THE LEVEL OF AWARENESS AND RESPONSE MECHANISMS OF THE ACTORS ABOUT THE IMPACTS OF CLIMATE CHANGE ON TOURISM, THE CASE OF ANTALYA

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ABSTRACT

THE LEVEL OF AWARENESS AND RESPONSE MECHANISMS OF THE ACTORS ABOUT THE IMPACTS OF CLIMATE CHANGE ON TOURISM, THE CASE OF ANTALYA

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The concept of "climate change" is, nowadays, seen as a global problem of the whole world. It has impacts on the economic, social, and environmental life of human beings, and also on the local life. As one of the sectors that are important for the local economies, "tourism" is vulnerable to climate change due to being sensitive to the factors of climate and weather. Therefore, to discuss the relation between the climate change and tourism is the aim of this thesis. In this regard, the context of "the awareness of the actors" about the impacts of the climate change becomes important. To evaluate the awareness of the actors, the research is focused on "the response mechanisms" that they develop. The hypothesis is that although the expected impact of climate change is very important, the level of awareness of the actors on this sector is rather limited and this leads to limited action to mitigate the negative impacts of climate change on tourism. In this regard, in this research, the main purpose is identified as to discuss the impacts of climate change on tourism, and to evaluate the awareness of the actors and the response mechanisms. It is researched that whether the actors are aware of the current condition about climate change and tourism and whether the response mechanisms that actors develop are effective on the impacts of climate change on tourism. As a sample in Turkey, Antalya is defined as the case study area, and the impacts of climate change on tourism are examined, and the awareness of the actors is analyzed. It is displayed, by the results of the analysis, that which type of mechanisms the actors in Antalya have trend to develop about climate change impacts.

Keywords: Climate Change, Tourism, The Impacts of Climate Change on Tourism, Response Mechanism, Antalya

ÖZ

İKLİM DEĞİŞİKLİĞİNİN TURİZM ÜZERİNDEKİ ETKİLERİ HAKKINDA İLGİ GRUPLARININ FARKINDALIĞI VE TEPKİ MEKANİZMALARI, ANTALYA ÖRNEĞİ

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"İklim değişikliği" kavramı bugünlerde, tüm dünyada küresel bir problem olarak görülmektedir. Insanların ekonomik, sosyal, çevresel yaşamı üzerinde ve ayrıca yerel yaşam üzerinde sonuçları olduğu düşünülmektedir. Yerel kalkınma için önemli sektörlerden biri olan "turizm", iklim ve hava faktörlerinden etkilenmesi nedeni ile iklim değişikliği açısından duyarlılığı olan bir sektördür. Bu nedenle, iklim değişikliği ve turizm sektörü arasındaki ilişkiyi tartışmak bu tezin amacı içerisinde yer almaktadır. Bu kapsamda, iklim değişikliğinin etkileri konusunda "ilgi gruplarının farkındalığı" konusu önemli bir konu haline gelmektedir. Bu çalışmada, ilgi gruplarının farkındalığını değerlendirmek için onların geliştirdikleri "tepki mekanizmaları" araştırılmıştır. Tez, iklim değişikliğinin tahmin edilen etkileri çok önemli olmasına rağmen, ilgi gruplarının bu sektör üzerindeki farkındalık düzeyinin sınırlı olduğu ve bunun da turizm üzerinde iklim değişikliğinin neden olacağı olumsuz etkileri azaltmak için yapılacak eylemlerin sınırlı olmasına neden olacağı hipotezi üzerine kurulmuştur. Bu çerçevede, çalışmada, asıl amaç, iklim değişikliğinin turizm üzerindeki etkilerini tartışmak ve ilgi gruplarının farkındalığını ve tepki mekanizmalarını değerlendirmek olarak tanımlanmaktadır. Türkiye'de bir örnek olarak da Antalya kenti alan çalışması için belirlenmiştir ve iklim değişikliğinin turizm üzerindeki etkileri incelenmiş ve ilgi gruplarının farkındalığı analiz edilmiştir. Antalya'da yapılan analizler sonucunda ilgi gruplarının, iklim değişikliğinin etkileri konusunda hangi tür tepki mekanizmaları geliştirme eğiliminde oldukları ortaya konmuştur.

Anahtar Kelimeler: İklim Değişikliği, Turizm, İklim Değişikliğinin Turizm üzerindeki Etkileri, Tepki Mekanizmaları, Antalya

To My Little Brother

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LIST OF ABBREVIATIONS

CO_2	Carbon-Dioxide
COP	Conference of the Parties
ECCP	European Climate Change Programme
EPA	Environmental Protection Agency
EU	European Union
EUAs	European Union Allowances
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
Kwh	Kilo watt
LOS	Length of Stay
MDG	Millennium Development Goals
MJ	Mega joule
Pkm	Passenger kilometer
SRES	Special Report on Emissions Scenarios
TAR	IPCC Third Assessment Report
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNWTO	World Tourism Organization
WMO	World Meteorological Organization

CHAPTER 1

INTRODUCTION

1.1. The Context and Scope

The awareness of the actors about the impacts of climate change on tourism and the response mechanisms that actors develop constitutes the subject matter of this thesis. There is two-way relationship between climate change and tourism, that there are impacts of climate change on tourism and, also contribution of tourism to the climate change. In this condition, the actors that are effective in the sector and their level of awareness about the relation between tourism and climate change become important because these actors develop some response mechanisms. Therefore, to evaluate the relation between the climate change and tourism and to examine the level of awareness and the response mechanisms are the primary purpose of this thesis.

> "1) The term "climate change" encompasses all forms of climatic inconstancy (that is, any differences between long-term statistics of the meteorological elements calculated for different periods but relating to the same area) regardless of their statistical nature or physical causes. Climate change may result from such factors as changes in solar activity, long-period changes in the Earth's orbital elements (eccentricity, obliquity of the ecliptic, precession of equinoxes), natural internal processes of the climate system, or anthropogenic forcing (for example, increasing atmospheric concentrations of carbon dioxide and other greenhouse gases).
>
> 2) The term "climate change" is often used in a more restricted sense, to denote a significant change (such as a change having important economic, environmental and social effects) in the mean values of a meteorological element (in particular temperature or amount of precipitation) in the course of a certain period of time, where the means are taken over periods of the order of a decade or longer." (homepage, http://www-nsidc.colorado.edu/arcticmet/glossary/, last accessed at May 2009).

That the climatic systems are changing and that anthropogenic activities cause this change appear to be supported by a wide array of scientific and physical evidences. The Inter-

governmental Panel on Climate Change (IPCC) Fourth Assessment Report states that "warming of the climate system is unequivocal...evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level" and "…Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gases (GHG) concentrations" (Gaita, R. & Both, M., pp: 1-2).

Tourism is one of the sectors which climate change, one of the most important problems of the present day, has been economically and environmentally related. It is an important sector for almost the whole countries in the world economically; however, it is very sensitive to the changes of the climate. Thus, in one aspect, all changes in climate have some impacts on tourism. In addition, in other, it has some contribution to the climate change via transportation, accommodation, activities, etc… in important measures. In this regard, it is clear that there is a strong relationship between the climate change and tourism and a dual position between them, which is the context of the thesis.

In most of the newly developing countries, the sector tourism is taken as a catalyst for local development. Many cities invest heavily on tourism for promoting local development because the sector is considered to be a major global economic force and world's largest industry. In addition, it is considered to be played a major role in bringing people and countries together, contributing to mutual understanding, as well as being an important source of revenue and employment (Crouch and Ritchie, 1999; Göymen, 2000). According to the World Tourism Organization (WTO, 2004), tourism is a sector that favors local development because it generates jobs, increases the income of workers and stimulates capital investments through new business opportunities, which results in the establishment of new organizations, including SME, among other advantages.

It is attempted that there is a relation between the climate change and tourism, then, it is clear that it is required more knowledge and studies on how tourism sector is affected in relation to global climate change. However, in this point, it can be seen that there is two faces of the discussion. While tourism as an industry provides fundamental benefits for countries, at the same time, the industry makes contribution to the climate change which has negative effects on the Earth and so the sector. In other words, tourism sector cause to be occurring negative impacts of climate change on the sector itself by contribution to the climate change.

Climate and weather is an important criterion for choosing a tourism destination (Didaskalou et al. 2004), and can determine the appeal of a location. “The climatic facets of tourism are related to thermal and bioclimatic aspects as the combined effect of temperature, humidity, wind and radiation; the nature of individual weather events such as storms, rainfall, etc… and aesthetics such as sunshine, cloud cover, etc…” (de Freitas, 2003). For the potential tourist, the mean climate values determine the choice of destination and the time of the travel. For the tourism sector, climate sets limits to the overall appeal of a destination, the type of infrastructure to offer, the possible length of the tourist season and the nature of promotion and marketing campaigns (Meze-Hausken, E., 2008, p: 312). Therefore, the changes in the climate cause some negative impacts on the sector and some loses economically and environmentally, and so the economic and social life in the local is affected.

In this regard, it becomes necessary to examine that how the actors, during the process of climate change, is effective on the relationship between the tourism sector and the climate change; whether they are effective or not; whether they are aware of the current situation or not; what kind of responses they develop. The effects of the actors in the sector are occurred as an important issue because the actors can be very effective on the industry.

Mainly, in this thesis, the focus will be on the awareness of the actors about the impacts of the climate change on tourism. The actors which are interested in tourism sector can develop response mechanisms such as mitigation to the contribution of tourism to the climate change or adaptation to the impacts of climate change on the sector. Since the actors can be active about this paradox and develop these response mechanisms, the context will be examined in the frame of the actors and their awareness.

1.2. Purpose, Research Question and Hypothesis

Tourism sector is very important sector economically for almost all countries in the world. One of the most important problems which affect the tourism sector is considered as climate change but the lack of information and research about the climate change cause big loses on the world and lead to the economic and environmental problems. This research tries to examine the negative effects of the climate change on the tourism sector which has fundamental benefits to local economy.

However, there are strong doubts related to the level of awareness on this relationship. Thus, the awareness of actors and their responses will be explored in the work by addressing the following questions: Whether the actors are aware of the climate change has impacts on tourism or not and which types of response mechanisms they develop. The awareness of actors and response mechanisms are the part of the work since actors are effective on the industry and develop responses to these negative impacts on the sector to prevent loses which the contributions of tourism to the climate change cause environmentally and economically.

The main purpose is identified as to discuss the impacts of the climate change on tourism, and to evaluate the level of awareness of the actors and the response mechanisms about these impacts. In this regard, it is researched the review of the impacts of the climate change, and with the help of the case study on Antalya, it is evaluated the identification of the awareness of the actors about the effects of the climate change, which is an important problem for the whole world, and the response mechanisms which they develop such as adaptation and mitigation.

All changes and impacts that are mentioned above have some effects on tourism. In the work, these impacts and the actors' awareness about these impacts are explained and the response mechanisms are identified. In this regard, the main question in this thesis is: What are the effects of the climate change on tourism and in the view of these impacts, the response mechanisms that the actors develop? For developing the theoretical framework of the research aim to focus on the questions below:

- What is the climate change?
- Why is the climate change important?
- Why and for whom the tourism is important?
- What are the impacts of climate change on tourism?
- Are the actors aware of the impacts of the climate change on tourism sector?
- How do they respond to these impacts of climate change?

In accordance with these questions, the main hypothesis in the thesis is that "There is limited awareness on the impacts of the climate change on tourism and vice-versa, which leads to limited action to mitigate the negative impacts of climate change on tourism."

1.3. Methodology and Outline

In order to answer the questions and to examine the mechanisms that are mentioned above, firstly, the theoretical perspective and approaches, in general, about the climate change and the tourism sector will be clarified in the thesis. The definition of the concept of climate change and the local and economic importance of tourism sector is analyzed. Then, the relationship between the climate change and tourism is studied. To understand this relationship, it is necessary to analyze the structure of tourism sector.

In the thesis, some contributions to the frame of the issue have been tried to be done by the help of the literature research. Especially, the outcomes of the climate change on tourism have been researched and the impacts are tried to be categorized into three as original work.

To examine the impacts of the global climate change on tourism, looking at the general characteristics of the sector, and researching the importance of the sector economically become inevitable. In addition, an evaluation is necessary to be made about the stakeholders and their roles after climate change and appearing the impacts on tourism. In this regard, it is tried to be made clear whether the actors are aware of the relation between climate change and tourism, how they respond and which types of mechanisms they develop in this process.

When it is considered that the sector is effective on the economy, environment and social life of the locality and that it provides contribution to the nation and the local, it is important to think of whether the actors are aware of the impacts of the climate change on the sector or not. Mainly, the actors, their level of awareness and the response mechanisms which they develop are tried to be focused in the work.

Secondly, Antalya case area is introduced in order to understand that how the current condition is in local area after mentioned the literature on the impacts of the climate change on tourism and the response mechanisms.

In the thesis, the case area has been chosen according to vulnerability in terms of climate change and economic-sectoral characteristics. Antalya, in terms of the tourism development and the local stakeholders interested in this sector, has been examined to answer the questions that are addressed in the research.

Within this order, in the second chapter, the literature on climate change is presented. In the chapter, it will be mentioned the definition of the climate change and researched the factors that indicate the happening of the climate change. The importance of the climate change as a global problem, the causes of this problem and the impacts of it will be, also, explained in the chapter.

In the third chapter, the relation between the climate change and tourism are examined together. Firstly, the economic and local importance of the tourism sector will be examined. After that, the relationship between them will be summarized focusing on the impacts of climate change on tourism such as effects on demand, supply, and selection of destinations. Then, the response mechanisms such as adaptation and mitigation are examined and in these policies, that what actors do will be explained by categorization and by giving examples.

In the fourth chapter, the general information about Antalya and tourism statistics will be given and the local importance of tourism for the city will be highlighted. Then, the level of awareness of the actors and their responses will be evaluated in this part of the thesis.

The case study that will include questionnaires and interviews will be carried out in Antalya, focusing on actors involved in tourism. The questions used in the study will be formulated in relation to the hypothesis. Examples of questions themes are;

- Actors awareness and level of knowledge on the short term / long term impact of climate change on tourism; Underestimate/overestimate future impacts, Adaptation strategies, Possible tensions/conflicts/dilemmas,
- Travelers preferences with respect to; National/international destination, Weather and climate (the role of climate in choice of destination, different activities and tourist destination, perception of thermal comfort, range of weather and climate acceptance), Season (summer/winter/autumn/spring)
- The contribution of tourism industry to the climate change; Energy saving, CO_2 emissions,

In the last chapter, the evaluation of the relation between the climate change and tourism and the limited awareness of the actors and their responses will be made. That the negative effects of the climate change cause suffering the tourism sector, itself, in time is examined but most importantly, the limited level of the awareness of the actors and their responses are focused.

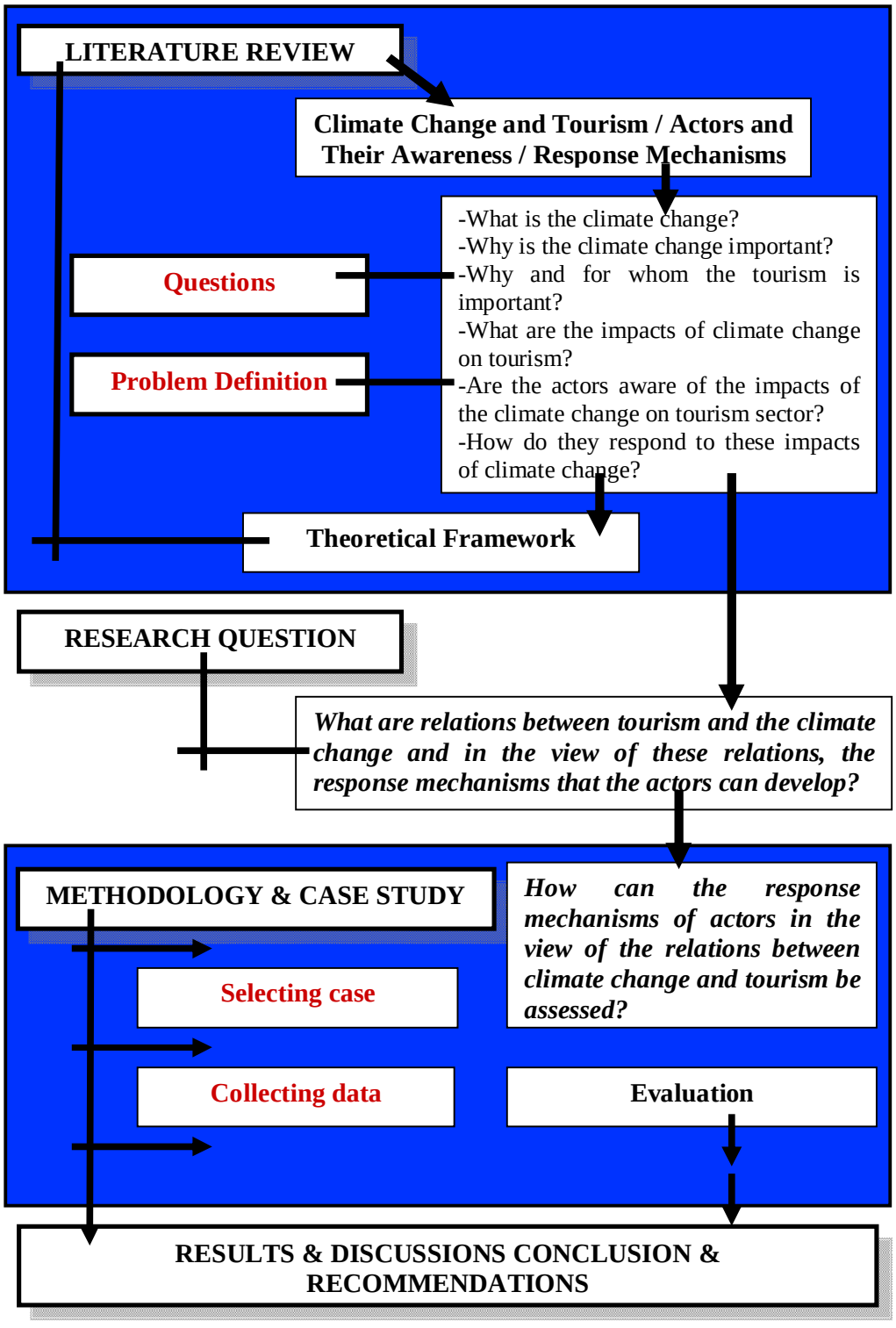


Figure 1. Flow of the Research Methodology

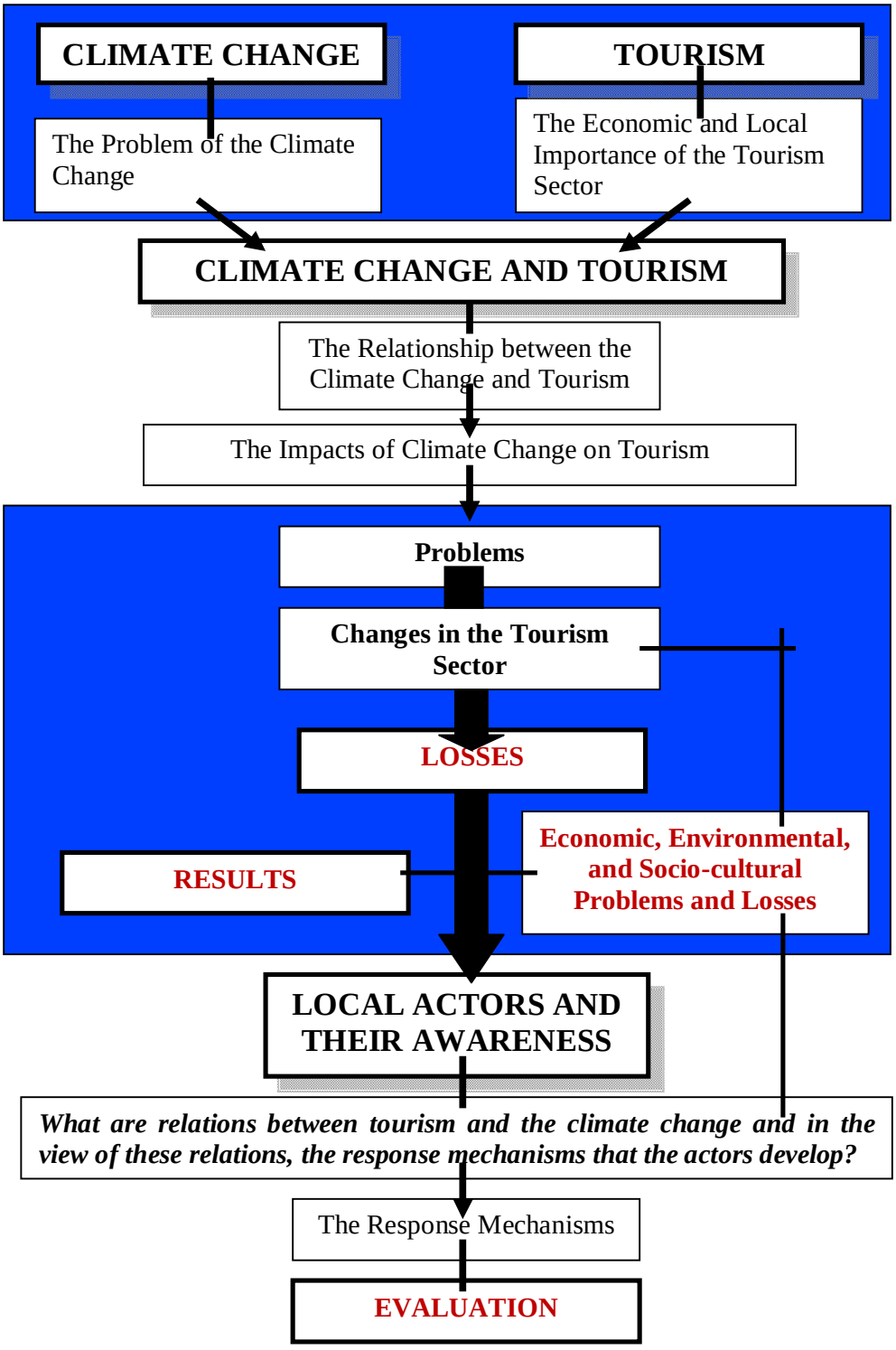


Figure 2. The Framework of the Thesis

CHAPTER 2

THE IMPORTANCE OF CLIMATE CHANGE: FACTS AND POLICIES

2.1. What is Climate Change?

That climate change as the one of the basic term of the research is an environment or development issue is an important question. It has previously seen as an environmental issue: long-term reduction in emissions, but, now increasingly seen as a development issue: need to address short-term impacts (Dodman D., 2008).

