													
Night													85-90
Day													

Qaemshahr Station:

Qaemshahr station had been in discomfort situation caused by heat in summer days during (1997 to 2001) and goes to the comfort zone by decreasing the heat at night. According to Evans` index October (September-October), November (October-November) and May (April-May) at night and December (November-December), January (December-January), Bahman (January-February), March (February-March) and April (March-April) in both day and night are placed in J index. To wit, they experience* discomfort caused by cold. May (April-May), October (September-October) and November (October-November) in day and June (May-June), June (June-July), August (July-August) and September (August-September) at night will be placed in index B from Evens` index at night and have a benignant and comfortable situation. Although in summer this situation is just appears at night and the discomfort caused by warmth is dominant in days.

Evans` index for years (2001 to 2006), Noshahr station shows that 5 months of the year are in discomfort caused by cold, which this situation is equal during day and night and these months are: April (March-April), December (November-December), Day (December-January), Bahman (January-February) and March (February-March). Although the situation is equal in May (April-May) and November (October-November) but they have comfort climate during the day. June (May-June), June (June-July), August (July-August) and September (August- September) will be placed in index B from Evans` index during the night it means they are in comfort climate but there is a hot climate during the date. Decreasing heat in October (September-October) had brought cold days and nights for this area.

In the years (2006 to 2011), results show that comfort situation is available in June (May-June), June (June-July), August (July-August) and September (August- September) at night and May (April-May) and October (September-October) in a day. Summer days are in index A form Evans` index and are in discomfort situation caused by cold. Cold climate all nights in the winter and also cover April (March-April), November (October-November) and December (November-December) and thick cloth and heating system are needed in order to create a comfort zone. According to table 12, Qaemshahr climate situation is shown based on the Evans` index.

Table 12: Climatic comfort items Qaemshahr based on Evan's index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night	blue	green	red	red	red	red	green	green	blue	blue	blue	blue	76-80
Day	blue	blue	green	green	green	green	blue	blue	blue	blue	blue	blue	76-80
Night	blue	green	red	red	red	green	green	green	blue	blue	blue	blue	80-85
Day	blue	blue	green	green	green	green	blue	blue	blue	blue	blue	blue	80-85
Night	blue	green	red	red	red	red	green	blue	blue	blue	blue	blue	85-90
Day	blue	blue	green	green	green	green	blue	blue	blue	blue	blue	blue	85-90

Dashtnaz Station:

Review of climatic factors, temperature humidity in years (1997-2001), in this station shows that according to Evans` index, 6 months of a year are in index J and have a discomfort caused by cold which* these months are: April (March-April), November (October-November), December (November-December), January (December-January), Bahman (January-February) and March (February-March). Although cold climate also exists in May (April-May) and October (September-October) at night. This station`s comfort situation is available in May (April-May) and October (September-October) during the day and August (July-August) at night and is in a comfortable situation in June (May-June), June (June-July) and September (August-September) in both day and night and will be placed in index B from Evans` index.

This area`s comfort zone is the same in the periods (2001to 2006) and (2006 to 2011) as if Evans` index, is in discomfort situation caused by cold in December (November-December), January (December-January), Bahman (January-February), March (February-March) and April (March-April) and citizens have to use heating system in order to be comfortable and this discomfort situation is also dominant in May (April-May), October (September-October) and November (October-November) at night but the days in these months are in moderated climate and comfortable situation. This comfort zone is also stands for June (May-June), June (June-July), August (July-August) and September (August- September) during the day but these months will have a discomfort situation caused by warmth because of increasing in the temperature during the day which can be seen in table 13.

Table 13: Climatic comfort items Dashtnaz based on Evan's index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night	blue	green	green	green	red	green	green	blue	blue	blue	blue	blue	76-80
Day	blue	blue	green	green	green	blue	blue	blue	blue	blue	blue	blue	76-80

												Period
Night												
Day												80-85
Night												
Day												85-90

XI. BEAKER MODEL`S RESULTS

Babolsar Station:

The Babolsar station had been put in index B from Beaker index during (1997 to 2001, and has a desirable situation and also is in comfort from bioclimatic`s point of view. This situation is also existing in May (April-May) and September (August- September) at night. April (March-April), October (September-October) and November (October-November) during the night and December (November-December) during the day have a cold climate, it means that they`re in lack of comfort and the winter`s months are in index D from Beaker index and have an extremely cold climate. This index also shows that equal discomfort situation caused by heat is dominant in summer during day and night, although this discomfort and sultry situation is sustainable by wearing comfortable cloth at night.