> "Since 1956 and the publication of Thomas' Man's role in changing the face of the earth, the human John Thornes population has almost doubled, half the world's tropical forests have been lost, the processes of overgrazing and desertification have increased, over-fishing, pollution and the conversion of estuarine habitats have altered the world's marine habitats, chemical pollution has become all pervasive, new hazardous wastes have become wide- spread, global warming is occurring - probably due, in part at least, to human activities - and the economy has been globalized through debt- financing and international corporate activity" (Talbot, 1989).

There is now strong evidence that global warming is occurring that it is likely that most of the warming in recent decades can be attributed to human activities and that this warming has already led to changes in the Earth's climate. In other words, more precisely, global warming implies the impacts of events which occur at the global scale, such as climatic changes (Thornes J., 1995, p: 358).

Climate change is a change in the statistical distribution of weather over periods of time that range from decades to millions of years. It can be a change in the average weather or a change in the distribution of weather events around an average (for example, greater or fewer extreme weather events). Climate change may be limited to a specific region, or may occur across the whole Earth (Wikipedia).

2.2. The Major Causes of Climate Change

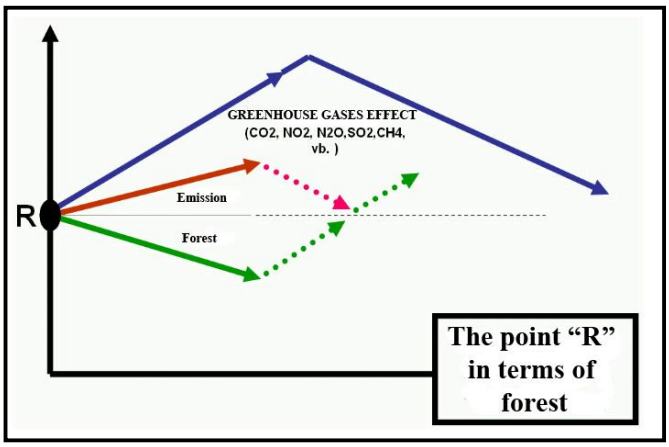
There is growing international concern about "greenhouse warming" which is a scientific theory that predicts that increases in CO_2 and other atmospheric gases may produce significant climatic changes. The concern is only one of a number of areas where population and economic growth have threatened to have significant impacts upon the global environment. According to Nordhaus W. D. (1993), other concerns include increasing evidence of widespread damage from acid rain; the appearance of the Antarctic "ozone hole," interpreted by some as the harbinger of global ozone depletion that threatens to remove the shield that protects organisms from harmful ultraviolet radiation; deforestation, especially in the tropical rain forests, which may upset global and local ecological balance: and a depletion of genetic resources that arises from urbanization and other impacts upon major ecosystems.

According to Dornbusch R. and Poterba J. M. (1993), the scientific debate on climate change centers on question: Do greenhouse gases play a critical role in contributing to any such changing? Accumulation of carbon dioxide and other trace gases affects the process by which solar radiation heats the earth. The larger the buildup of trace gases in the atmosphere, the higher the mean global surface temperature. This means that special attention should be focused on activities that are intensive producers of greenhouse gases (Figure 3).

The cause for concern of present and future climate change is believed due in part to anthropogenic (human-induced) build-up of increased atmospheric trace gas. The major greenhouse gases (GHGs) are carbon dioxide, methane, nitrous oxides, etc… Carbon dioxide is the major contributor to climate change, with most CO_2 emissions coming from the combustion of fossil fuels. Records show a clear correlation between CO_2 and temperature. It is erroneous to conclude from this that changes in CO_2 concentration were responsible for the large temperature changes (Dornbusch R. & Poterba J. M., 1993, p: 18).

About one-half the carbon released by fossil fuel burning ends up in the atmosphere. Deforestation also releases carbon and recently this activity contributes about one third of the annual human caused additions to atmospheric CO_2. The burning of petroleum and natural gas is a major problem since there is more carbon stored in these two fuels than there is in the atmosphere, but from Table 1, it is clear that the biggest problem is coal. About 80 percent of the world's fossil fuel carbon reserves are in the form of coal. Known coal reserves contain about five times as much carbon as is now in the atmosphere. If most of

these reserves are burned without CO_2 controls, the results will likely be severe (Caldeira, K. & Kasting, J., 1993).



Source: Kayhan, M., Küresel İklim Değişikliği ve Türkiye

Figure 3. Changing of the Greenhouse Effects

Table 1: Carbon in the Environment and Carbon Stored as Fossil Fuel

Reservoir	Size (gigatons)
Atmosphere	750
Forests	610
Soils	1580
Surface ocean	1020
Deep ocean	38100
Total active carbon in the environment	3960
Fossil fuels	
Coal	4000
Oil	500
Natural gas	500
Total fossil fuel carbon	5000

Adapted from Kasting (1998); similar numbers are given in the IPCC's fourth assessment report, 2007.

Offsetting emissions through re-forestation can have only a negligible effect (Kasting, 1998). Stabilizing the global climate at levels at 2–3 ºC above current temperatures will require phasing out fossil fuel use, especially coal. According Socolow et al. (2004), to keep atmospheric CO_2 at double its pre-industrial level, emissions should be kept under the current level until 2054, then rapidly decline after that. Annual carbon emission grew by about 0,8 percent from 1990 to 1999. From 2000 to 2005, they grew by 3,2 percent or four times faster (Brahic, C., 2006).

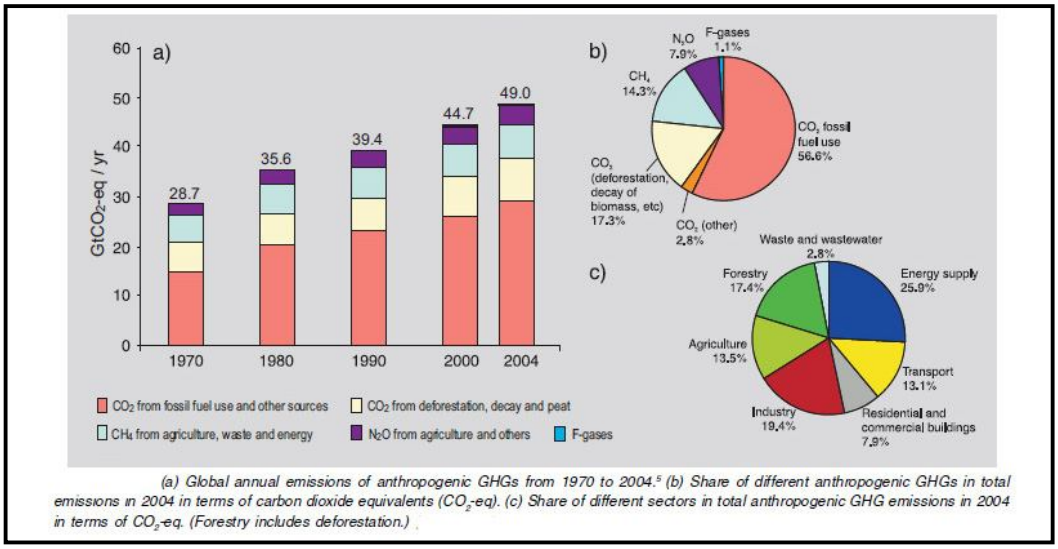
While it is not yet clear how large a problem climate change will be, it is certain that an attempt to stabilize atmospheric composition by restricting emissions of greenhouse gases will be a problem. It has been estimated that CO_2 emissions would have to be reduced immediately by around 75 percent to stabilize CO_2 concentrations at their present level. It is most clearly in this sense that there is climate changing problem (Becken, S., 2002a).

The studies state that even if greenhouse gas emissions were stabilized instantly at today's levels, the climate would still continue to change as it adapts to the increased emissions of recent decades. Further changes in climate are therefore unavoidable, and nations must prepare for them. The statement concludes by urging all nations to take prompt action to reduce the causes of climate change, adapt to its impacts and ensure that the issue is included in all relevant national and international strategies (Becken, S., 2002a).

> "During the past 100 years or so, consumerism and materialism came to be the dominant form of behavior in industrial market societies and this behavioral pattern is rapidly sweeping over the entire planet. But this behavior is no more "natural" than any other of the thousands of behavioral patterns exhibited in human cultures throughout our history (Sahlins, 1996). Like other cultural patterns, consumerism is dominant not because of genes but rather because of cultural systems of rewards and punishments. Citizens of industrial societies are subjected to hundreds of commercial messages daily. These messages not only promote specific products, but they also promote a lifestyle based on material consumption" (Gowdy, J. M., 2008, pp: 639-640).

The climate change challenge is unique compared to other public choice challenges since it involves changing the organizing principle of the industrial economy: abundant and cheap energy. Changing this well-established and highly successful (from a strictly material point of view) pattern of production and consumption presents many dilemmas intertwining social justice, technology, and behavior (Paavola and Adger, 2006). Therefore, avoiding dangerous climate change will require lifestyle changes and cross-cultural cooperation on an unprecedented scale (Gowdy, J. M., 2008, p: 640).

The Intergovernmental Panel on Climate Change (IPCC) 1 declared that 'warming of the climate system is unequivocal'. The IPCC1 concluded that most of the observed increase in global average temperatures is 'very likely' the result of human activities that are increasing greenhouse gas concentrations in the atmosphere (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 1). Global GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004. Carbon dioxide (CO_2) is the most important anthropogenic GHG. Its annual emissions grew by about 80% between 1970 and 2004. The long-term trend of declining CO_2 emissions per unit of energy supplied reversed after 2000 (Figure 4).



(a) Global annual emissions of anthropogenic GHGs from 1970 to 2004.[5] (b) Share of different anthropogenic GHGs in total emissions in 2004 in terms of carbon dioxide equivalents (CO_2-eq). (c) Share of different sectors in total anthropogenic GHG emissions in 2004 in terms of CO_2-eq. (Forestry includes deforestation.)

Source: Climate Change 2007: Synthesis Report

Figure 4. Global Anthropogenic GHG Emissions

2.3. The Outcomes of Climate Change

The probable consequences of climate change are well known and include sea level rise, increased droughts and floods, more frequent and intense forest fires, more intense storms, more extreme heat episodes, agricultural disruption, the spread of infectious diseases, and biodiversity loss, etc… (Flannery, 2005, p: 199).

Rising sea level is consistent with warming. Global average sea level has risen since 1961 at an average rate of 1.8 [1.3 to 2.3] mm/yr and since 1993 at 3.1 [2.4 to 3.8] mm/yr, with contributions from thermal expansion, melting glaciers and ice caps, and the polar ice sheets. It is very likely that over the past 50 years: cold days, cold nights and frosts have become less frequent over most land areas, and hot days and hot nights have become more frequent (Climate Change Synthesis Report, 2007, p: 2).

From Ausubel, (1991, p: 215) taking another "look at the impacts of climate change...conventional wisdom" foretells that the most important impacts will be from sea-level rise. It is possible as Ausubel (1991, p: 216) noted that the impacts of sea-level rise may be scarcely apparent at all for the next 30 to 40 years.

The U.S. Environmental Protection Agency (EPA) estimated an average global rise of between 72 cm and 216 cm for the next century (Hoffman, et al., 1983). By 2025, the EPA projected global ocean levels will be between 13 cm and 39 cm higher than 1980. Earlier revised estimates for the next thirty or so years (to about 2020) range between 11 cm and almost 21 cm rise in global sea level (Hoffman, et al., 1986). Hoffman et al. (1986) have estimates of global sea-level rise generated from the anticipated climatic changes ranging from greater than 100 mm to less than 210 mm by 2025.

In terms of the temperature as the other indicator of the climate change, eleven of the last twelve years (1995-2006) rank among the twelve warmest years in the instrumental record of global surface temperature (since 1850). The hundred-year linear trend (1906-2005) of 0.74 [0.56 to 0.92] °C is larger than the corresponding trend of 0.6 [0.4 to 0.8] °C (1901-2000) given in the Third Assessment Report (TAR). The temperature increase is widespread over the globe and is greater at higher northern latitudes. Land regions have warmed faster than the oceans (Climate Change Synthesis Report, 2007, p: 2) (Figure 5). The probable temperature rise by the end of the century will be between 1,8 °C and 4 °C (3,2–7,2 °F). Possible temperature rise by the end of the century ranges between 1,1 °C and 6,4 °C (2–11,5 °F) (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 1).

The results report an attempt to characterize the results and uncertainties about future climate change. Most experts believe that mean temperature will rise and that the warmer climate will increase precipitation and run-off. In these models, future temperature trends resulting from trace gas and carbon dioxide build-up are unlikely to be uniformly distributed over the globe (Jones, et. al., 1988). Generally, trace gases individually and collectively alter the radiative balance of the atmosphere and may cause a rise in global mean surface air temperature by trapping more heat near the Earth's surface. These results, however, include some portion resulting from changes in atmospheric greenhouse gas concentrations (Stouffer, et. al., 1994).

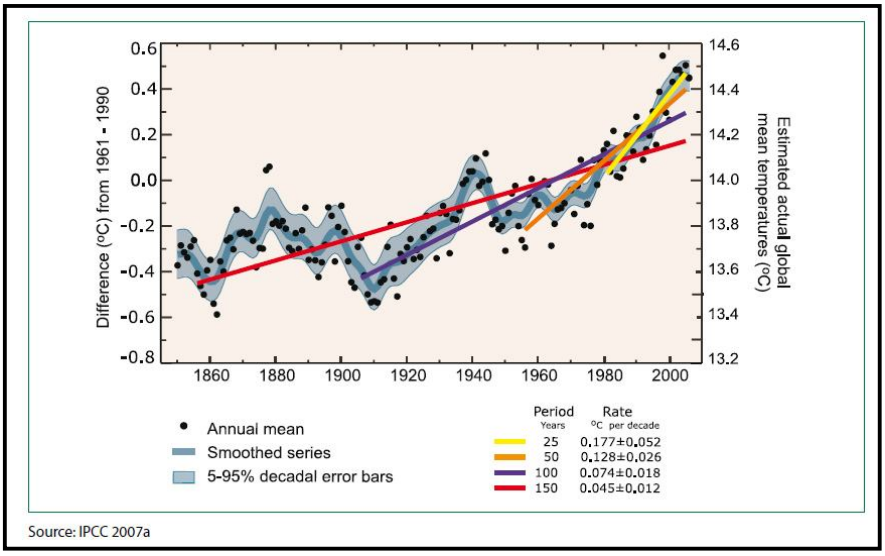
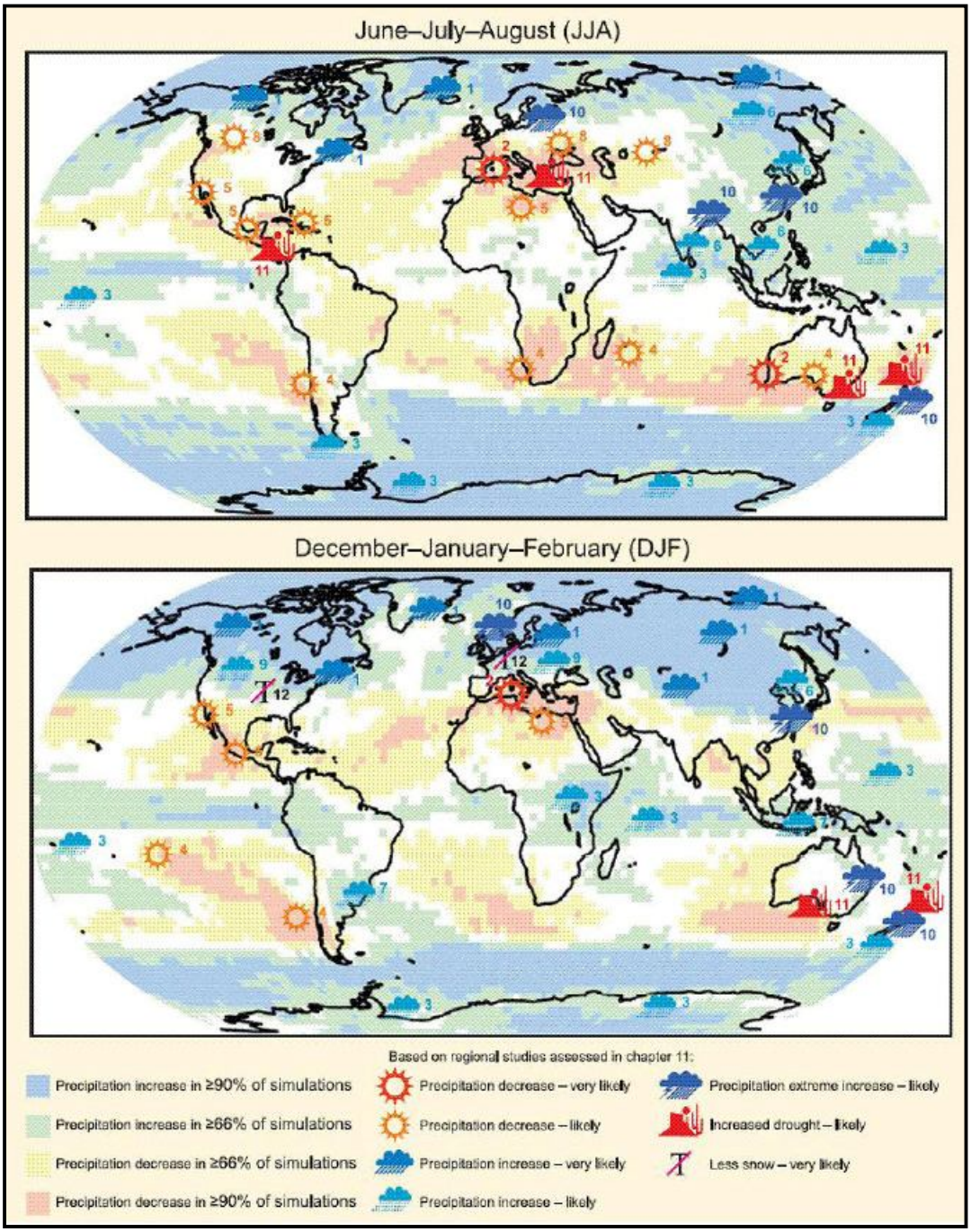


Figure 5: Recorded Changes in Global Average Temperature Since 1850

Climatic change caused by the greenhouse effect will be showed clearly in other ways than simply temperature warming. Increased air temperatures will lead to increased evapotranspiration, meaning that precipitation will need to increase in order to maintain or increase net precipitation (precipitation minus evaporation) levels. A dramatic change in summer climate, for example, can greatly affect the success of tourism sector and also decreasing in summer rainfall cause drought that cause loses in the biodiversity and natural resources, which affect the sector negatively (homepage, www.geographical.co.uk, last accessed at June 2009).

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). Their role is to assess the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. It states that climate change is “very likely that means as a greater than 90% probability due to the observed increase in anthropogenic greenhouse gas concentrations”. In Figure 6, the risks that the whole earth will have can be seen clearly. The Mediterranean Region and Turkey, for example, have marked as having risk of precipitation decrease >90% of simulations and both of summer and winter rainfalls decreases likely and summer season have drought risks (Figure 6).



Source: Climate Change and Tourism: Responding to Global Challenges, Advanced Summary

Figure 6. IPCC Representation of Anticipated Regional Climate Change

2.4. Developments on the World about Climate Change

In the international developments about the climate change which is a global problem for the whole countries, it can be seen a lot of conference that has been organized in different fields, conventions and protocols that have been ratified by different parties. One of the most important developments in this global issue is the establishment of the Intergovernmental Panel on Climate Change (IPCC). The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). Their role is to assess the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. The other important development is ratifying the United Nations Framework Convention on Climate Change (UNFCCC) which has been signed on the 24th of March, 1994, and has been adopted at the Earth Summit in Rio de Janeiro in 1992. It has been seen as necessary because of the possible results of the climate change which have been the basic problem for the environmental issues. Except for these, a lot of conferences have been organized about the climate change and the reports have been prepared.

In the first years of the developments about the climate change in the world, the focus has been on the green house gases and the other causes of the climate change. Then, CO2 emissions and human resourced contributions to the climate change and the effects of them and that what should be done to decrease the emissions have been discussed in the agenda. After that, beside these discussion, the impacts of climate change has been started to be focused in the world.

In the agenda of 2000s, the focus has been on both causes and impacts of the climate change in detail. Anymore, the measurements that should be taken for decreasing the impacts of the climate change are started to be discussed. In all documents, congress or others, the precautions that will provide decreasing the accumulation of green house gases in the atmosphere have been supported. Taking into account the common but different responsibilities of the countries, national and regional development priorities, targets and special conditions, the common responsibilities in the areas such as decreasing human resourced green house gases emissions, preventing the climate change and decreasing the impacts of the climate change have been focused in the process (Türkeş, M., 2001., pp: 2-3).

CHAPTER 3

CLIMATE CHANGE AND TOURISM

3.1. Tourism as an Important Activity for Local Economic Development

Although tourism is economically, socially and politically important, there is still debate over what tourism exactly is. One commonly used definition of a tourist (and hence tourism) is that of the World Tourism Organization (WTO): "Persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes" (WTO, 2002, online). 'Tourism' refers to all activities of visitors, including both 'tourists (overnight visitors)' and 'same-day visitors'. This is a technical definition, which was created to harmonize the different national tourism statistics. Furthermore, it is a demand side definition. Attempts at a supply-side definition have been made but these are also disputed. For example, Smith has developed a definition: "Tourism is the aggregate of all business that directly provide goods or services to facilitate business, pleasure, and leisure activities away from the home environment" (Smith, 1988, p: 183).

As an economic activity, tourism is defined on the one hand by the demand and consumption of visitors, whether by tourists (i.e. overnight visitors) or by same-day visitors; on the other hand, tourism refers to the goods and services produced to meet that demand. As such it comprises a whole range of different activities, e.g., transport to and at the destination, accommodation, catering, entertainment, shopping, services of travel agencies, outgoing and incoming tour operators, etc.

The substantial growth of the tourism activity clearly marks tourism as one of the most remarkable economic and social phenomena of the past century. The World Tourism Organization (WTO) has documented the rapid increase in tourism since the birth of the package tour in the 1950s. According to the latest World Tourism Barometer issued by the

World Tourism Organization (UNWTO), international tourist arrivals have increased from 25 million in 1950 to over 842 million in 2006, corresponding to an average annual growth rate of 6,5% and they are expected to increase further, to 1.6 billion, by 2020 (homepage, http://www.world-tourism.org/facts/menu.html, last accessed at September 2009).

Tourism receipts have also expanded enormously. In 1950, the global total was US$ 2.1 billion, which had increased to 40.7 billion in 1975 and in 2002, receipts had reached 474.2 billion. Europe dominates with 50.7% of all receipts while the Americas have the second highest market share of 24.1%. In terms of individual countries, the US earned 66.5 billion US$ in 2002, which amounts to a market share of 14% (WTO, 2005) (Figure 7).

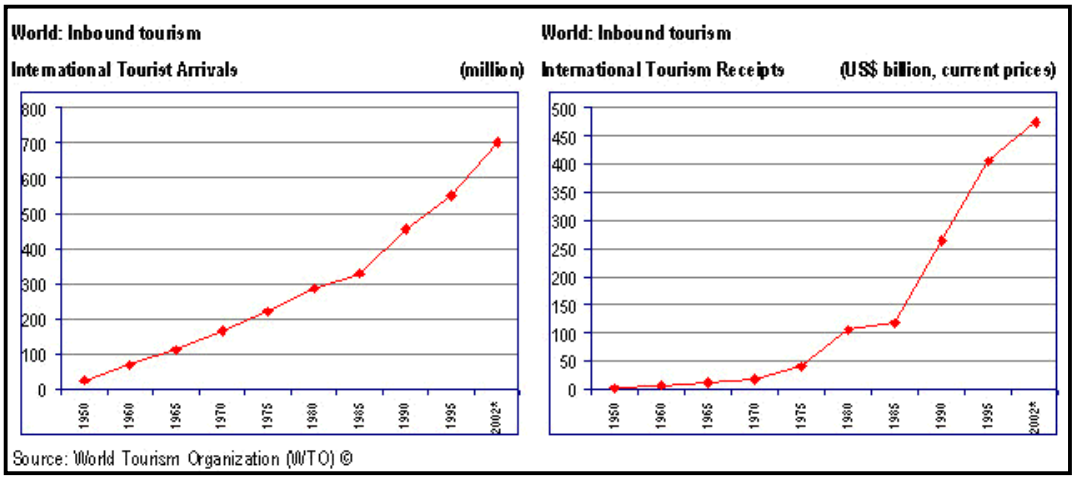


Figure 7. International Tourist Arrivals and Tourism Receipts between the years 1950 and 2002

Tourism is a key sector that has a fundamental importance in the world, which the numbers below show (homepage, kvmgm.kulturturizm.gov.tr/.../DosyaGoster.aspx?...sonturizmraporu..., last accessed at September 2009):

- In the year of 2007, the international tourist arrivals is 903 million by the rise of 6,6% compared to the previous year.
- In the year of 2007, the international tourism receipts reaches 856 billion US$ with the growth of 5,6% compared to the previous year.

As well as collecting statistics on the development of tourism over the years, the WTO provides a long term forecast for the global and regional development of tourism in 2010 and 2020. Tourism arrivals are expected to continue to grow at 4.1%, although there will be

regional differences. The WTO (2005a) predicts that the Americas and Europe will experience lower than average growth rates. By 2010, the number of arrivals is expected to reach the 1 billion mark and by 2020, almost 1,6 billion arrivals are expected (WTO, 2005a). The WTO predicts, for example, that by 2020 346 million tourists will visit destinations at the Mediterranean accounting for more than a fifth of all arrivals (WTO, 2001b).

Tourism has become very important sector for developing countries. Until the 1980s, the activity of tourism-led economic development was confined narrowly to the place marketing activities of the traditional sea, sun and sand resorts (Agarwal, 1999). Since the 1980s, the increasing internationalization process and the opening of national economies have boosted tourism to becoming the second most global sector, second only to the financial sectors (Silveira, 2002; Cunha and Cunha, 2005). Improved transport and communications systems that have reduced traveling time and costs, as well as the increasing number of business trips and social gains have accelerated the growth of tourism and the internationalization process. In this process, tourism became an essential part of the economic development strategies of the local state.

In most of the newly developing countries, the sector tourism is taken as a catalyst for local development at the centre of interest to academics as well as to urban managers. Many cities invest heavily on tourism for promoting local development, however, little is known about critical success factors that determine economic development of cities via tourism. In the international context, tourism is widely recognized as an instrument for promoting local economic development (Agarwal et al., 2000) that force places to compete.

According to the World Tourism Organization (WTO, 2004), tourism is a sector that favors local development because it generates jobs, increases the income of workers and stimulates capital investments through new business opportunities, which results in the establishment of new organizations, including SME, among other advantages (Theuns, 2002).
In most economic activities, it is the product that reaches the consumer, but when it comes to tourism, it is the opposite in that the consumer seeks for tourism services. Because of this characteristic, tourism has a heavy impact on local development. Tourism differs from other sectors in that it's product can only be consumed in loco, thereby stimulating the development of other economic activities (entertainment, trade, transport, lodgings, travel agencies, crafts, supporting services and amenities) in addition to the development of infrastructure depending on the environmental sustainability and the generation of income and creation of local jobs (Cunha and Cunha, 2005).

The developments in tourism cities mean the spatial reflection of realizing effectively the incentive politics that have been developed for tourism by central government after 1980s. It is seen that the investments, in general, are in the construction sector, especially on transportation and infrastructure. With these infrastructure and transportation investments, the relations with other cities are easier and the service sector that is active in tourism cities is more effective.

Spatially, the new settlement areas are developed on a grid system that is planned with modernist planning approaches, and in which defined and hierarchic roads intersect each other perpendicularly and in which these roads form defined house blocks. The new developed areas have an identity that there are densities of houses that are used like summer house some periods in the year, in contrast to the traditional structure.

With developing tourism sector, the investments appear like hotels, congress and culture centers, modern shopping centers and office buildings as a result of supply that the potential of tourism and international production relations and capital movement. In addition, it has a reflection in spatial areas as settlements and shopping and entertainment centers for middle and high income groups.

3.2. Climate Change and Tourism

3.2.1 The Relationships between Climate Change and Tourism

In terms of climate change, in 2001, the IPCC reported that it is likely that the 1990s was the warmest decade on record since instrumental records began. The report stated that in the Northern Hemisphere, temperatures increased more in the 20th century than in any other century over the past millennium, and global mean surface temperature increased over the same period (IPCC 2001). In fact, the fourth quarter of the 20th century experienced warming two times that of the entire first half of the century, with significantly more warming occurring in high latitudes (Burkett et al. 2005).

The warming is likely to be higher inland than along the coast in Mediterranean Region. The largest increase in temperature is expected to take place in the summer, when extremely hot days and heat waves are expected to increase substantially, especially in inland and southern Mediterranean locations. During the last 50 years of the 20th century large parts of the

Mediterranean experienced winter and summer warming. Giorgi (2002) analyzed the surface air temperature and found a significant warming trend. For the same period, precipitation over the Mediterranean decreased. Giorgi (2002) found negative winter precipitation trends over the larger Mediterranean land-area for the 20th century.

For Turkey, in general, the temperatures of the year of 2008 have been 0,7 °C over the normal. In 2008, it is saved that the mean temperatures are over the normal in, especially, eastern and coastal areas of Turkey. The mean weather temperatures in Turkey have a trend of increasing in southern and south-western regions. Heating trend especially in summer mean temperatures are defined by significant positive serial relationship factor in most of the stations.

Significant changing in precipitation serials are seen mostly in winter seasons. 24 of 78 stations that have decreasing trend in the precipitation of winter are significant statistically. Winter precipitations of Mediterranean, Mediterranean Transition, Terrestrial Central Anatolia and Terrestrial Mediterranean Regions decrease. For example, the precipitation decreases in a significant level in Antalya. (Demir, İ., Kılıç, G., Coskun, M., Sümer, U.M., 2008*)*.

The concepts of tourism as an economic activity and climate as related with tourism have been examined separately in general and they are evaluated for the Mediterranean Region, Turkey and Antalya as case area. In addition, the relation between them that include the impacts of the climate change on tourism and contribution of tourism on climate change is another subject that should be examined in the research. The impacts of climate change will be explained below and the necessary information, in detail, about the contribution of the tourism sector is attached Appendix C.

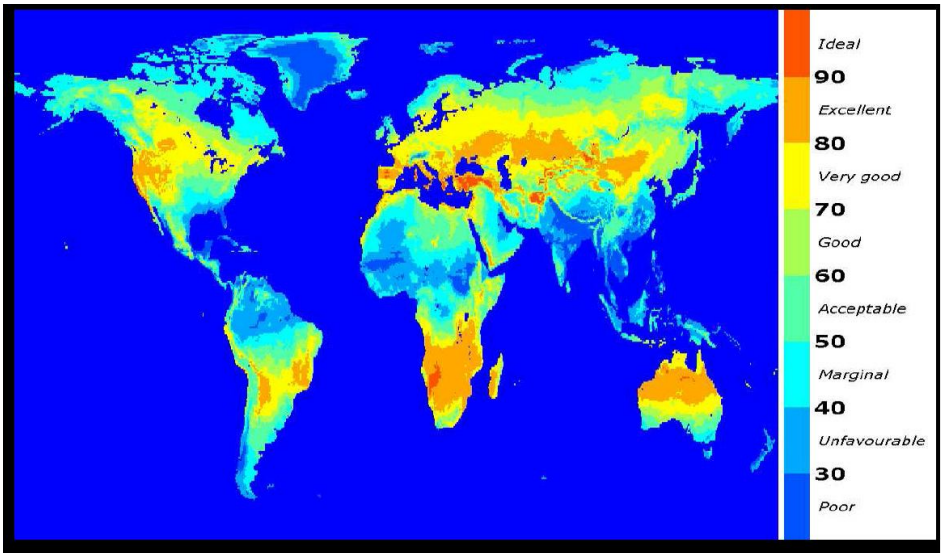
In tourism climatic index maps below, the differences between the current year and 2080s can be seen clearly. The countries that are ideal in current map will be poor countries in 2080s with the impacts of the climate change in terms of tourism. Especially for Turkey, it can be seen clearly the threat of climate change on tourism (Figure 8 and 9). Global warming and extreme weather events such as storms or heat waves are related to climate change. Thus, it will have implications in terms of weather patterns and events, as well as associated impacts on physical and biological resources and so both flora/fauna and tourism are directly influenced. It is attempted that tourism is one of the world's biggest industries and also the fastest growing; for many regions, tourism is the most important source of income, and

generally accepted that climate is an important part of the tourism resource base. However, little is known about:

a) the effects of climate on tourism, or the role it plays;

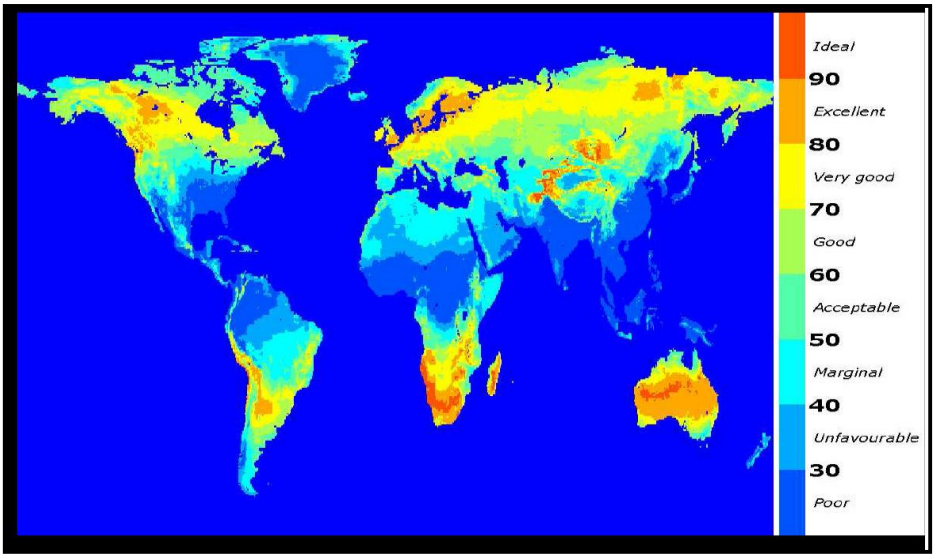
b) the economic impacts of climate on commercial prospects for tourism;

c) which climate related criteria people use to make decisions about tourism choices.



Source: Climate Change and Tourism: Responding to Global Challenges, 2008

Figure 8. Tourism Climatic Index – Current

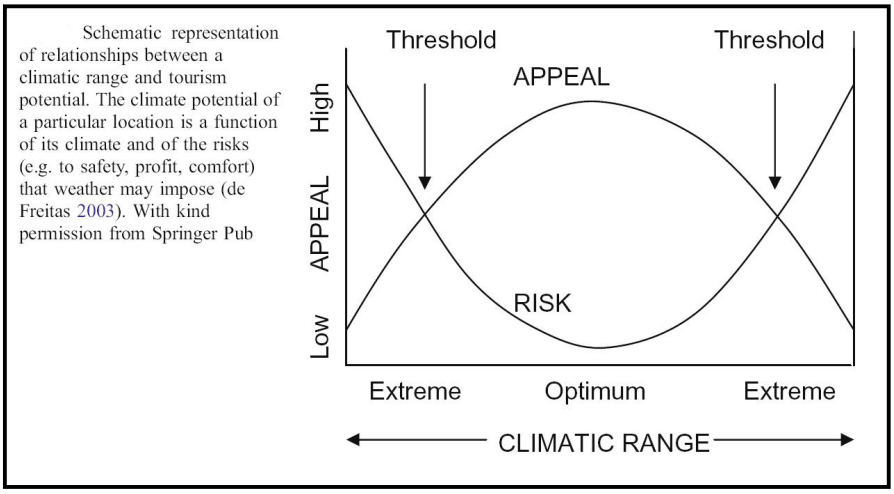


Source: Climate Change and Tourism: Responding to Global Challenges, 2008

Figure 9. Tourism Climatic Index - Summer 2080s

Values for individual countries are not subjective perceptions of climatic comfort, but are extrapolated from the statistical relationship between tourist demand and the climatic characteristics of a country, yielding a value of the temperature of the destination country that maximizes total tourist arrival in that country (Bigano et. al., 2006). How these optimum temperatures may be verified, considering that many countries have both winter and summer seasons and offer recreation activities with various dependencies on weather and climate is difficult to comprehend. de Freitas (2003) generalizes the problem by describing a climatic range in which tourism is possible for a certain location. Exceeding the threshold means a high weather/climate risk related to safety and economic viability, as well as an increase in discomfort and dissatisfaction for tourists, resulting in a decrease in arrivals (Meze-Hausken, E., 2008, p: 313) .

Changes in climate have the potential to affect tourism thresholds, changing the suitability of a destination for a specific tourist performance. Modeling impacts under an assumed 1 °C increase for 2025, Hamilton (2005) arrives at a turning point for a country's attractiveness, meaning that if a cool country gets warmer, it first attracts more tourists, until it gets too warm and starts attracting fewer tourists. Although such calculations are somewhat simplistic, it is likely that many countries which currently experience low mean temperatures will become more attractive as holiday destinations as their mean (summer) climate becomes warmer, either as a direct result of more comfortable temperatures or because their climate is more appealing than that of the countries generating tourists (Hamilton, 2005) (Figure 10).



Source: Meze-Hausken, E., 2008

Figure 10. Schematic Representation of Relationships between a Climatic Range and Tourism Potential

3.2.2. Climate, Weather and Tourism in Mediterranean Region

In recent years, tourism is under the threat of climate change. With its close connections to the environment and climate itself, tourism is considered to be a highly climate-sensitive economic sector. The increasingly important tourism sector is highly vulnerable to the effects of climate variability and change. Indeed climate change is not a remote future event for tourism as the varied impacts of a changing climate are even now becoming evident at destinations around the world. Climate change is already influencing decision-making in the tourism sector (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 4).

> "Climate is a dominant attribute of a tourist destination and has a major effect on tourism demand and satisfaction, but its relationship with tourism is complex. Because of this, considerable effort has gone into devising climate indices that summarize the significance of climate for tourism. In addition, if it is thought the local and economic importance of tourism sector, any shifts in tourism patterns and volumes as a result of changing climates worldwide could have widespread impacts on the economy, the environment, and society in general" (Scott, et. al. 2004).

According to de Freitas (2001), there are two further aspects of climate that are relevant for tourism: first, there is the physical aspect. Here, the climate facilitates or hinders certain tourist activities whether through rain, wind or snow. For example, wind and rain will make a day of sunbathing at the beach impossible. Second, there is the aesthetic aspect of climate. This may be through the quality of light that affects the appearance of the tourists' surroundings or it may come from the appearance of the sky and of the sea and other water bodies. In the long run, climate has an effect on other elements that fall under the aesthetic category defined by de Freitas. Landscape is also influenced by climate. Climate determines the types of crop that are possible to grow and through this the appearance of the cultivated landscape. Moreover, the influence of climate on the types of flora and fauna that exist in a particular area affects the appearance of cultivated environments as well as ones that are more natural.

Tourism, especially outdoor tourism is directly affected by weather and climate. Outdoor, or nature-based tourism, can also be indirectly affected by climate through alterations to the renewable biophysical resources upon which it depends, such as forests, lakes, or beaches (Smith 1993). Thus, climate is a pull factor motivating tourists to visit particular destinations (Paul 1972). More recently, Gomez-Martin (2004) argues that temperature, number of sun hours, precipitation, wind, humidity, and fog are the climatic elements that have the greatest influence on tourism. Maddison (2001) identifies climate as a major factor in destination

choice and time of departure, with a possible goal of obtaining a short-term climatic advantage while on recreational trips.

In terms of nature-based and related outdoor tourism, Jones and Scott (2006) assert that climate is a strong influence. They say that both the physical resources, upon which many tourism and recreation activities depend, and the length and quality of the tourism season can be affected by climate. Thus, climate is intrinsically linked to tourism, particularly when time is spent outdoors. Climate change is expected to have a net positive effect on nature-based tourism and outdoor recreation activities if the season length increases for warm weather-based activities. However, after a point, hotter seasonal months and temperatures have some negative impacts on tourism activities.

In Mediterranean Region, the climate analysis has been based on the temperature and precipitation outputs of A2 and B2 emission scenarios. The study is focused on the thirty-year period (2031–2060) centered on the time that global temperature is expected to reach 2 ºC above pre-industrial levels (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: C).

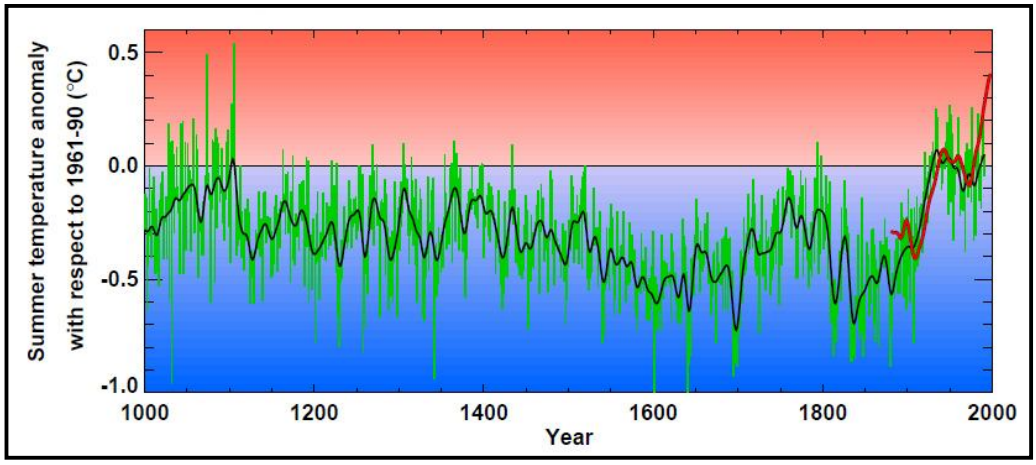
The results show that a global temperature rise of 2 °C is likely to lead to a corresponding warming of 1-3 °C in the Mediterranean region. The warming is likely to be higher inland than along the coast. The largest increase in temperature is expected to take place in the summer, when extremely hot days and heat waves are expected to increase substantially, especially in inland and southern Mediterranean locations (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: C).

Under the A2 scenario, a drop in precipitation seems to be the dominant feature of the future precipitation regime while under the B2 scenario, rainfall increases in the northern Mediterranean, particularly in winter. Longer droughts are seen according to the figures. In terms of extremes, the number of dry days is shown to increase (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: C).

During the last 50 years of the 20th century large parts of the Mediterranean experienced winter and summer warming. For the same period, precipitation over the Mediterranean decreased (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: 2).

3.2.2.1. Temperature

The climate system is dynamic and varies on all time scales. However, over the last century, it has been seen an increase in the average temperature of the Earth. The warming this century has been more rapid than any other period (Viner, D. & Agnew, M., 1999, p: 4) (Figure 11).

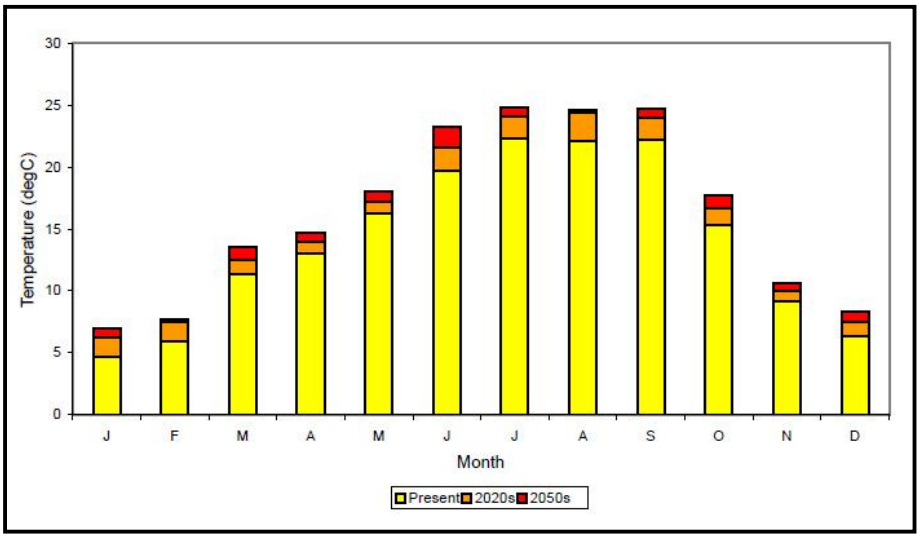


Source: Viner, D. & Agnew, M., 1999, Climate Change and Its Impacts on Tourism, WWF-UK

Figure 11. The Reconstructed Temperature Anomaly for the Last 1000 Years and the Observed Temperature Anomalies (Red Line)

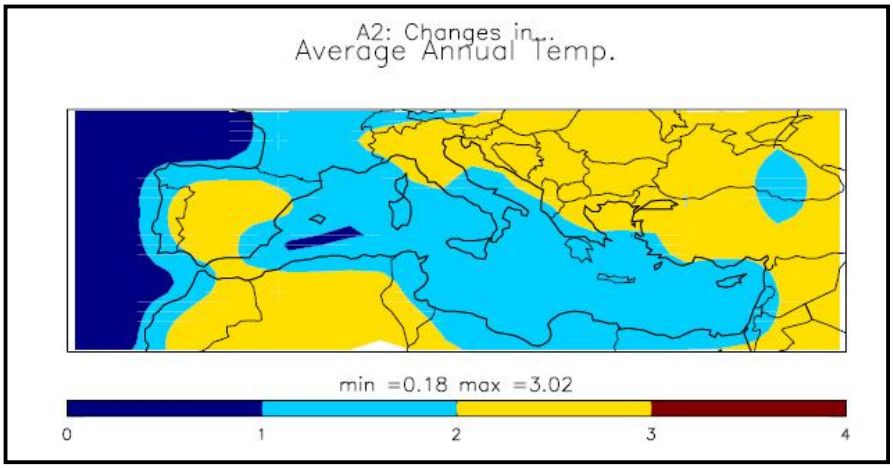
The climate is Mediterranean with mild winters and long, hot summers with maximum temperatures often exceeding 40 ºC. Climate modeling suggests that mean summer temperature increase will be in excess of 4 ºC by the middle of the next century (Figure 12). In the interior of Turkey, the climate is characterized by extremes in temperature, with hot, dry summers and cold snowy winters on the plateau (Viner, D. & Agnew, M., 1999, p: 20).