In the (2001 to 2006) period, winters in this strict area are in scale D and summers are in scale A. Scale D represents a very cold and compressed climate and scale D represents a very undesirable and warm climate. There is a discomfort caused by coldness in every April (March-April) during the day and night and also in November (October-November) nights and December (November-December) days. But of course, according to Beaker index it takes place in scale C and by the environmental conditions point climate is cool and a little compressed. In an equal condition they experience a bioclimatic comfort in May (April-May), June (May-June) and October (September-October) during the night and they take place in scale B of Bealer index. Also November (October-November) during the day has the equal conditions like these months and has a pleasant and desirable environmental conditions.

Babolsar station during the year the years (2006 – 2011) has been spending days and nights in discomfort caused by coldness in April (March-April) and December (November-December). This condition is also existing for May (April-May) and November (October-November) at night. This station`s bioclimatic comfort is just in May (April-May) and November (October-November) during the day and in June (May-June) and October (September-October) at night. At this condition the citizens experience desirable climate and pleasant and desirable environmental conditions. June (June-July), August (July-August) and September (August- September) have a uncomfortable situation caused by extreme heat in the day and also warm condition at nights but according to Beaker index are in bioclimatic comfort and this conditions are sustainable. It`s been shown in table 14.

Table 14: Climatic comfort items Babolsar based on Beaker index

Month Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night													
Day													76-80
Night													
Day													80-85
Night													
Day													85-90

Ramsar Station:

Parameters reviews in Ramsar`s station and describing the wind`s maximum and minimum speed by using Beaker index shows that in the years (1997 to 2001), it has a discomfort in summer during days and nights which is caused by warmth, sultry and undesirable condition. But it should be noted that the temperature is lower at night and the heat is sustainable. Generally, 3 month of the year are in extremely cold and restrainer

condition like January (December-January), Bahman (January-February) March (February-March); and April (March-April) in day and night, November (October-November) at night and December (November-December) in the day experience a cold climate with benignant bioclimatic human condition.

Comfort conditions is also existing in May (April-May), June (May-June) and October (September-October) in both day and night and environmental conditions are benign and pleasant based on Beaker index. In the (2001 till 2006) period, winters in this area are in scale D and summers are in scale A. Scale D represents a very cold and compressed climate and scale D represents a very undesirable and warm climate. There is a discomfort caused by coldness in every April (March-April) during the day and night and also in November (October-November) nights and December (November-December) days. But of course, according to Beaker index it takes place in scale C and by the environmental conditions point climate is cool and a little compressed. In an equal condition they experience a bioclimatic comfort in May (April-May), June (May-June) and October (September-October) during the night and they take place in scale B of Bealer index. Also November (October-November) during the day has the equal conditions like these months and has a pleasant and desirable environmental conditions. During the years (2006 to 2011) in April (March-April) and December (November-December), Ramsar`s station had been in discomfort situation caused by cold during day and night. This situation also stands for May (April-May) and November (October-November) at nights.

This station`s bioclimatic comfort in May (April-May) and November (October-November) during the day and in June (May-June) and October (September-October) in both day and night. At this condition the citizens experience desirable climate, pleasant and desirable environmental conditions. June (June-July), August (July-August) and September (August- September) have a uncomfortable situation caused by extreme heat in the day and also warm condition at nights but according to Beaker index are in bioclimatic comfort and this conditions are sustainable. It`s been shown in table 15.

Table 15: Climatic comfort items Ramsar based on Beaker index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night	yellow	green	green	red	red	red	green	green	yellow	blue	blue	blue	76-80
Day	yellow	yellow	green	red	red	red	green	yellow	blue	blue	blue	blue	
Night	yellow	green	green	red	red	red	green	green	yellow	blue	blue	blue	80-85
Day	yellow	green	green	red	red	red	green	yellow	blue	blue	blue	blue	
Night	yellow	green	green	red	red	red	green	green	yellow	blue	blue	blue	85-90
Day	yellow	yellow	green	red	red	red	yellow	yellow	blue	blue	blue	blue	

Noshahr Station

According to the Beaker index Noshahr station experiences lack of comfort caused by cold during day and night in the statistic period (1997 to 2001) in April (Mars-April), November (October-November) and December (November-December). This cold weather is more severe in winter as it happens in restrainer situation. May (April-May), June (March-June) and October (September-October) during the day and night and September (August-September) at night have benignant province and are in comfort. June (June-July) and August (July-August) have equal situations and are discomfort which is caused by warmth and also cooling system and thin cloth are needed to resolve this discomfort.

Also in statistic period (2001 to 2006) cold climate is dominant in the June winter and there is an extremely cold environment with too much bioclimatic pressure. Indeed, cold term exists in April

(Mars-April) and November (October- November) as well, but takes place in the Beaker index in the scale of C it means it has a benignant bioclimatic pressure and is sustainable for human being. This period`s comfort zone is May (April-May), June (March-June) and October (September-October) which exists in this station`s area all night. In all months of the summer discomfort caused by extremely warm (undesirable and sultry) and warm (sustainable) exists in this situation in both day and night.