Figure 13 presents the differences between the daily mean temperature averaged over 2031–2060 and 1961–1990 for scenario A2. It is clear that the average rise in temperature (daily mean averaged over 30 full years) is between 2 and 3 °C inland. Under scenario B2 (Figure 14), the rise in temperature is somewhat larger than in A2, but in general, the patterns of changes are broadly similar (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: 14).



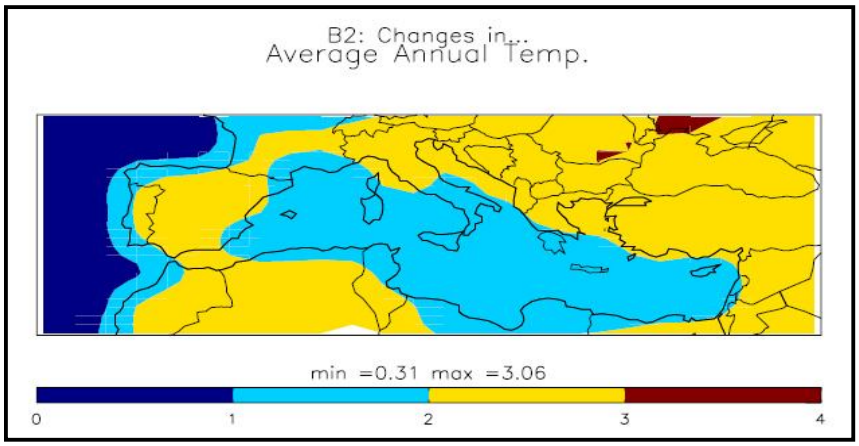
Source: Viner, D. & Agnew, M., 1999, Climate Change and Its Impacts on Tourism, WWF-UK

Figure 12. Estimated Temperatures for the Eastern Mediterranean for the Present, the 2020s (2010–2039) and the 2050s (2040–2069)



Source: Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 °C Global Temperature Rise

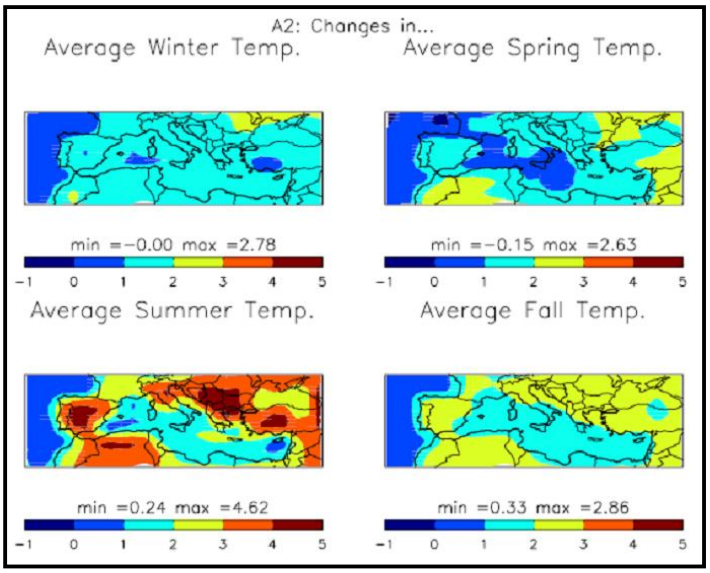
Figure 13. Difference between the Daily Mean Temperatures Averaged over 2030–2060 and over 1961–1990, for Scenario A2



Source: Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 °C Global Temperature Rise

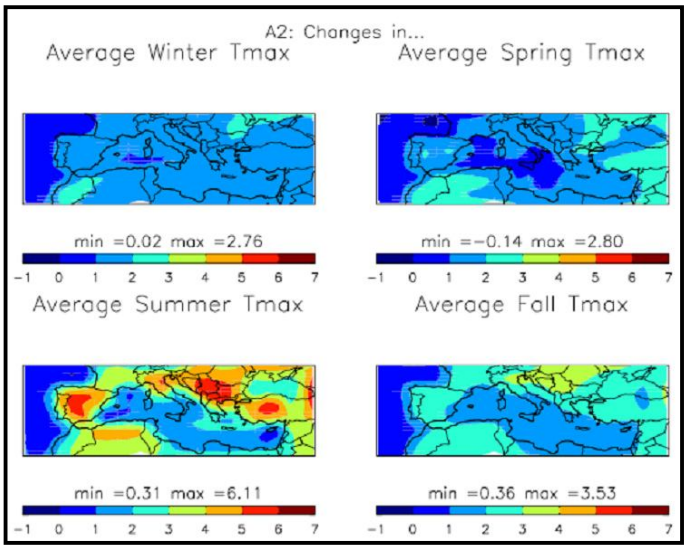
Figure 14. Difference between the Daily Mean Temperatures Averaged over 2030–2060 and over 1961–1990, for Scenario B2

For Tmean, the rise occurs mainly in summer, when it reaches 4 °C inland on average. Fall is the second season to get warmer, with temp rises above the 2 °C average. Winter is likely to be uniformly warmer by 1-2 °C. Spring experiences the average 2 °C increase, except in the north-western part of the region, where the warming is less (Figure 15). Tmax features the same seasonal variation, with a rise notably larger than Tmean in summer and slightly larger in fall (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: 17) (Figure 16).



Source: Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 °C Global Temperature Rise

Figure 15. Difference between the Daily Mean Temperatures Averaged over 2030–2060 and over 1961–1990, for Scenario A2 for Each Season

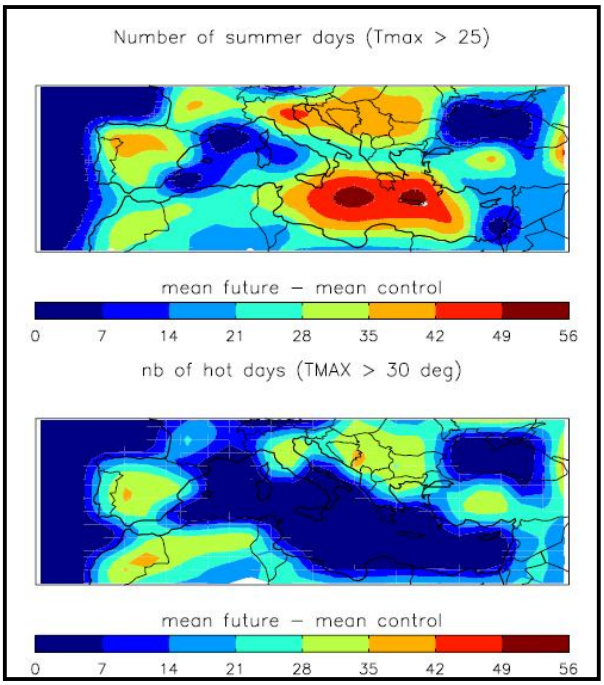


Source: Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 °C Global Temperature Rise

Figure 16. Difference between the Daily Mean Temperatures Averaged over 2030–2060 and over 1961–1990, for Scenario A2 for the Daily Maximum Temperature

The increase in the number of summer days, defined as the number of days when Tmax exceeds 25 ºC, is from 2 to 6 weeks (Figure 17-top). This is translated to about one additional month of summer days on average. Large increases are found in Central Mediterranean Region, North Adriatic, and inland (within Maghreb, Spain, Turkey, South of France and the Balkans) (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: 20).

The pattern in the number of hot days, defined as the number of days with Tmax> 30 °C (Figure 17-bottom) is somewhat different from the pattern of the number of summer days. The increase is from 2 weeks along the coast to 5–6 weeks inland (within Spain, Turkey, South of France, the Balkans and in the Maghreb) indicating the role the Mediterranean Sea exerts in preventing too hot days (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: 20).

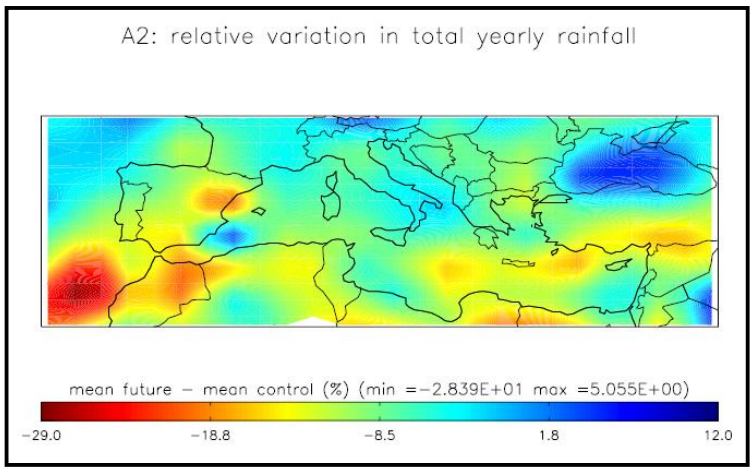


Source: Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 °C Global Temperature Rise

Figure 17. Differences in the Number of Summer (top) and Hot (bottom) Days between Control and Future Period for Scenario A2

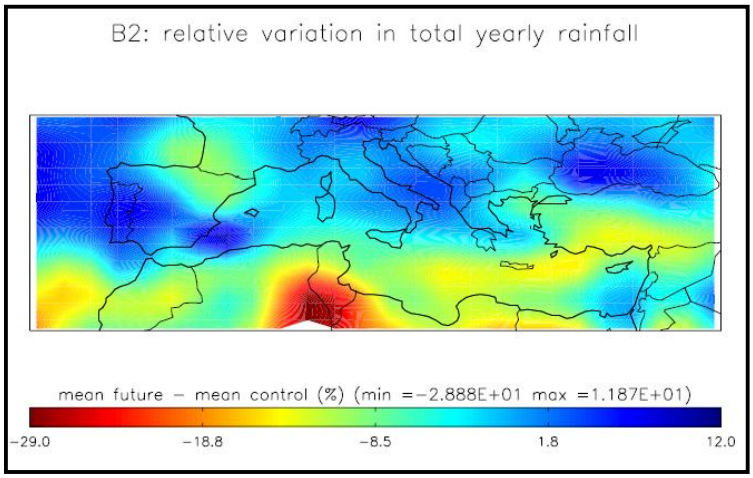
3.2.2.2. Precipitation

Figure 18 and 19 give the variations in the mean total yearly rainfall for both scenarios. Under scenario A2, a drop in precipitation seems to be the dominant feature of the future precipitation regime. Under B2, some rainfall increases are expected in the northern part of the region. Compared to temperature, precipitation exhibits larger differences between the two scenarios (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, p: 25).



Source: Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 °C Global Temperature Rise

Figure 18. Difference between the Relative Variation in Total Yearly Rainfall over 2030–2060 and over 1961–1990, for Precipitation under A2 Scenario



Source: Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 °C Global Temperature Rise

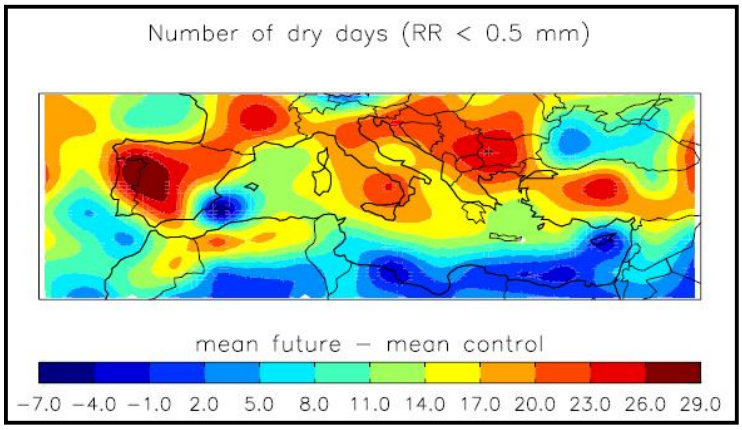
Figure 19. Difference between the Daily Mean Rainfalls Averaged over 2030–2060 and over 1961–1990, for Precipitation under B2 Scenario

The main feature of the seasonal variations in precipitation is the contrast between the North - South and winter- summer:

- A summer drop in the total rainfall over the northern region is expected, only partially balanced by an increase in winter.
- The opposite pattern is evident in SEMR (including the southern part of Turkey): small increase in autumn rainfall, slightly larger decrease in spring.

(Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, pp: 27-28).

Figure 20 describes the differences in the yearly number of dry days between the two examined periods. On average, the Mediterranean is expected to feature more dry days. The increase is likely to be lower along the coast (~2 weeks), but higher inland (3 weeks in Turkey) (Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, pp: 28-29).



Source: Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 °C Global Temperature Rise

Figure 20. Difference between the Average Yearly Number of Dry Days in the Future and in the Control Years (RR <0,5 mm defines dry days) under A2 Scenario

3.2.3. The Impacts of the Climate Change on Tourism

Under the relationship between climate change and tourism, the impacts of climate change on the sector as an important point has been on the agenda nowadays. A cyclical relationship between climate change and tourism is illustrated by Giles and Perry (1998), where the only effects of changing from elevated greenhouse gas concentrations worldwide included are those of rising sea levels, higher temperatures, and a higher incidence of extreme weather events. According to their analysis, these effects are felt at either a regional or global scale, and tourism flows are impacted (Figure 21).

> "Human-induced global warming has already caused changes in several climatic variables, with substantial impacts on natural and socioeconomic systems. The climate changes and their impacts are very likely to be even stronger in the future. Changes in extremes are likely to be more important from the impact viewpoint than changes in the mean values. Changes in climate extremes include changes of temperature (daily maximum or minimum), intense precipitation, snow cover, and wind speed" (Kundzewicz, Z. W., et. al., 2008, p: 130).

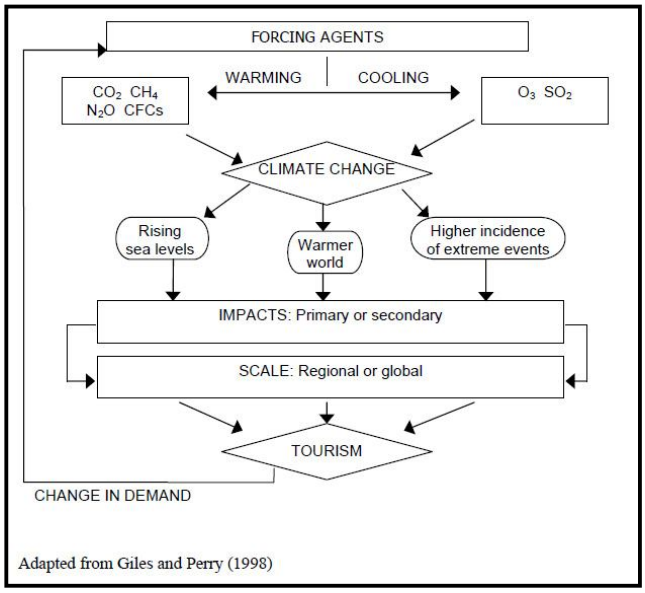


Figure 21. The Relationship between Climate and Tourism in a Globally Warmed World

These outcomes of climate changes cause that some of the present destinations will lose appeal, and some others will increase their potential to attract masses of tourists. Some of the presently popular places, for example, could become dangerous or associated with a high health threat. Climate change could possibly also affect the availability of vital resources, for example drinking water, and will have some impact on propagation of diseases like malaria and other vector, food and water-borne diseases, etc (Cegnar, T., 2007).

The impacts of climate change on tourism can be categorized into three groups: Impacts on supply as a natural resource, impacts on destination selection with the effects on attractiveness and the seasonal pattern of the destination, impacts on demand by the effects on the quantity and quality of natural resources used for recreation and by the effects on the comfort and safety of tourists.

3.2.3.1. Supply

Climate change greatly impacts tourism supply. Considering that climate represents one natural resource on which the tourism industry is based, and realizing that climate changes could potentially alter the distribution of climate assets among tourism destinations, Amelung, Nicholls, and Viner (2007) applied comfort indices to measure the potential impacts of climate change on the attractiveness of a destination in terms of climate assets.

The analysis found that a substantive spatial and temporal redistribution of climate resources for tourism was possible as a result of projected climate change in the 21st century. For example, Amelung, Nicholls, and Viner (2007) found that the seasonal pattern in the Mediterranean is likely to shift from the current summer peak to a two shoulders pattern, in spring and autumn.

The IPCC1 has concluded that changes in a number of weather extremes are probable as a result of projected climate change, including: higher maximum temperature and more hot days over nearly all land areas (very likely), greater tropical storm intensity and peak winds (likely), more intense precipitation events over many land areas (very likely), and longer and more severe droughts in many mid-latitude continental interiors (likely). Such changes will affect the tourism industry through increased infrastructure damage, additional emergency preparedness requirements, higher operating expenses (e.g., backup water and power systems, evacuations), and business interruptions (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 6).

In addition, climate codetermines the suitability of locations for a wide range of tourist activities, and has an important influence on operating costs, such as heating-cooling, irrigation, food and water supply, and insurance costs. Thus, changes in the length and quality of climate dependent tourism seasons (i.e., sun and sea or winter sports holidays) could have considerable implications for competitive relationships between destinations and therefore the profitability of tourism enterprises (UNWTO-UNEP-WMO, Advanced Summary, 2007, pp: 5-6).

3.2.3.2. Destination Selection

Weather and climate play an important role in destination selection because tourists are sensitive to climate and to climate change (Bigano et. al., 2006). Hamilton (2005) confirmed that climate is at least the third most common attribute in the tourists' decision making. Hence, travelers are likely to consider climate and the changing climate conditions in their decision on whether or not to go, what activities to participate in, when to participate and where to participate (Wall, 1998).

Because environmental conditions are such a critical resource for tourism a wide range of climate induced environmental changes will have profound effects on tourism, especially outdoor tourism at the destination level. Changes in water availability, biodiversity loss,

reduced landscape aesthetic, increased natural hazards, coastal erosion and inundation, damage to infrastructure and the increasing incidence of diseases will all impact tourism to varying degrees. The indirect effects of environmental change are likely to be largely negative. Especially, mountain, island, and coastal destinations are considered particularly sensitive to climate induced environmental change, as are nature-based tourism market segments (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 6).

The impact of climate change on the natural environment is manifested in changes in geography, landscape and ecosystem. Glaciers are retreating, sea level is rising, lakes are disappearing, and forests are struggling to move to higher, cooler locations in the North regions. Since all of these natural resources are fundamental for tourism sector, the changes in these structures and the loses in natural environments due to the climate change are related to the sectoral activities.

Therefore, climate is both an important attribute and a limiting factor for a destination. Changes in climate can directly affect the attractiveness and the seasonal pattern of the destination. Climate change can also affect tourism indirectly through its impact on other natural resources, which tourism heavily depends on, such as, landscape and ecosystem. This combination makes the impact of climate change on tourism potentially one of the largest of all of the market impacts of climate change (Dawson, Maher, and Slocombe, 2007).

3.2.3.3. Demand

Tourism and recreation can be affected directly and indirectly by climate change. Altered weather patterns may directly affect the comfort and safety of tourists, while longer term climatic and seasonal changes can alter the biophysical resources upon which many recreational activities depend. According to Loomis and Crespi (1999), direct effects of climate change on recreation take place through the participants' desired demand, and indirect effects on demand occur through changes in the quantity and quality of natural resources used for recreation (Loomis and Crespi 1999).

Qualitative studies rely on experts' opinions on the likely impact of climate change. For example, Perry (2000) discusses the impact that climate change will have on tourism at the Mediterranean. The main impact caused by an increase in temperature will be a "doughnut" shaped pattern of demand: in the shoulder season there will be more visits than in the summer season. In addition, he expects that there will be an increase in the demand for long

winter holidays particularly from the older generations. The indirect effect of enhanced beach erosion caused by sea level rise will reduce demand and increase the need for planning restrictions in the coastal zone.

Lise and Tol (2002)'s study implies that climate change has the potential to cause the relocation of tourist towards higher latitudes and altitudes. Studies indicate that a shift of attractive climatic conditions for tourism towards higher latitudes and altitudes is very likely. As a result, the competitive position of some popular holiday areas is anticipated to decline (e.g., the Mediterranean in summer), whereas other areas (e.g. southern England or southern Canada) are expected to improve.

According to the Climate Change and Its Impacts on Tourism, the WTO Background Paper on Climate Change and Tourism and to the Latest Climate Change and Tourism Responding to Global Challenges reports, the areas interested by the tourist flow Northern Europe-Mediterranean are going to be subjected to dissimilar impacts. These are going to affect tourist offer and tourism demand in each area, in relation to both push and pull factors. Climate change will soon start to change that which destinations it is felt comfortable about visiting and when.

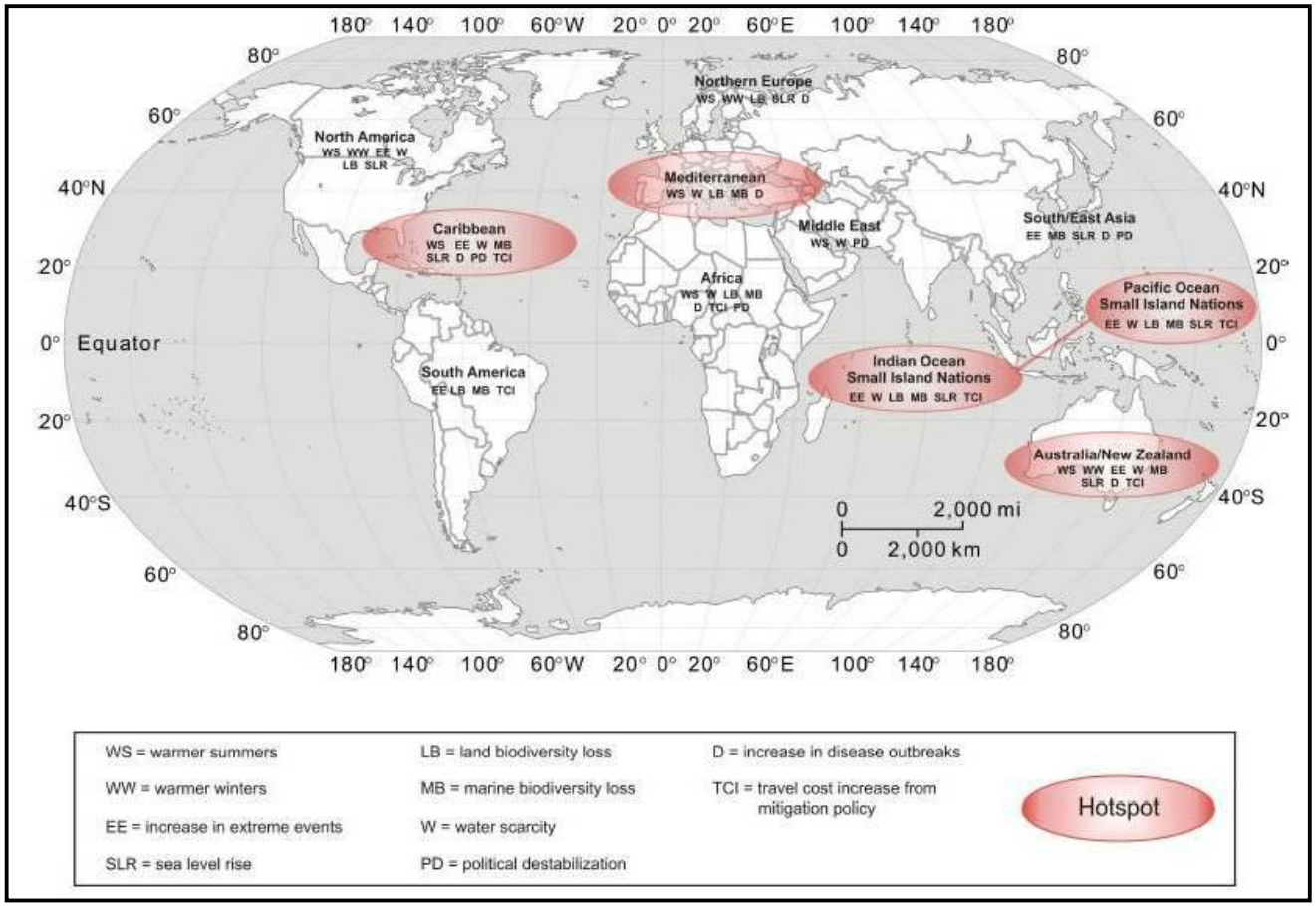
Destinations will also be forced to change their focus. In the Mediterranean areas increased health risks, occurrence of heath waves, pressure on water resources with possible droughts and coastal erosion might jeopardize the area's appeal for the Northern-European tourists. Coral bleaching, coastal erosion and a rise in sea level will threaten many traditional diving and beach destinations. Extreme weather events are also likely to become more frequent, reducing the tourist season in many destinations. Uncertainties related to tourist climate preference and destination loyalty require attention if the implications for the geographic and seasonal redistribution of visitor flows are to be projected.

Information on tourist climate preferences and key thresholds (i.e., 'what is too hot for a beach holiday'), tourist perceptions of the environmental impacts of global climate change at destinations (i.e., perceptions of coral bleaching, diminished or lost glaciers, degraded coastlines, reduced biodiversity or wildlife prevalence), and tourist perceptions of the environmental impacts of tourism related travel and their willingness to pay to reduce this impact, remain important knowledge gaps that need to be addressed if potential long range shifts in tourist demand are to be more accurately projected (UNWTO-UNEP-WMO, Advanced Summary, 2007, p:12).

3.2.3.4. Destination Vulnerability Hotspots

> "The integrated effects of climate change will have far-reaching consequences for tourism businesses and destinations. Importantly, climate change will generate some impacts in the tourism sector and these impacts will vary substantially by market segment and geographic region. Figure below provides a summary assessment of the most at risk tourism destinations for the mid to late 21st century. "Until systematic regional level assessments are conducted a definitive statement on the net economic or social impacts in the tourism sector will not be possible. Furthermore, the outcome most likely will depend on the extent of climate change. The impact on the tourism sector may strongly parallel that of the global economy, where a 1 ºC temperature rise may result in a net benefit for the world economy, but greater increases increasingly show net declines"" (UNWTO-UNEP-WMO, Advanced Summary, 2007, pp: 7-8).

In Figure 22, there are hotspot regions that are defined as vulnerable regions in terms of the impacts of the climate change on tourism. One of these regions is defined as the Mediterranean Region. The risks that are defined fort he region can be ranged as warmer summers, land biodiversity loss, marine biodiversity loss, water scarcity, increase in disease outbreaks. The causes of these risks are explained by climate change and all of the changing affect tourism negatively in this region.



Source: UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 10

Figure 22. Geographic Distribution of Major Climate Change Impacts Affecting Tourism Destinations

3.2.3.5. The Impacts on Mediterranean Region

In Europe the dominant tourist flow is currently represented by the mass of tourists that, from the northern and central countries, head each summer towards the Mediterranean coasts. According to the available scenario forecasts for Mediterranean, climate change should bring forth some common consequences for the continent but also trigger impacts that are locally determined depending on the geophysical characteristics (Gomez, M. B., 2004).

Mediterranean tourism is predominantly coastal tourism. Climate models project an increased risk of drought in the region. Among likely impacts are: increase in desertification (through decrease in total rainfall), increase in water resource pressures, increase in heat stress and human discomfort, intensification of rainfall and convective activity, increase in flash floods and erosion, poor air quality in cities, energy shortages and vulnerability to more tropical diseases (Gomez, M. B., 2004).

The Mediterranean tourism sector could be adversely affected by the improvement of northern European summers, which could trigger more domestic holidays and a decreased incentive for Mediterranean summer holidays. Domestic tourism in Western and Northern Europe (e.g. destinations like the Baltic Coast or Scandinavia) may thrive in summer together with an increased incentive for southerners to go north. However, an increased incentive for shoulder month Mediterranean holidays could possibly develop (Kundzewicz, Z. W., et al., 2008, pp: 129-130).

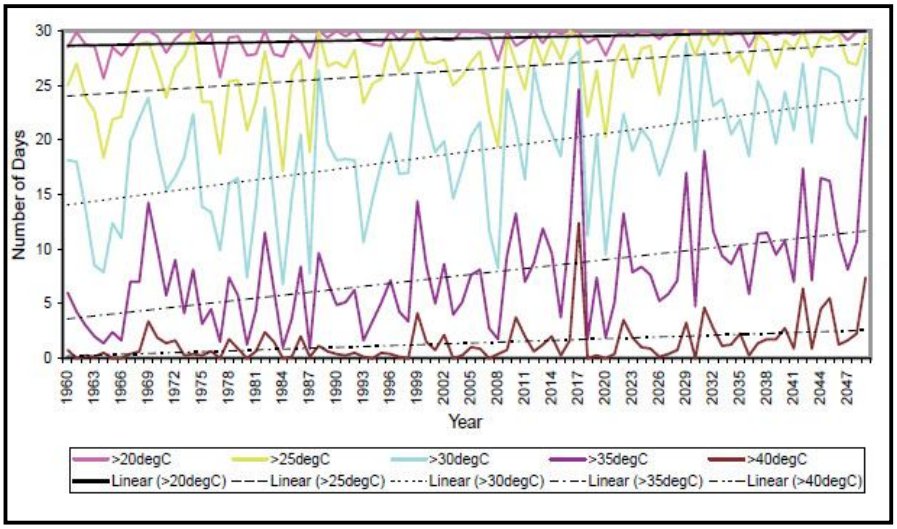
As some measure of the economic importance of summer tourism to the Mediterranean, 147 million international tourists visited the Mediterranean in 2003 (22% of the international tourism market) and generated US$113 billion for the region. It is very difficult to model the potential response of tourists to climate change. However, it was possible to identify some of the impacts climate change may have on the tourism industry (C. Giannakopoulos, M. Bindi, M. Moriondo and T. Tin, 2005, p: 45). These impacts in the Mediterranean Region can be ranged as improvement of summers triggers more domestic holidays in other origin market, decreased incentive for Mediterranean summer holidays, increased incentive for shoulder month Mediterranean holidays, increased incentive for southerners to go North (Table 2)

Table 2: Likely Climate Change Impacts on Major Tourist Flows to the Mediterranean Region

Major tourist flow	Climate change in origin region	Climate change in destination region (Mediterranean)	Implications for destination region (Mediterranean)	Possible market reactions
Northern Europe to Mediterranean	– Much warmer, wetter winters – Warmer summers – More ''reliable'' summers	– Warmer, wetter winters – Hotter, drier summers – Changes more pronounced in Eastern Mediterranean, – Increased heat index – More days above 40 °C – More arid landscape – Sea level rise Small tidal range means greater impact of sea level rise	– Greater drought and fire risk – Increased water shortages – Higher personal heat stress – Beach degradation and habitat loss due to sea level rise – Vulnerability to more tropical diseases (e.g. malaria) – More flash floods – Urban quality problems in cities	Overwhelmingly a leisure travel market – Improvement of Northern European summers triggers more domestic holidays – Decreased incentive for Mediterranean summer holidays – Increased incentive for shoulder month Mediterranean holidays – Increased incentive for southerners to go north
North America to Mediterranean	– Warmer winters – Warmer summers – Slight rainfall increases – In Southeast of USA, increased risk of storm and beach erosion, increasing destructive power of hurricanes – Higher storm risk and higher rainfall in the Pacific coast			Mostly leisure (70%), some business travel – Too hot for peak summer cultural visits to Southern Europe – Increased incentive for shoulder month travel to the Mediterranean

Source: Kundzewicz, Z. W., et al., 2008

Rising temperatures over the Mediterranean region in 2031–2060 will certainly affect the comfort of tourists and their ability to acclimatize to a region prone to high temperatures and heat waves. In terms of tourism, increases in summer temperatures to above 40 ºC will reduce personal comfort and can lead to increased incidence of heat stress. At present, August is the most popular month for tourist travel to Greece and Turkey. However, it is anticipated that with soaring temperatures and an associated reduction in the comfort index many tourists may be discouraged from visiting at this time of the year. Alternatively, holiday-makers may opt for an earlier or later time of the year (since climate models suggest that June in 2020 will be as warm as July, August and September at present) or they may switch to alternative locations in other countries (Viner, D. & Agnew, M., 1999, p: 21) (Figure 23).



Source: Viner, D. & Agnew, M., 1999, Climate Change and Its Impacts on Tourism, WWF-UK

Figure 23. Estimated Changes in the Frequency of Days above Certain Key Temperature Thresholds for the Eastern Mediterranean

3.3. Policies and Response Mechanisms of Actors

A literature survey (Willms, 2007) shows a lack of awareness and knowledge of climate change, including its economical, social and environmental impacts. Studies on the influence of long-term climate change on tourism are also rare. However, some basic questions about these effects are asked such as:

- How will climate change affect entrepreneurs working in the tourist industry (travel organizers, agents, and operators in tour companies)?
- Will tourism become less sustainable as a result of climate change? What new management strategies and policies should be put in place?

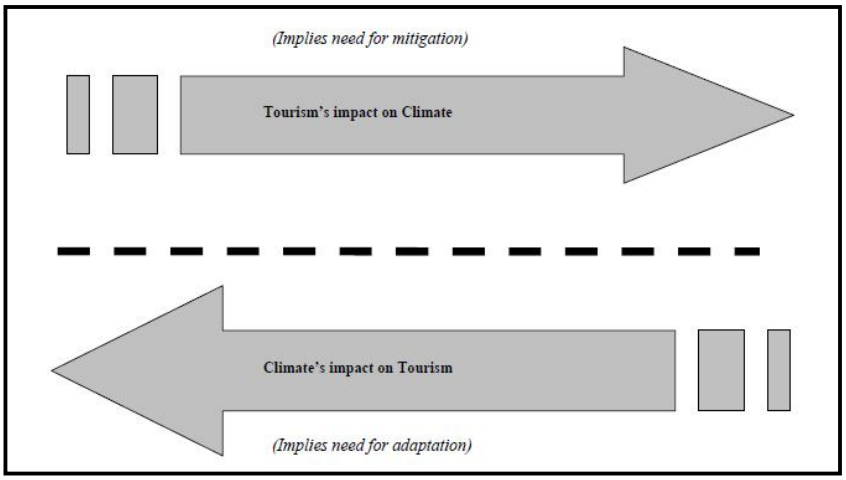
In fact, there is relatively little debate over the science of climate change. The debate is really over how it should be responded to the possibility of climate change. Given tourism's importance in the global challenges of climate change, there is a need to urgently adopt a range of policies which encourages truly sustainable tourism. Perhaps the most effective reaction to potential global climate change is a mixture of prevention and adaptation formally described in the literature (Skodvin and Fuglestvedt, 1997).

The environmental and economic risks of the magnitude of climate change projected for the 21st century are considerable and have featured prominently in recent international policy debates. The IPCC concluded with very high confidence that climate change would impede the ability of many nations to achieve sustainable development by mid-century. The Stern Review 4 on the Economics of Climate Change found that the costs of taking action to reduce GHG emissions now, are much smaller than the costs of economic and social disruption from unmitigated climate change. Our lifestyles, economies, health and social well-being are all affected by climate change, and although the consequences of climate change will vary on a regional basis, all nations and economic sectors will have to contend with the challenges of climate change through adaptation and mitigation (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 2).

The scrutiny of the international debate on tourism and climate change highlighted the existence of an institutional discourse based on the belief that climate change is happening now and its impact on tourism must be taken seriously. The two prevailing lines of actions for tourism industry appear to be mitigation and adaptation. In this view the potential impacts of climate change have very important implications for employment, investment policies, and governments' policies and for the livelihood of local residents. It, therefore, seems essential the involvement of tourism industry in joint initiatives (with governments, the research community, local authorities or international agencies) to assess the implications of climate change and act on the triggering causes (Gaita, R. & Both, M., 2008, p: 5).

A standard list of policy responses was endorsed by the IPCC WG III, many of which hearken back to 1970s efficiency framing of the energy policy debates. These responses include: increased energy efficiency, emission control, aforestation, and international cooperation. Mitigation responses call for changes in production and others for changes in lifestyle and consumption. Adaptive responses help the majority of the world's population, but don't receive as much policy attention in terms of immediate actions (Haas, P. M., 2004, pp: 1-2).

> "The first conceptual model presented depicts the tourism/climate change system as 'a two way street': climate influencing tourism, and tourism influencing climate.When attention is focused on climate's influence on tourism, adaptation to changes in climate is viewed as the most urgent area of knowledge. When tourism's influence on climate is a primary concern, discussions center on mitigation. … Under this conceptual model, win-win solutions are precluded: to advance in one direction means that less progress is made in another" (Patterson, T., 2004, pp: 216-217) (Figure 24).



Source: Advances in Tourism Climatology, 2004, p: 217

Figure 24. The Tourism-Climate Change System is Typically Illustrated as a Two-Way Street

Tourism can play a significant role in addressing climate change if the innovativeness and resources of this vital global economic sector are fully mobilized and oriented towards this goal. The concern of the tourism community regarding the challenge of climate change has visibly increased over the last five years. This time has been a watershed in terms of raising awareness about the implications of climate change within the international tourism community. In this time, it has been recognized the complex inter-linkages between the tourism sector and climate change and established a framework for future research and policy making on adaptation and mitigation. A number of individual tourism industry associations and businesses have also shown leadership on climate change, voluntarily adopting GHG emission reduction targets, engaging in public education campaigns on climate change and supporting government climate change legislation (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 4).

3.3.1. Mitigation Policies

Climate change mitigation relates to technological, economic and socio-cultural changes that can lead to reductions in greenhouse gas emissions. Tourism related emissions are projected to continue to grow rapidly in contrast to the substantial emission reduction targets the international community agreed was required in the latest round of UNFCCC negotiations

('Vienna Climate Change Talks 2007'), where it was recognized that global emissions of GHG need to be reduced to well below half of the levels in 2000 by mid-century (Climate Change and Tourism: Responding to Global Challenges, 2008, p: 34).

As the emission reductions required for tourism to contribute meaningfully to the broader emission reduction targets of the international community are substantial, mitigation should ideally combine various strategies, such as voluntary, economic, and regulatory instruments. These can be targeted at different stakeholder groups, including tourists, tour operators, accommodation managers, and airlines, manufacturers of cars and aircraft, as well as destination managers. It is clear that for those actors being proactive in addressing climate change, mitigation offers a range of business opportunities. Given current societal trends, it seems that there will be new, permanent and growing markets for environmentally oriented tourists and many opportunities to develop new low carbon tourism products (UNWTO-UNEP-WMO, Advanced Summary, 2007, pp:14-15).

Mitigation, in general, in the tourism sector can be achieved by reducing energy use, for instance through changing travel behavior, by improving energy efficiency, increasing the use of renewable energy, carbon offsetting strategies, sustainable destination planning and management, tour operators' choice of destinations and packaging of travel products, as well as other changes in business practices. While technological innovation has considerable potential to achieve reductions in GHG emissions, this will, given the high growth rates in global tourism, not be sufficient to achieve absolute reductions. Behavioral changes from tourists as well as structural change within the tourism industry will thus be of importance in reversing the trend of growing GHG emissions in tourism (Fotiou, S. & Simpson, M., p: 59, visit also http://www.climateactionprogramme.org/books/2008/).

National or international mitigation policies, in addition, – that is policies that seek to reduce GHG emissions – are likely to have an impact on tourist flows. They will lead to an increase in transport costs and may foster environmental attitudes that lead tourists to change their travel patterns (e.g., shift transport mode or destination choices). Increased travel cost and environmental concern over tourism travel may impact long-haul and air travel. There has been substantial recent media coverage on this topic, specifically as it relates to air travel (UNWTO-UNEP-WMO, Advanced Summary, 2007, pp: 6-7).

3.3.2. Adaptation Policies

The IPCC indicated that, as a second response mechanism, the need for societies around the world and economic sectors like tourism to adapt to climate change in the decades ahead is inescapable. The inevitability of the need to adapt to future climate change and the realization that adaptation is occurring today partially explains why there has been an explosion of research and policy interest in adaptation to climate change over the past five years. Adaptation has figured less prominently in climate change research on tourism than in some other economic sectors (e.g., agriculture) and remains an important knowledge gap, particularly with respect to destinations (Climate Change and Tourism: Responding to Global Challenges, 2008, p: 81).

Adaptive capacity in tourism sector is high, but varies substantially between sub-sectors, destinations and businesses. Some tourism stakeholders-regions will require assistance to adapt effectively to climate change. It is now recognized that regardless of the emissions reduction efforts, there is an inevitable need for societies around the world to adapt to unavoidable changes in climate. It is essential to emphasize that regardless of the nature and magnitude of climate change impacts, all tourism businesses and destinations will need to adapt to climate change in order to minimize associated risks and capitalize upon new opportunities, in an economically, socially and environmentally sustainable manner (Scott, D. et al., 2007d).

Adaptation can be pursued by societies, institutions, individuals, governments. It is motivated by economic, social or environmental drivers, by many means, for example social activities, market activities, local or global interventions. The implementation of adaptation measures in the tourism sector should consider the time horizon of climate change impacts. The information requirements, policy changes and investments that are required for effective adaptation by tourism destinations will require decades in some cases, and therefore the process of adaptation needs to commence in the very near future for destinations anticipated to be among those impacted by mid-century (Climate Change and Tourism: Responding to Global Challenges, 2008, p: 81).

The most important adaptations are those taken by private agents-consumers and businesses, for example. In addition, governments could prevent harmful climatic impacts by land-use regulations or investments in research on living in a warmer climate. Governments play an

important role by ensuring that the legal and economic structure is conducive to adaptation, particularly by making sure that the environmental or climatic changes get reliably translated into the price and income signals that will induce private adaptation (Nordhaus W. D., 1993, pp: 52-53).

3.4. The Actors

3.4.1. Climate Change Governance

The aim in this part of the work is to find how to engage with the problem of climate change. For Carlarne, the key for good climate governance is the creation of an overarching supranational environmental organization. She argues that the growing realization of the need to address climate change puts new vigor into political demands for such an organization. Moreover, she argues that there is need for more immediate action and, in a manner consistent with that of van Asselt et al., her writings explore the possible ways the inter-linkages between regimes might be developed to enhance policies and practices to deal with human induced climate change (Haines, F. & Reichmann, N., 2008, p:388).

Paul Harris forcibly argues for rethinking state-centric models for tackling climate change. As a resident of China, Harris mounts a cosmopolitan argument around the responsibility of individuals to deal with climate change. His writings acknowledge common arguments around differentiated national responsibility and the need for the developed world to take the lead in reducing emissions, since the bulk of the problem was of their making. However, he argues on the basis of the need to substantively reduce greenhouse emissions must play their part. His writings tease apart the various components of individual responsibility and reasserts the central agency inherent in a world where the wealthy not only have the means to help address the problem but also have the knowledge that their actions are responsible for compounding the current crisis (Haines, F. & Reichmann, N., 2008, pp: 388-389).

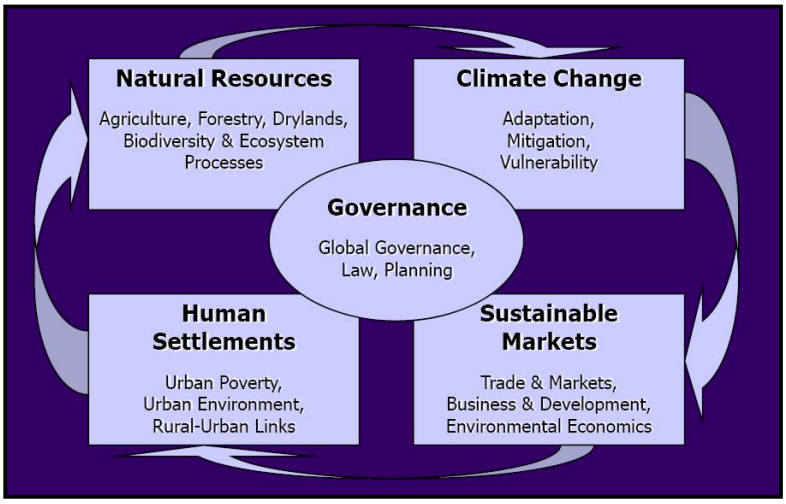
What is clear, however, is that creating a successful regime to combat climate change is not just a problem of implementation but also a theoretical problem that, so far, regulatory theories have failed to generate. Climate change is a problem that eludes and evades the inherent instrumentalism of much regulation (Black, J., 2002). It requires to question, to draw on existing knowledge and extend it, and to question standard regulatory practices and traditional locales of both responsibility and authority. This is a complex undertaking not

least because placing climate protection “on the inside” requires dealing with the intersecting challenges of environmental protection, social justice, and economic development. It will not be sufficient simply to appreciate the nature of social, economic, and political relations that constantly result in shortcomings in the development of law and policy. Nor will it be sufficient to posit normative arguments that conveniently forget what it is known about the challenges of policymaking. Rather, what is demanded is finding ways forward in full acknowledgment of the challenges (Haines, F. and Reichman, N., 2008, pp: 390-391).