In statistic period (2006 to 2011) the situation was the same as past periods as if in winter discomfort from very cold weather is dominant and also there is a more benignant cold term in November (October-November), December (November-December) and April (Mars-April) at this locale. Summer months are spending time in discomfort from warm type. May (April-May), June (March-June) and October (September-October) are in comfort zone and have a desideratum condition. As it`s been shown additionally in table 16.

Table 16: Climatic comfort items Noshahr based on Beaker index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night	yellow	green	green	red	red	red	green	yellow	yellow	blue	blue	blue	76-80
Day	yellow	green	green	red	red	green	green	yellow	yellow	blue	blue	blue	
Night	yellow	green	green	red	red	red	green	yellow	yellow	blue	blue	blue	80-85
Day	yellow	green	green	red	red	green	green	yellow	blue	blue	blue	blue	
Night	yellow	green	green	red	red	red	green	yellow	yellow	blue	blue	blue	85-90
Day	yellow	green	green	red	red	red	green	yellow	yellow	blue	blue	blue	

Qaemshahr Station

Qaemshahr station spent June (June-July), August (July-August) and September (August-September) in total discomfort caused by heat, during (1997 to 2001), and this discomfort exists a few days in June (March-June) as well. According to Beaker index these months are placed in index A and are in undesirable, hot and sultry environmental situation. The station's comfort months are: May (April-May) in a day, June (March-June) at night, October (September-October) day and night and there is desirable environmental situation in these months. April (Mars-April), November (October- November) and December (November-December) are placed in index C from Beaker index and have a benignant cold bioclimatic situation. This situation will intensify in winter as if Bahman (January-February) and March (February-March) will be placed in index D from Beaker index and are in extremely cold situation with great bioclimatic pressure.

According to Beaker index, during (2001 to 2011), April (Mars-April) and November (October-November) are cold in the day and night and May (April-May) at night is in equal situations as these months but has a bioclimatic comfort during the day. Summer overall has a hot and sultry climate in day and night and citizens are not comfortable. And also extremely cold climate is dominant in the winter and heating system are needed in order to create comfort.

According to Beaker index, during (2006 to 2011), April (Mars-April) and December (November-December) have been causing extremely cold and undesirable situation which caused discomfort for citizens. Climate comfort is dominant in May (April-May) in a day, June (March-June) at night, October (September-October) day and night and will be placed in index B from Beaker index. June (June-July), August (July-August) and September (August-September) are in index A form Beaker index. It means that the amount of their CP is between 0-9 and have an extremely hot and undesirable climate in day and night. As it`s been shown in table 17. Qaemshahr station`s climate comfort situation has been shown according to Beaker index.

Table 17: Climatic comfort items Qaemshahr based on Beaker index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night	yellow	green	red	red	red	red	green	yellow	yellow	blue	blue	blue	76-80
Day	yellow	yellow	green	red	red	red	green	yellow	yellow	blue	blue	blue	
Night	yellow	green	red	red	red	red	green	yellow	yellow	blue	blue	blue	80-85
Day	yellow	yellow	green	red	red	red	green	yellow	blue	blue	blue	blue	
Night	yellow	green	red	red	red	red	green	yellow	yellow	blue	blue	blue	85-90
Day	yellow	yellow	green	red	red	red	green	yellow	yellow	blue	blue	blue	

Dashtnaz station

In years (1997-2001), this station experiences days and nights with extreme cold on January and Bahman and March but from April it is in cold discomfort at night. There are welfare conditions in days and nights of May and continue to June but by the beginning of summer and the zone's temperature increasing it has extremely warm day and nights that it needs cooling systems for making welfare.

In years (2001-2006), December in a day and November in day and night are in C scale of Becker's index and have moderate cold climate conditions. The months of winter completely in each 2 terms of day and night have similar discomfort conditions they are in D scale of Becker's index and their Cp is between 40-59. In summer also there are discomfort conditions of extremely hot type and citizens for making welfare use cooling systems. This station's welfare month in this term include: April (day), May (day and night), October (day and night), and November (day).

In statistical term (2006-2011), this station experience summers with extreme heat which stays in discomfort and humidity unwanted climate conditions, and June also has the same conditions. In winter also there are extremely cold conditions in the zone and has the same day and night of bioclimatic sight and they are also in discomfort too. April in a day and May and October at night and June at night are in bioclimatic welfare conditions and experience desirable situations as mentioned in schedule number 18.