3.4.2. The Role of the Stakeholders

The aim in this part of the thesis is to understand the translation of the global debate on tourism and climate change into the discourses of different categories of local stakeholders (policymakers, private entrepreneurship and NGO) in order to assess the respective perceptions and stands upon the matter.

According to the IPCC, it is very likely that hot extremes, heat waves and heavy precipitation events will continue to become more frequent. However, behavioral science at least offers a more far-reaching and realistic approach to designing policies that might get us through this impending crisis (Gowdy, J. M., 2008, p: 642). Stakeholders had the opportunity to react to the scientific results and to reflect on their perception of the likely impacts of projected changes in extremes on relevant activity sectors and the potential to adapt and avert adverse consequences. As it is seen in the Figure 49, the actors and their interrelationship are in the center of the relations. They can cover the resources, responses, related activities, and human beings (Kundzewicz, Z. W., et al., 2008, pp: 129-130) (Figure 25).



Source: Dodman, D., 2008

Figure 25. Five Principal Thematic Groups to Mainstream Climate Change

"Objectives of the stakeholders in general are:

- improve the understanding of climate change impacts for countries including both policy makers and poor groups,
- improve the decision-making capacities in vulnerable countries to cope with the impacts of climate change,
- improve the negotiating capacities of countries in the climate change negotiations through analysis of issues relevant to them,
- improve the sustainable livelihoods opportunities of communities in countries in light of possible climate change impacts"

(Dodman, D., 2008).

In addition, in terms of the international institutional discourse about climate change and tourism, it seems to be widely acknowledged and employed as reference at local level. There are essentially two discourses characterizing those informants that can be labeled institutional believers. For the group clustered around the first discourse, the main concerns are represented by the threats posed by climate change to the current path of development, while the second is rather focused on finding the adaptation to future impacts. The implications are that one discourse associates more closely to mitigative strategies to prevent the change and the other to strategies that could allow adapting to the change (Gaita, R. & Both, M., p: 5).

Firstly, strong believers not only are informed through the media, but actively seek to keep themselves updated. They support the mitigation approach but appear more willing to

actively pursue adaptive strategies. Nonetheless the constraints relative to resource and expertise availability at local level limit the scope of actions (Gaita, R. & Both, M., p: 6).

Secondly, although these informants are aware of the basic general knowledge regarding climate change, their conceptualization is mainly relying on information passed by mass media, thus resulting in being shaped by a huge amount of consistent and contradictory information. The clearness and accuracy of their understanding of the phenomenon is therefore affected. They declare to be in favor of taking every possible step, to begin with those that don't require big investment costs, to reduce emissions. More perplexities are expressed towards what adaptation measures should be taken and they way they should be financed. In this respect, they look to the central administration in wait of more precise indications and concrete help to favor the implementation of the strategies that will be progressively defined (Gaita, R. & Both, M., p: 6).

In terms of effectiveness in preventing the climate change and its impacts, the actors and their position that means categorization becomes important because of their characteristics and relation to the sector. In this respect, actors such as governments, NGOs, etc… have different responsibilities or interest areas in making decisions or in planning actions in the sector in terms of climate change.

3.4.2.1. Governments

Both central and local governments will always have a key role to play in defining and promoting action to be taken by the tourism sector in response to climate change. However, it is likely that such initiatives will need to be implemented at a sub-regional or local level in order to take into account local conditions and needs (Gaita, R. & Both, M., p: 2). The steering role of both governments is considered very important, but is also stressed the importance of the cooperation and contribution of each group of civil society. Mitigating and adaptive strategies are pursued with equal commitment, although the lack of local resources renders the co-involvement of the central administration fundamental. (Gaita, R. & Both, M., p: 7).

In the absence of strong domestic pressures for action, governments are reluctant to organize international institutions and knowledge-application in a way that would exercise any degree of influence over the states themselves. So far, governments have lacked the political will to

resort to stronger institutions, or to strengthen existing institutions. Political will in this regard come from the perceptions of interest from salient political participants and from economic actors—firms (Haas, P. M., 2004).

A concerted push for national-level research and development on energy alternatives, for example, across a wide portfolio of technologies could help build the political will for stronger international cooperation. Such a push is likely to be sustained in most of the major industrial and industrializing countries because it serves several policy goals: reducing dependence on high priced energy sources, reducing vulnerability to fuel supply interruptions, and stimulating niches in new green markets. By supporting national technological breakthroughs, better policy alternatives will become commercially viable and economic constituents for international action will be mobilized. In addition, the discussed mitigating measures are eco-efficiency, waste generation and recycling while the adaptive regard possibilities for water storage, land use management and new parameters to be integrated into architecture (Haas, P. M., 2004).

3.4.2.2. Local Entrepreneurs

The central referential role of the institutional discourse is highlighted with two differences. The share of the declared skeptics is higher than within the policymakers and the weak believers' position resembles that of the skeptics. Skeptical and weak believers both are characterized by a wait and see approach: they are concerned with issues related to sustainability but are not willing to make any investments apart from those that will have a sound economic return. They expect the public administration to provide guidance and assistance on climate change related issues. Strong believers are, on the contrary, investing their own resources for keeping updated with sustainable practices and technologies. Within the limits of possibilities these entrepreneurs took the effort (Gaita, R. & Both, M., p: 6).

Tourist entrepreneurs are included in strong believers but constitute a uniform group of strong believers. They all know about climate change and related potential impacts; some even asserted having directly witnessed them. It has not been possible to discern the existence of either a threat or opportunity discourse within this group, most probably because of the early stage of the debate and because of the different time span employed for the study of climate change and for planning tourist development. They appear to be willing to take action but wait for the central and local administration to provide guidelines and support.

The current priorities for local entrepreneurship are the integration of sustainable practices into tourist activities, the development of more varied attractions, decrease of seasonality and the improvement of the qualitative profile of the visitors (Gaita, R. & Both, M., p: 8).

3.4.2.3. Environmental NGOs

The NGO informants proved to belong to the strong believers' group. The scientific conclusions of the IPCC are accepted and agreed upon; nonetheless these interviewees actively search for information through other media and from other sources. Their discourse is that of climate change as national threat; critics are directed to the local administration, which is said to be leaning back and waiting for national policies, and to the national administrations, which is believed to be too narrowly focused on mitigation. They all belong to the group of active believers and their main discourse is definitively that of climate change as a threat (Gaita, R. & Both, M., pp: 6-7).

The Davos Conference (2007) calls for the following actions as examples for the stakeholders in the sector:

> 1) "Governments and International Organizations:
> - Collaborate in international strategies, policies and action plans to reduce GHG emissions in the transport, accommodation and related tourism activities.
> - Introduce education and awareness programs for all tourism stakeholders – public and private sector – as well as consumers.
> - Develop regional and local climate information services tailored to the tourism sector and promote their use among tourism stakeholders. Build capacities for interpretation and application of this information, strengthening collaborations.
> 2) Tourism Industry and Destinations
> - Take leadership in implementing concrete measures (such as incentives) in order to mitigate climate change. Establish targets and indicators to monitor progress.
> - Promote and undertake investments in energy-efficiency tourism programmes and use of renewable energy resources.
> - Implement climate-focused product diversification, to reposition destinations and support systems, as well as to foster all-season supply and demand.
> - Raise awareness among customers and staff on climate change impacts and engage them in response processes.
> 3) Consumers
> - In their choices for travel and destination, tourists should be encouraged to consider the climate, economic, societal and environmental impacts of their options before making a decision.
> - In their choices of activities at the destination, tourists should also be encouraged to opt for environmentally-friendly activities that reduce their carbon footprint.
> 4) Research and Communications Networks
> - Include environmental and climate specific subjects in the study curricula of tourism training programmes and extend these to broader educational systems.
> - Raise awareness on tourism's economic role as a tool for development, and present information on causes and effects of climate change based on sound science, in a fair, balanced and user-friendly manner."

The report provides a synthesis of the state of knowledge about current and future likely impacts of climate change on tourism destinations around the world and an overview of policy and management responses adopted by the key stakeholder groups (international organizations, public administrations, the tourism industry) with respect to adaptation to and mitigation of climate change.

3.5. Climate Change in the Context of Planning

The impacts of climate change is varied and extensive, including extreme weather events and the long-term implications of more gradual change, like sea level rise, melting permafrost, receding ice caps, and drought. These changes affect all aspects of community life and range from environmental through long-term economic, health and social implications. Communities need to understand these changes but, more importantly, must develop strategies and plans for adaptation and build these strategies into their day-to-day planning and decision-making processes.

Planning, in the context of climate change, aims to strengthen adaptive capacity for assessing vulnerability and adaptation, which includes the influence of climate changes and extreme events. In addition, it aims to reinforce national and local capacity to adapt. This objective mainly involves adaptation evaluation and review of implementation. In this regard, the aims can be ranged as:

- To reduce greenhouse gas emissions, specifically reducing energy use, waste, and the use of unsustainable forms of transport.
- To encourage other sectors of the city to reduce their greenhouse gas emissions.
- To prepare for the changes that will happen because of the changing climate.
- To create behaviour change around how it is used natural resources.
- To illustrate the economic, social and environmental benefits of taking action on climate change.

(Climate Change Action Plan for Brighton & Hove, 2006, p: 3).

Energy sourcing and use: This has been to establish sustainable use of energy in all operations and buildings. For example, as a result of the researches that were made in the planning process, the following can be suggested to provide reduced energy use:

- Investigate the potential and benefits for using renewable technology for lighting.
- Help business to make use of small scale solar, wind and other appropriate renewable technology.

Types of renewable energy include electricity from wind turbines or from the sun in the form of photovoltaic (PV) panels; heating and hot water from ground source heat pumps; hot water from the sun in the form of solar water heating; heating from wood burning stoves, using wood from sustainably managed forests, and biomass-fired boilers, and hydro (water driven) systems. It should be researched that which one is more suitable for the local and then, it can be implemented the planning decisions in that local in terms of climate change.

The core of most efforts to address climate change and ensure the long term sustainability of economies is often linked to energy policies. Plans, in terms of energy, also commit to the following:

- All new electricity generation projects developed have zero net greenhouse gas emissions, including zero net emissions for coal-fired generation;
- All exiting thermal power negation reaches zero net greenhouse gas emissions;
- New energy efficiency standards for buildings is determined and implemented;
- A new innovative clean energy funds is researched to encourage the development of clean energy and energy efficient technologies in the electricity, alternative energy, transportation and oil and gas sectors.

Purchasing of goods and services: A comprehensive range of measures are being introduced to tackle climate change through procurement. In terms of renewable energy, it can be adopted supplementary planning guidance on energy efficiency and renewable energy which asks developers to build energy efficiency into their buildings and incorporate renewable energy measure, so reducing CO2 emissions.

Reducing the amount of waste produced: Waste reduction is the most effective way of reducing greenhouse gas emissions.

Maximising recycling rates: Recycling reduces greenhouse gas emissions, as the energy requirements for recycling processes are much lower.

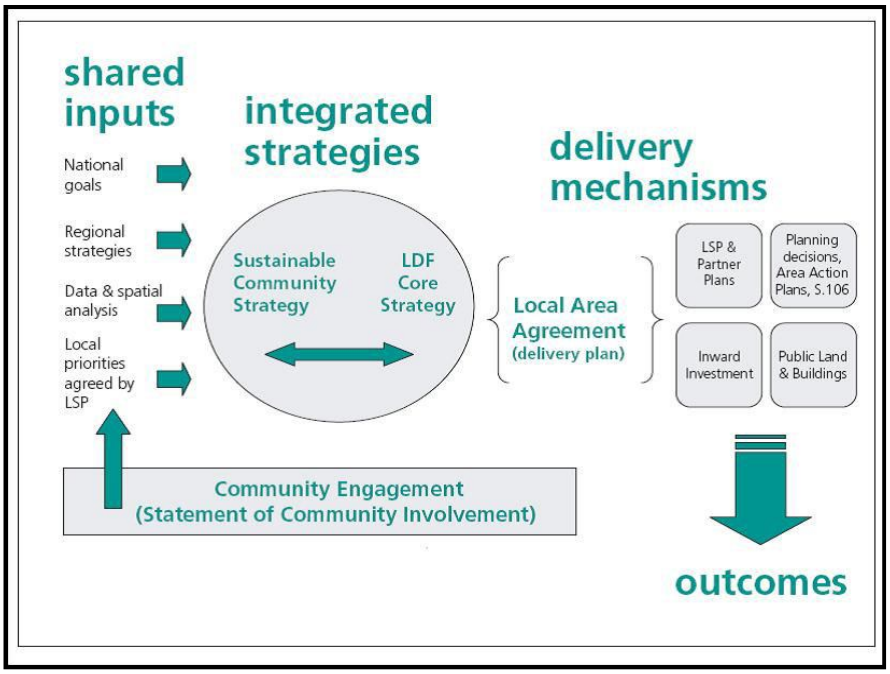
Transport: It includes using more sustainable forms of transport both to and within sector, so reducing emissions. It can be worked extensively in partnership with bus and rail companies to increase public transport use in the city reducing emissions.

Awareness: Publicising grants for energy efficiency improvements will enable vulnerable sectors such as tourism to make their buildings more energy efficient. Disseminating information to developers in the city will enable them to design their buildings with regard to reducing greenhouse gas emissions, and ensuring their buildings are robust to extreme weather conditions caused by climate change.

It is encouraged local planning authorities to engage constructively and imaginatively with developers to secure the delivery of sustainable buildings and recognises there will be local circumstances that justify higher standards for particular developments. Where there are demonstrable and locally specific opportunities for requiring higher levels of building performance it is proposed these should be set out in advance.

It is considered the climate change in their actions and recommendations within the broad ambit of planning activities (including, for example, long-range plan preparation, development approval, planning for energy, infrastructure and transportation, resource management) in order to:

- minimize risks associated with extreme events and with the cumulative effects of climate change;
- protect natural resources and habitats;
- build resilience into communities; and
- take advantage of mitigation and adaptation techniques, whenever possible.



Source: Planning for Climate Change RTPI Conference, 2009, Planning Advisory Service

Figure 26. Working System of Planners

The diagram in the Figure 26 shows how planners work collaboratively across their authorities and with their local partnerships. Planners look at their locality and work with partners and the community to decide what makes the area distinctive and set a clear vision for the area. The diagram shows that the core strategy is a delivery strategy whether through the actions of determining planning applications or through actions taken by other parts of the authority. It is informed by, and in turn inform, local strategies on climate change (Planning for Climate Change RTPI Conference, 2009, p: 6) (Figure 26).

Planning sits within a wider policy context and within the emerging field of adaptation policy development, planning can become an important aspect of implementation, so the following challenges are posed to policy and decision makers.

- Recognise critically important role of land use & allocation decisions,
- Act to protect community investment in infrastructure,
- Support further research.

In this process, the adaptation, which is provided by plans, to the climate change provides such benefits:

- Greater clarity with respect to carbon and climate change issues.
- Reduced costs associated with climate change due to the adoption of renewable and low-carbon energy technologies, and carbon capture and storage.
- Reduced environmental damage costs associated with non-carbon atmospheric emissions due to the reduced consumption of fossil fuels.
- Increased ability of developments to cope with higher temperatures without the need for expensive solutions such as air conditioning.
- Reduced health impacts associated with rising temperatures.
- Stimulation of the markets for renewable and low-carbon energy technologies.

3.6. Evaluation

In the thesis, the climate change is defined as any long-term changes in the statistics of weather over periods of time that range from decades to millions of years. It can express itself as a change in the mean weather conditions, the probability of extreme conditions, or in any other part of the statistical distribution of weather. According to the researches, the probable temperature rise by the end of the century will be between 1,8 °C and 4 °C (3,2–7,2 °F). The Intergovernmental Panel on Climate Change (IPCC) states that climate change is "very likely due to the observed increase in anthropogenic greenhouse gas concentrations". The increases in CO_2 and other atmospheric gases may produce significant climatic changes over the next century. The concern is only one of a number of areas where population and economic growth have threatened to have significant impacts upon the global environment.

In the research, in addition to climate change, tourism is also examined to be able to understand the relation between these two. Until the 1980s the activity of tourism-led economic development was confined narrowly to the place marketing activities of the traditional sea, sun and sand resorts. Since the 1980s, improved transport and communications systems, as well as the increasing number of business trips and social gains have accelerated the growth of tourism and the internationalization process. In this process, tourism became an essential part of the economic development in the local. In most of the newly developing countries, the sector tourism is taken as a catalyst for local development. In other words, the sector has both economic and social effects on localities.

Tourism is a key sector that has a fundamental importance in the world. In the year of 2007, the international tourist arrivals is 903 million by the rise of 6,6% and the international tourism receipts reaches 856 billion US$ with the growth of 5,6% compared to the previous year.

Since tourism sector is crucial as such, climate change and its impacts on tourism are important. According to de Freitas (2001), there are two aspects of climate that are relevant for tourism: the physical aspect and the aesthetic aspect of climate. Physically, climate factors such as wind, snow are effective on tourism. Aesthetically, the quality of light that affects the appearance of the tourists' surroundings or the appearance of the sky and of the sea and other water bodies become important. Landscape is also influenced by climate. Moreover, the influence of climate on the types of flora and fauna that exist in a particular area affects the appearance of cultivated environments as well as ones that are more natural, which affects the tourism potentials in the destinations.

Therefore, the warming or changing in the temperature is very effective on tourism. For example, in Mediterranean Region, the largest increase in temperature is expected to take place in the summer, when extremely hot days and heat waves are expected to increase substantially, especially in inland and southern Mediterranean locations. In addition, longer droughts are seen according to the researches. In terms of extremes, the number of dry days is shown to increase in the region.

The changes in climate have the potential to affect tourism thresholds, changing the suitability of a destination, supply, and demand. For example, weather and climate play an important role in destination selection because tourists are sensitive to climate and to climate change. The climate is one of the most common attribute in the tourists' decision making. Hence, travelers are likely to consider climate and the changing climate conditions in their decision on whether or not to go, what activities to participate in, when and where.

While these changes of climate have some impacts as above on tourism, some response mechanisms are developed by stakeholders such as mitigation and adaptation. Firstly, mitigation should combine various strategies as the emission reductions required for tourism to contribute to the broader emission reduction targets of the international community are substantial. These can be targeted at different stakeholder groups, including tourists, tour operators, accommodation managers, and airlines, manufacturers of cars and aircraft, as well

as destination managers. Secondly, although societies have a long record of managing the impacts of weather- and climate-related events, additional adaptation measures will be required to reduce the adverse impacts of projected climate change and variability. Adaptation can be pursued by societies, institutions, individuals, governments.

The impacts of climate change is varied and extensive, including extreme weather events and the long-term implications of more gradual change. These changes affect all aspects of community life and range from environmental through long-term economic, health and social implications. In this regard, communities need to develop strategies and plans for adaptation and build these strategies into their day-to-day planning and decision-making processes. Planning, in the context of climate change, aims to strengthen adaptive capacity for assessing vulnerability and adaptation, which includes the influence of climate changes and extreme events. In addition, it aims to reinforce national and local capacity to adapt.

CHAPTER 4

THE CASE STUDY

4.1. The Evaluation of Climate Change and Tourism in Antalya

4.1.1. The Climate Change in Antalya

In Turkey, the temperatures of the year of 2008 have been 0,7 °C over the normal. In 2008, it is saved that the mean temperatures are over the normal in, especially, eastern and coastal areas of Turkey. The precipitation decreases in a significant level in Antalya (Turkish State Meteorological Service). The mean weather temperatures in Turkey have a trend of increasing in southern and south-western regions. Heating trend especially in summer mean temperatures are defined by significant positive serial relationship factor in most of the stations. The changing in the annual maximum temperature serials have generally increasing trend and increasing trend is significant statistically in Mediterranean, South-Eastern Anatolia and southern part of East Anatolia (Demir, İ., Kılıç, G., Coşkun, M., Sümer, U.M., 2008). In addition, significant changing in precipitation serials are seen mostly in winter seasons. 24 of 78 stations that have decreasing trend in the precipitation of winter are significant statistically. Winter precipitations of Mediterranean, Mediterranean Transition, Terrestrial Central Anatolia and Terrestrial Mediterranean Regions decrease (Demir, İ., Kılıç, G., Coskun, M., Sümer, U.M., 2008*)*.

In summary, there are large coherent patterns of warming across in the country affecting both maximum and minimum temperatures but there is a much more mixed pattern of change in precipitation (Sensoy S., Demircan, M. & Alan, İ.)

4.1.1.1. Temperature

It is seen significant heating trends in the Southern and South Eastern areas of Turkey, regions that have experienced urbanization in large-size. Heating trend in spring season in Mediterranean, South-eastern Anatolia and Marmara Regions has been defined clearly by the significant heating trends. In summer season, there are significant heating trends except for a few stations (Demir, İ., Kılıç, G., Coskun, M., Sümer, U.M., 2008).

For Antalya, the mean temperatures like mean highest mean lowest temperatures have been measured between 1975 and 2006. In addition, the sun time and number of rainy days are examined. In the Table 3, it can be seen the monthly values. For example, the summer mean temperatures were approximately 25–28 and the highest was 34 between these years. In winter season, the mean temperature changed between 9,5-11and the lowest was 5,6. The measures of the sun time showed that, in summer season, it reached approximately 11–12 hours. The number of rainy days was much more in winter season.

1971 and 2000 values show in the Figure 27 that the mean temperature normals of Antalya were between 15 °C and 17,5 °C and they increased to 17,5–20 °C interval in some centers in the city, especially in coastal regions. In the inner side of the city, the mean temperature normals were categorized in 12,5–15 °C intervals. However, it is clear in 2008 values that there is an increase in the mean temperature normals in the city. The mean temperature normals were between 17,5 °C and 20 °C with 2,5 °C increase in all coastal area. In addition, inner sides of the city show increases approximately 2,5 °C in the mean temperatures (Figure 28).

In addition, 1971 and 2000 values show that the mean temperature normals of August in Antalya were 26–27 °C and they increased to 28–29 °C interval in some centers in the city, especially in coastal regions. In the inner side of the city, the mean temperature normals were categorized in the interval of 24–25 °C. However, it is clear in 2009 values that there is an increase in the mean temperature normals in the city. The mean temperature normals were 29–30 °C with 1 °C increase in all coastal area. In addition, inner sides of the city show increases approximately 1–2 °C in the mean temperatures.

Table 3: Values That Have Seen in Periods (1975 – 2006)

ANTALYA	January	February	March	April	May	June	July	August	September	October	November	December
	Mean Values (1975 – 2006)											
Mean Temperature (°C)	9,6	9,9	12,2	15,8	20,8	25,3	28,3	27,8	24,3	19,5	14,2	10,8
Mean Highest Temperature (°C)	15	15,3	17,9	21,4	25,9	31,3	34,4	34,3	31,3	26,9	20,8	16,3
Mean Lowest Temperature (°C)	5,6	5,7	7,4	10,6	14,5	19	22,1	21,8	18,6	14,5	9,8	6,8
Mean Sun Time (hour)	5,3	6,1	6,9	8	9,9	11,6	12	11,6	10	8,1	6,3	4,9
Number of Mean Rainy Day	12,4	10,4	9	7,3	5,4	2,9	1,5	1,5	2	5,6	7,8	11,5
	Highest and Lowest Values (1975 – 2006)											
Highest Temperature (°C)	22	23,4	28,2	33,2	37,6	44,8	45	43,3	41,2	37,7	33	25,4
Lowest Temperature (°C)	-2	-4	-1,6	1,4	6,7	11,1	14,8	15,3	10,6	4,9	0,8	-1,9

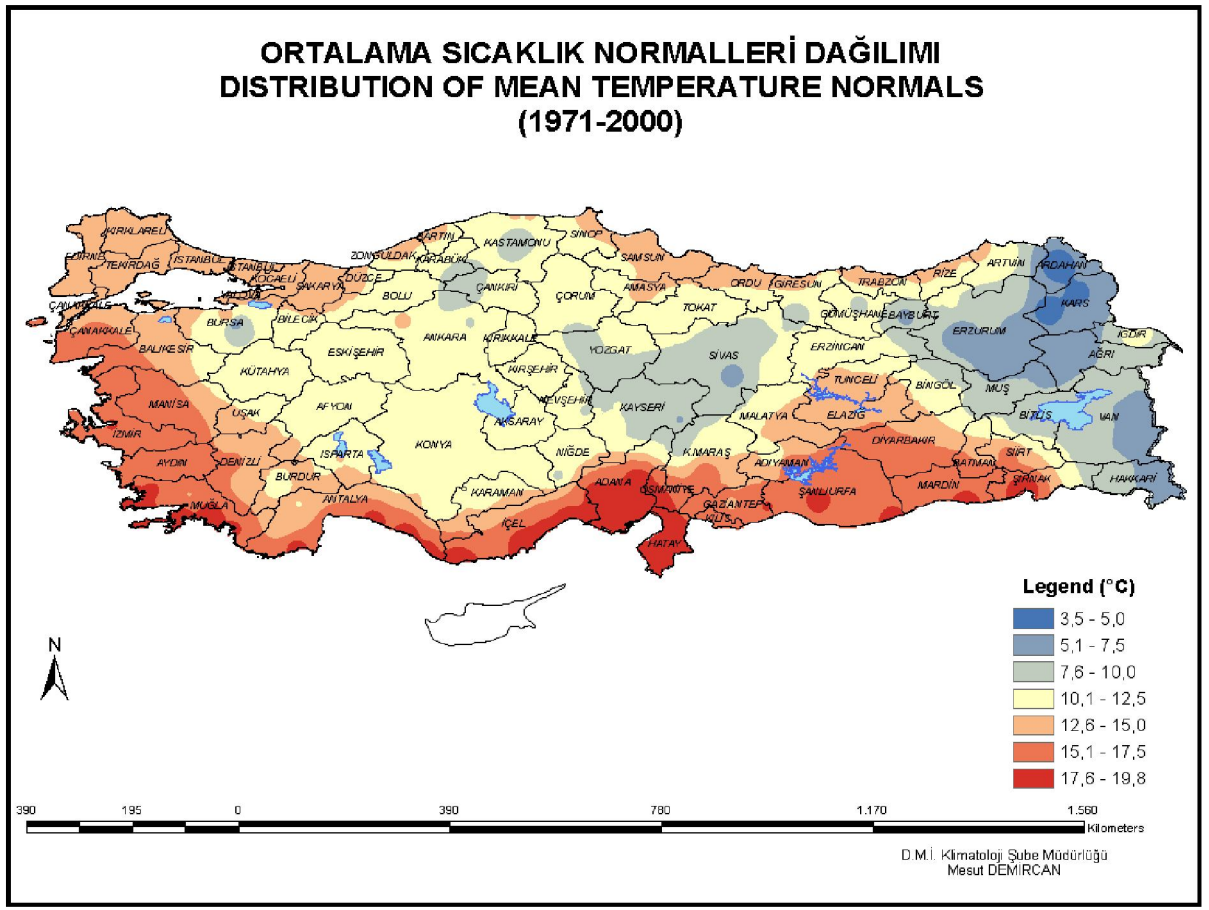


Figure 27. Distribution of Mean Temperature Normals (1971–2000)

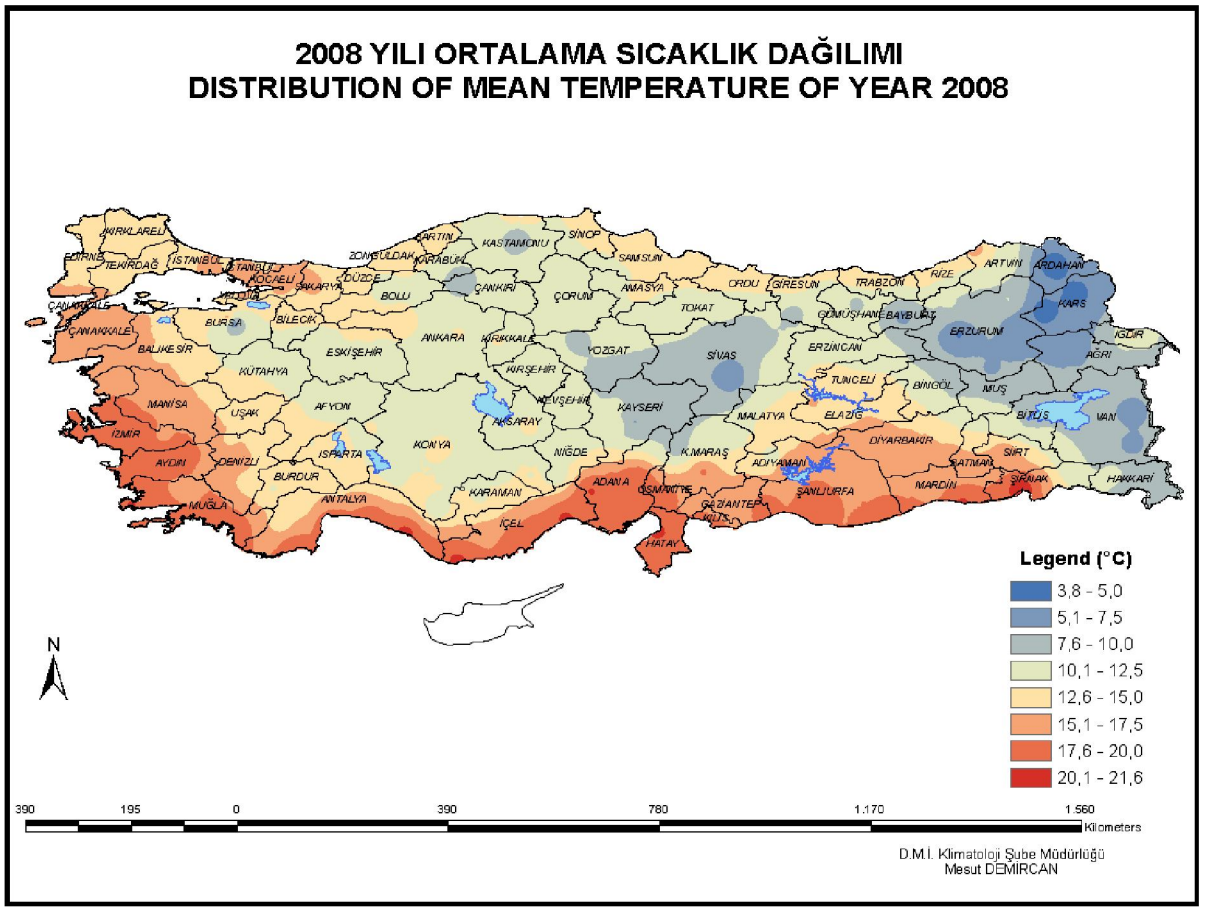


Figure 28. Distribution of Mean Temperature of Year 2008

According to Türkeş (2001), the changing of temperatures on Turkey until the years 2080s are that:

- According to the scenario in which emissions can not be controlled, there will be 3-4 C° (by comparing the normals of the years 1961-1990) increases in the annual mean temperatures on Turkey until 2080s;
- According to the scenario that predicts to stop the accumulation of CO2 on 750 ppmv, there will be 2-3 C° increases in the annual mean temperatures;
- According to the scenario that predicts to stop the accumulation of CO2 on 550 ppmv, there will be 1-2 C° increases in the annual mean temperatures.

For the scenario A2, it is found the expected temperature changing by evaluating the differences between the model results of the future period (as averages for 30 years, 2011–2099) and reference period (1961–1990) (Figure 29). The seasonal increases in mean temperatures are tried to be figured by periods such as:

- In winter season, the mean temperatures that will be in approximately 0,4–0,8 interval between 2011 and 2040 will be increased to the 3,5–4,5 interval between 2071 and 2099. This means that the increase in winter season is approximately 3–3,5 C°;
- In spring season, the mean temperatures that will be in approximately -0,8–0,4 interval between 2011 and 2040 will be increased to the 1,5–3,5 interval between 2071 and 2099. This means that the increase in spring season is approximately 2,5–3 C°;
- In summer season, the mean temperatures that will be in approximately -0,4–0,8 interval between 2011 and 2040 will be increased to the 2,5–6 interval between 2071 and 2099. This means that the increase in summer season is approximately 3–5 C°;
- In autumn season, the mean temperatures that will be in approximately 0,4–1,5 interval between 2011 and 2040 will be increased to the 2,5–4,5 interval between 2071 and 2099. This means that the increase in autumn season is approximately 2–3 C°;

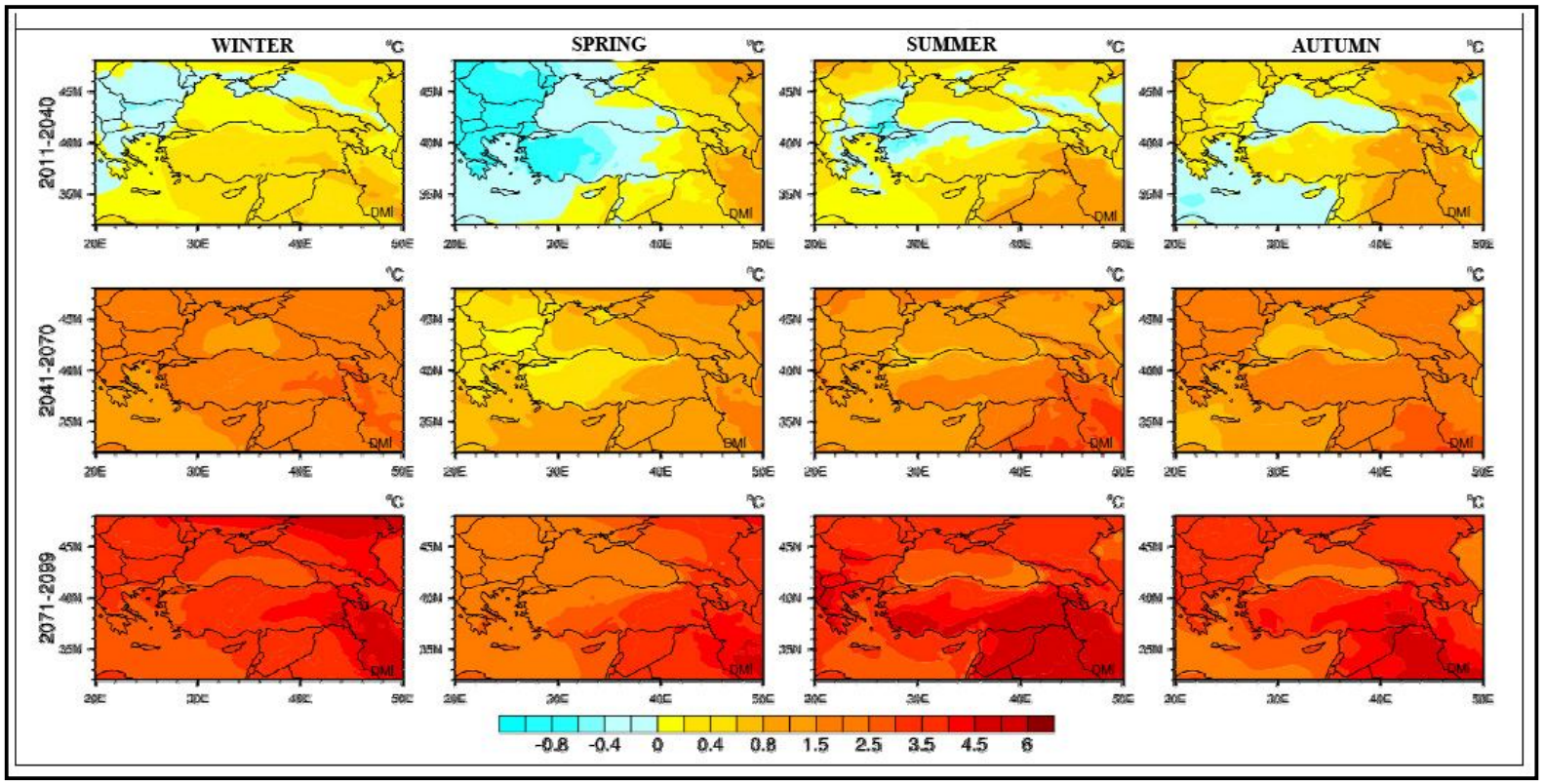


Figure 29. The Probable Seasonal Changing in Temperature that are Expected for Turkey (C°)

4.1.1.2. Precipitation

When the precipitation regions are evaluated spatially, there is a decreasing trend in Mediterranean, Mediterranean Transition, and Terrestrial Mediterranean Regions. The winter precipitations that are 40% of the total precipitation are very important in terms of water amount and it is determined decreasing trend in winter precipitations (Demir, İ., Kılıç, G., Coskun, M., Sümer, U.M., 2008).

In the maps of mean precipitation of the period between 1971 and 2000, Antalya has mostly three categories in the region from 692 to 775 mm, from 776 to 915 mm, and from 916 to 2.202 mm. In coastal areas, the third category is effective while in inner side the second and first categories. Moreover, in the western side of the city, categories that have less precipitation can be seen in the figure (Figure 30). In the table, it can be seen the values of the monthly precipitation for Turkey and Antalya between 1971 and 2000. When the values are compared, it is seen that spring and summer months such as April, May, June, July, August, and September are drier than the other months in terms of precipitation compared to Turkey (Table 4). In addition, in the monthly mean precipitation maps in the period of 1960-2000, the months of June, July, August and September are examined due to being intense in terms of tourism sector. The precipitations are very low that are between 0 and 10 mm or sometimes 20 mm. In these months, it can be said that there is no precipitations (Appendix-B).

The precipitation in the year of agriculture between 1st September, 2007 and 30th October, 2008 has been less than normal but more than last year (Turkish State Meteorological Service). In Mediterranean Region, mean of the region in the year of agriculture in 2007–2008 was 704,1 mm, the normal is 796,1 mm, and the mean precipitation of the same period of last year was 685 mm. In precipitation, there was a decreasing of 11,6% compared to normal, but increasing of 2,8% compared to last year (Turkish State Meteorological Service) (Figure 31). In the figure comparing the precipitation of the year of agriculture in 2007–2008 (12 months) with normals, the precipitation of Antalya is categorized in two groups both of which are decreasing. The central area of the city is figured as decreased in 25–50%, and the other areas are decreased in 0–25% compared to normals (Figure 32). In comparing with last year values, the precipitation shows decreasing in some areas of the city such as central area while in some areas, it shows increasing such as in western part of the city compared to last year.

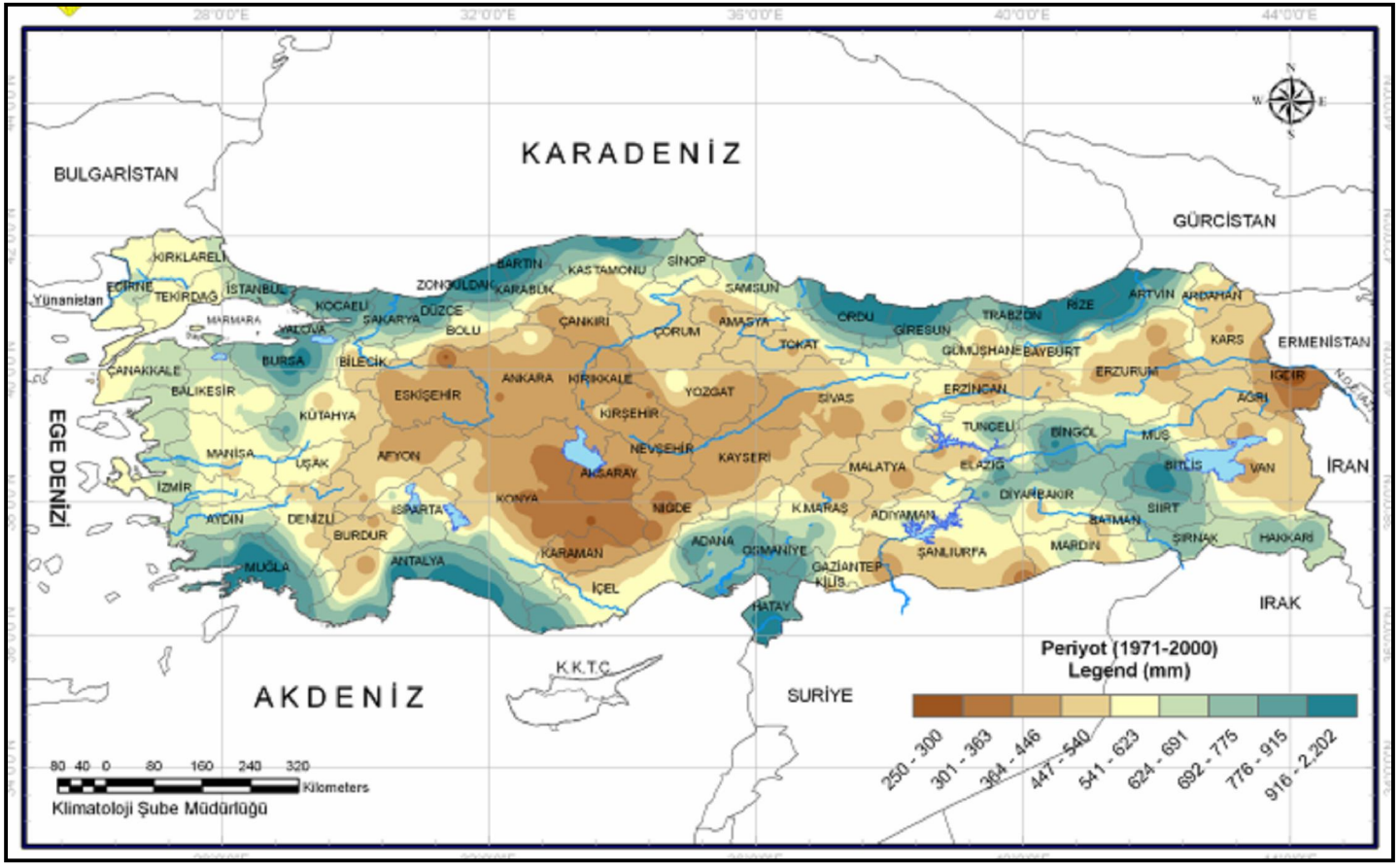


Figure 30. Distribution of Mean Precipitation of the Period of 1971 and 2000

Table 4: Annual Total Precipitation Values

Normal Period	January	February	March	April	May	June	July	August	September	October	November	December	Annual Total
1971-2000---Antalya	196,6	172,1	105,1	49,3	28,2	8,3	2,7	2,0	8,9	79,2	163,6	236,0	1051,9
1971-2000---Turkey	77,5	66,8	64,6	60,1	48,9	31,8	16,9	16,8	22,5	56,9	74,0	89,6	626,2

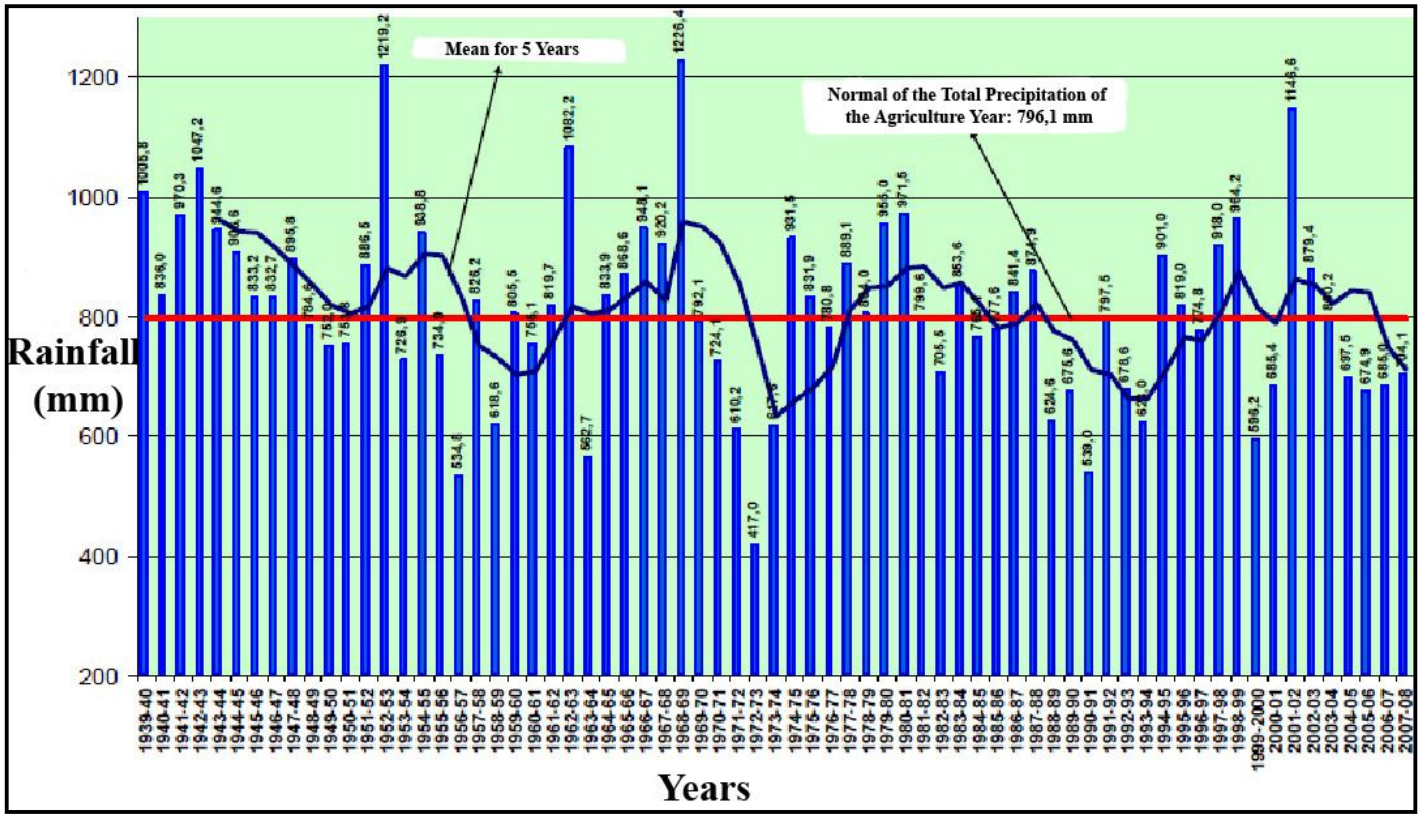


Figure 31. Total Precipitation of the Year of Agriculture in Mediterranean Region (mm)