Table 18: Climatic comfort items Dashtnaz based on Beaker index

Month / Period	April	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Period
Night	green	green	red	red	red	red	green	green	yellow	blue	blue	blue	76-80
Day	yellow	green	green	red	red	red	green	yellow	yellow	blue	blue	blue	85-
Night	green	green	red	red	red	red	green	green	yellow	blue	blue	blue	80-85
Day	yellow	green	green	red	red	red	green	yellow	blue	blue	blue	blue	80-
Night	green	green	red	red	red	red	green	green	green	blue	blue	blue	85-90
Day	yellow	green	green	red	red	red	green	yellow	blue	blue	blue	blue	

XII.   CONCLUSION

Climate is one of the important and effective features on different aspect of human life especially human health and welfare. By investigating Mahani index through statistical term and matching data with it and analyzing the results it's identified that most of the stations in summer have warm discomfort. Temperature increasing is from west (Ramras's station) to the east (Qemshahr and Dashtnaz station). Generally, in the first statistical terms in 4 years of the year all the stations have bioclimatic welfare conditions at night, these months include May, June, October and November. In a day the stations of Ramsar, Noshahr and Dashtnaz have the most welfare conditions time which are in desirable conditions along 4-5 months in a year. In the second statistical term temperature increasing has shown and in 5 months in a year they are in warm discomfort in day and night. This temperature increasing continues along the third statistical term too. The stations of Ramsar and Noshahr are extremely humid and Babolsar and Qaemshahr stations have humidity welfare too. From the west to the east of Mazandaran the raining and humidity have decreasing process meanwhile the temperature increases and finally the climate gets drier. Of course the investigations that have been taken from the past show that dry index has low decreasing process that up to now it doesn't change the climate index so far. Of course fluctuations of these changes are more in the west of the state and perhaps the cause of that are climate sensitive rainy parameters in the rainy areas. According to Evan's index, the investigations of three conditions on air temperature (cold, welfare, warm) in two separate parts (day and night) in different months of Mazandaran's state show that the daily welfare conditions of stations in the first statistical term are on May, June, October and November and the night welfare are on June, June, August and September. By the second statistical term the traditions are the same as the first term conditions. From November to March the cold discomfort conditions are in the zone. The welfare conditions at night are only exist on June, June, August, September and October but with a help of a thick blanket we can put the nights of November and April in the welfare zone. Although all the stations have the daily welfare on May and October and November but they have a spread potential of these conditions on November and April,

The results of human bioclimatic welfare in Mazandaran's stations base on Backer's index show that in every stations of June, June, August and September are warm base on bioclimatic conditions and the high relative humidity in these stations also increases because of its near distance to the sea that increases the bioclimatic pressure provided from this heat and the wind speed is about normal too. On Day, Bahman and March in every stations we witness the very cold conditions and on November. December and April the wind speed reduces of the air cold. In all the 15 years' statistical term the months of autumn and spring are exist in the welfare range more. The process of unwanted warm months in all stations were 4 months and also all months of summer that exist in the zone from November to March. It shows the desirable welfare time in the area which have the most period of time at night in stations of Dashtnaz, Babolsar and Noshahr and also in the stations of Babolsar, Noshahr. Ramsar and Dashtnaz. In other word the human welfare is more desirable in the east of Mazandaran's sea than the west of it.

According the achievements of three Mahoney, Evans and Becker index we can conclude that every stations on May and October are in the more desirable conditions than other months and June and November also have the potential to enter the welfare zone through day and night. The extreme cold climate conditions in winter need the use of heating systems and in summer the unwanted warm conditions exist and proper heating systems needed in order to make welfare. On months that are out of the welfare zone we can easily provide heating welfare conditions by architecting techniques basing on climate in the most times in a year and avoiding from problems of nature destruction and vocal pollutions and the high expense of energy.

XIII.   SUGGESTIONS

As it was mentioned Mazandaran has a moderate and humid climate therefore to provide human bioclimatic welfare conditions these solutions offered:
1. Put buildings on jambs in which way that air could move under the building,
2. Make sporadic contexture in a way that air could easily move around and inside of the building,
3. Use big windows that open from the bottom for improving the movement of air into the building,

4. Use opposite windows in plans,
5. Elongation of plans in perpendicular of wind's way,
6. Maximize the possibility of using the air between land and sea,
7. Use big porches for spending life time,
8. Banish warm spaces and humid made from the inside of the plan (like kitchen and bathroom)
9. Remove plants and water from the outside of the plan,
10. Make air passage channels by plants in a zone that is far from the plan

It should be added that in winter we need more risk managing because of the raining. Also introducing heating energy in this season and cooling energy in summer is more than other months. Therefore, we should try to avoid using high amount of energy and making pollutions in nature by observing the architectural principles that related to the climate.

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