(1st September-30th October)

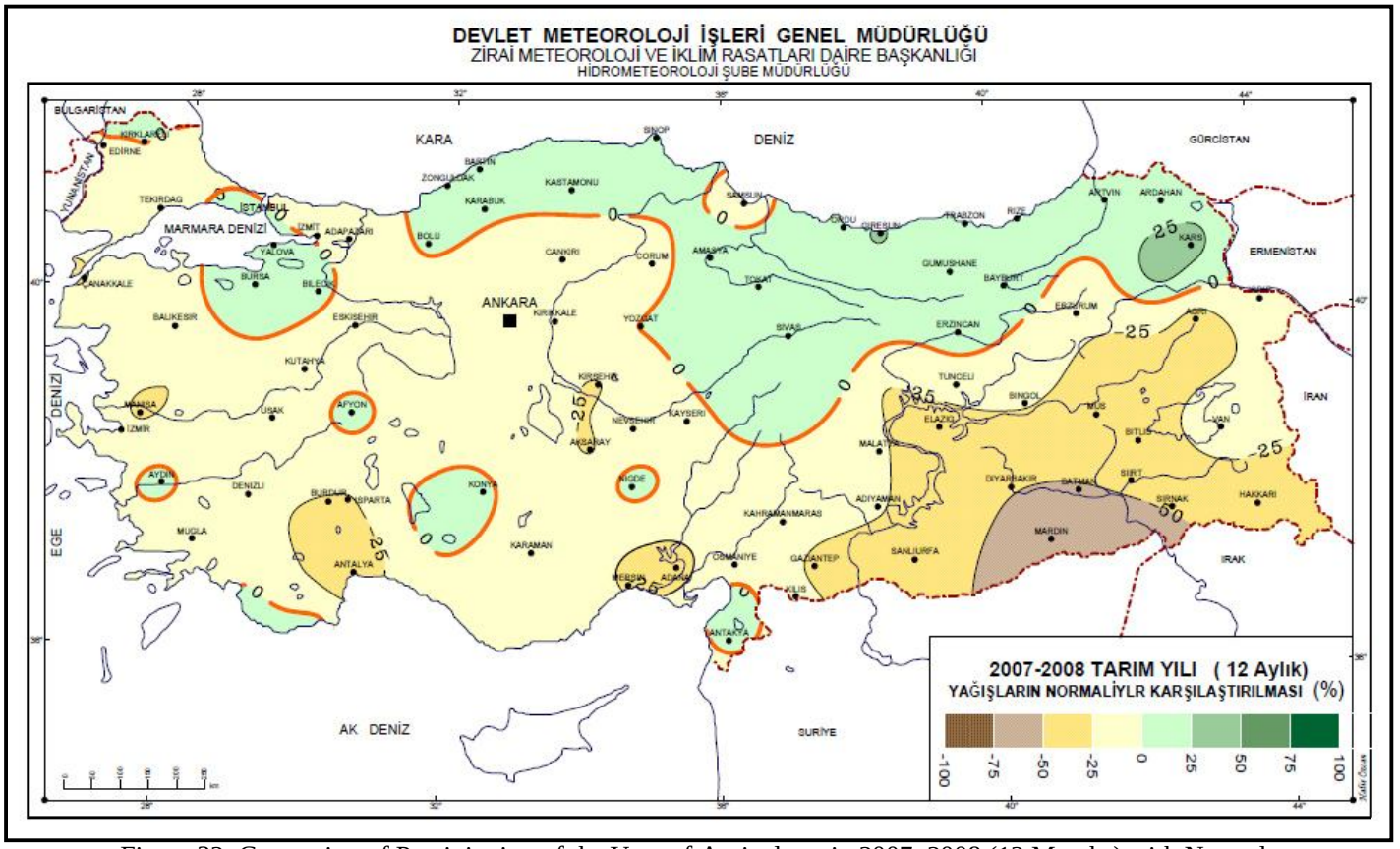


Figure 32. Comparing of Precipitation of the Year of Agriculture in 2007–2008 (12 Months) with Normals

According to Türkeş (2001), the changing of precipitation on Turkey until the years 2080s are that:

- According to the scenario in which emissions can not be controlled, there will be decreasing between 0 and 1 mm/days in the annual mean precipitation on Turkey until 2080s;
- According to both scenarios that predict to stop the accumulation of CO2 on 750 and 550 ppmv, there will be decreasing between 0 and 0,5 mm/days in the annual mean precipitation on Turkey until 2080s.

The changing of annual flows the important river basins in Turkey until the years 2080s are that:

- According to the scenario in which emissions can not be controlled, there will be decreasing approximately 20–50% in the annual current of the rivers in Turkey;
- According to the scenario that predicts to stop the accumulation of CO2 on 750 ppmv, there will be decreasing approximately 5–25% in the annual current of the rivers in Turkey;
- According to the scenario that predicts to stop the accumulation of CO2 on 550 ppmv, there will be decreasing approximately 0–15% in the annual current of the rivers in Turkey. (Türkeş, M., 2001, p: 198).

For the scenario A2, it is found the expected precipitation changing by evaluating the differences between the model results of the future period (as averages for 30 years, 2011–2099) and reference period (1961–1990) (Figure 33). The seasonal increases in total precipitation are tried to be figured by periods such as:

- In winter season, the precipitation that will be in approximately 0–16 interval between 2011 and 2040 will be decreased, especially in southern regions, to the (-16)–(-25) interval between 2071 and 2099. This means that the decrease in southern areas in winter season is approximately 25–30%;
- In spring season, the precipitation that will be in approximately 0–16 interval in general and 25–35 interval in western part between 2011 and 2040 will be decreased to the (-8)–(-16) interval in southern regions and 0–8 interval in western part between 2071 and 2099. This means that the increase in spring season is approximately 25% in general but approximately 40% in southern regions;
- In summer season, the precipitation that will be in approximately 35–50 interval in western and eastern parts, (-35)-(-50) in central areas, and 0–8 interval in other parts between 2011 and 2040 will be decreased to the (-50)–(-150) interval in central parts, and (-25)-(-35)

interval in other parts between 2071 and 2099. In addition, there is an increasing in eastern parts;

- In autumn season, the precipitation that will be in approximately 8–35 interval between 2011 and 2040 will be decreased to the 0–(-16) interval between 2071 and 2099. This means that the decrease in autumn season is approximately 25–35%.

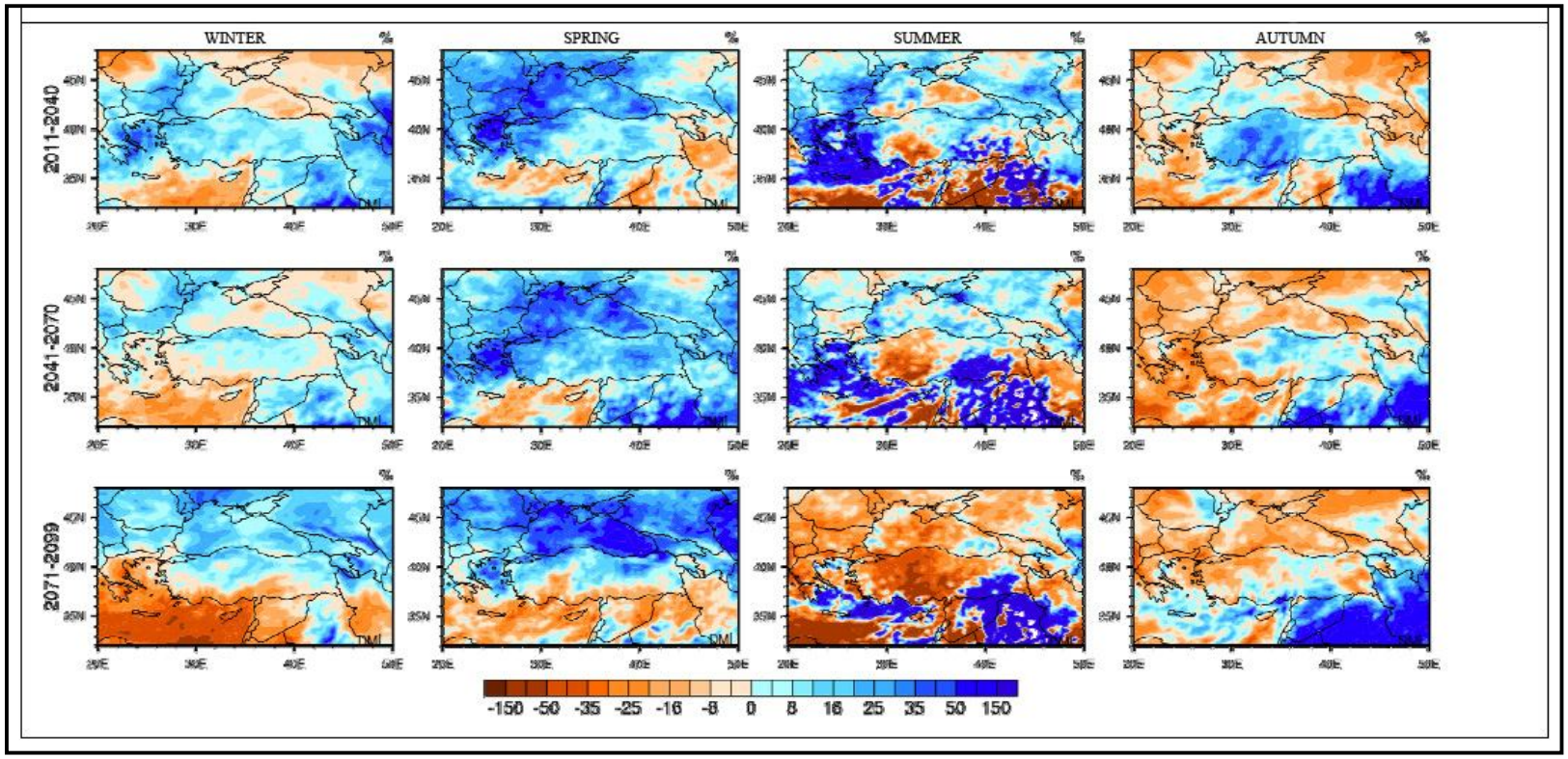


Figure 33. The Probable Seasonal Changing in Total Precipitation that are Expected for Turkey (%)

4.1.1.3. Drought

Drought can be defined as "the natural event that causes to be affected the land and water resources negatively and corruption of the hydrological balance as a result of precipitation decreasing significantly under the level of saved normal levels" (UNCCD-United Nations Convention to Combat Desertification, 1997. The Convention to Combat Desertification has been prepared by Intergovernmental Negotiation Committee that has been established in the framework of decisions that have been taken at UN Conference on Environment and Development in Rio de Jenerio at June 1992 and it has been accepted 17th June 1994. Turkey is a party on this convention formally in 1998.).

There are three methods of categorization of drought that are called as Standardized Precipitation Index – SPI Method, Percent of Normal Index - PNI Method and Aydeniz Method (Appendix-B).

In the evaluation of drought that made by SPI Method, Antalya is, in general, evaluated as normal in SPI method. In the maps for 6, 9 and 12 months, the west and east parts of the city are evaluated as humid and for 3 months (June 2009 to August 2009), the central part of the city is categorized as dry. In addition, the center of the city is in "dry" category in the map evaluating for 24 months (September 2008 to August 2009) (Figure 34).

In PNI Method, the values of Antalya are over normal. Most part of the city is showed as severely dry and western and eastern parts are over normal in the maps evaluating drougntness for 1 month (August 2009) and 3 months (June 2009 to August 2009). In addition, in other maps for 6, and 9 months, the city is evaluated as over normals in terms of droughtness. Moreover, for 12 months as the longest time evaluation map, the city is in "over and normal" category in terms of droughtness (Figure 35).

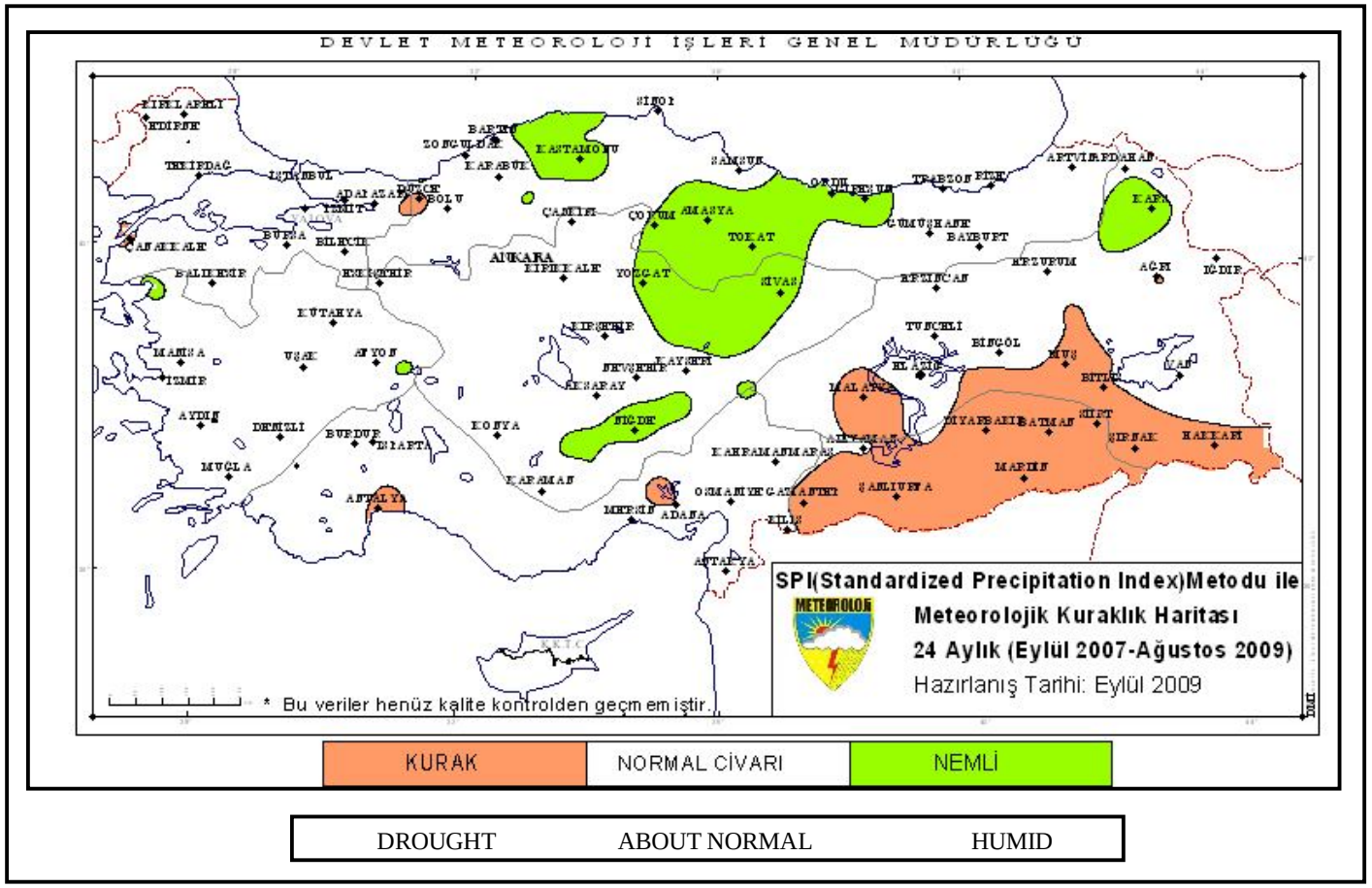


Figure 34. Map of Meteorological Drought for 24 Months by Standardized Precipitation Index-SPI Method

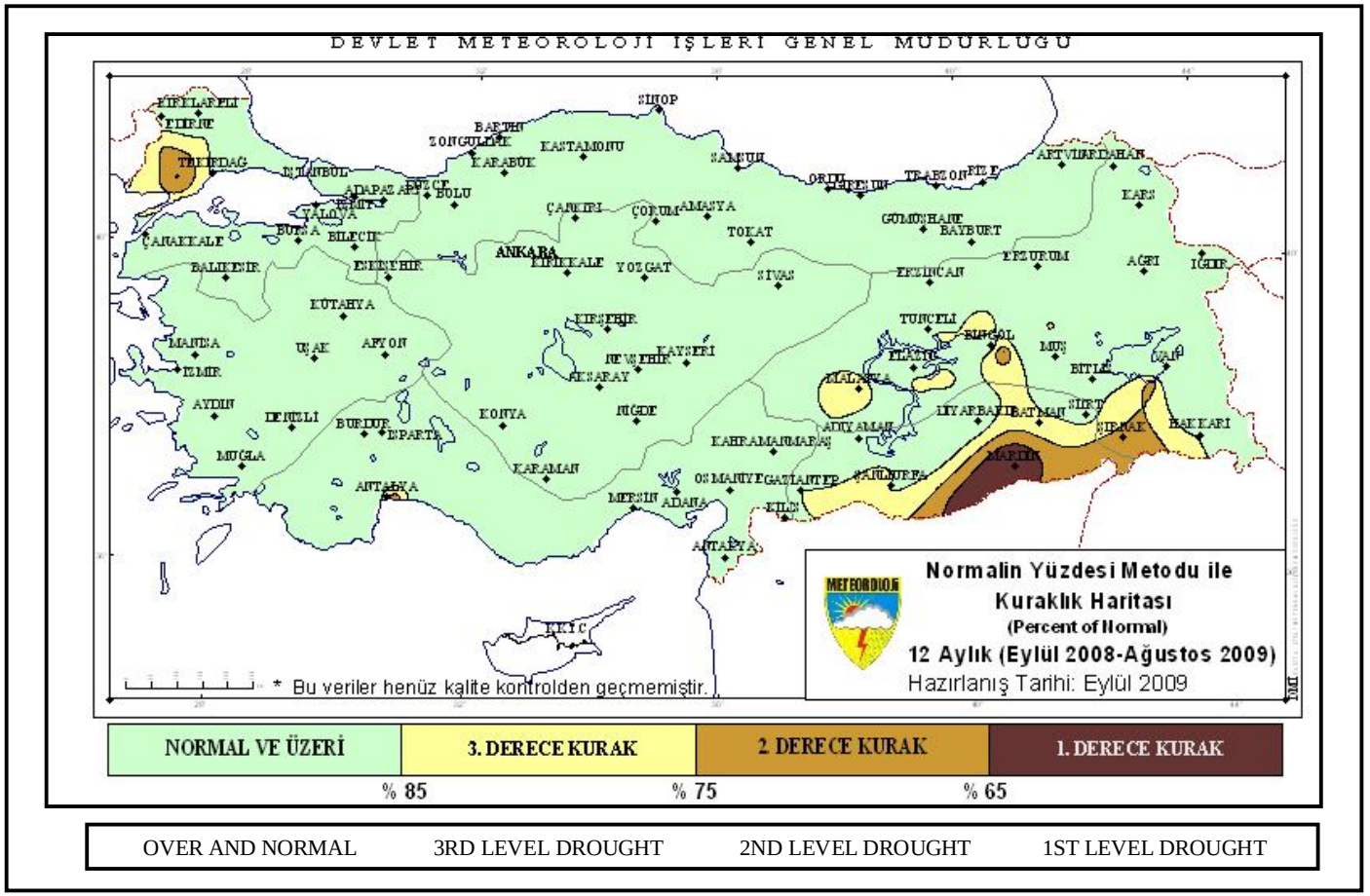


Figure 35. Map of Drought for 12 Months by Percent of Normal Index-PNI Method

4.1.1.4. Humidity and Evaporation

The relative humidity is called the rate of amount of vapor in current pressure and temperature to the maximum amount of vapor that weather can take in the same pressure and temperature. In other words, the relative humidity shows the hunger of the saturation of weather (Sensoy, S., Demircan, M., Ulupınar Y. & Balta İ.). There is an inverse proportion between relative humidity and evaporation (Sensoy, S., Demircan, M., Ulupınar Y. & Balta İ.). For Antalya, in the period between 1971 and 2000, the annual mean relative humidity values are between 60% and 63% in inner sides and between 64% and 67% in coastal areas. In addition, in some part of coastal areas, the values increase to the interval between 65% and 70% (Appendix-B).

In the work of evaporation of Turkey, it has been prepared total evaporation maps of 6 months period (May-October) in 2008 and for the time period between 1975 and 2004. In the map of total evaporation in 6 months period (May to October) for the time period between 1975 and 2004, Antalya has 1.250–1.500 mm evaporation values in central area and 1.000–1.250 mm in other regions (Appendix-B). However, in the figure of 2008, most parts of the city have 1.250–1.500 mm values for total evaporation in 6 Months (May to October) (Figure 36).

In Turkey, obscurity of clouds is more in north latitudes while less in south latitudes (Sensoy, S., Demircan, M., Ulupınar Y. & Balta İ.). For Antalya, the values are between 2,7 and 3,2 that is the lowest interval in Turkey (Appendix-B).

The sun time and intensity in Turkey is less in north latitudes while more in south. In the sun time, there is an inverse proportion with cloudiness (Sensoy, S., Demircan, M., Ulupınar Y. & Balta İ.). The map of annual mean sun time shows that the sun time in Antalya is the most with the 8-8,4 interval that is the highest interval in Turkey (Appendix-B).

The maximum temperatures are over 25 °C in the 6 months of the year in Aegean, Mediterranean, and South-Eastern Anatolia (Sensoy, S., Demircan, M., Ulupınar Y. & Balta İ.). The figure of mean number of summer days in Turkey for the time period between 1971 and 2000 show that the mean number of summer days in Antalya are between 151 and 175 days in coastal areas and between 126 and 150 in inner sides. These values are very high for Turkey (Appendix-B).

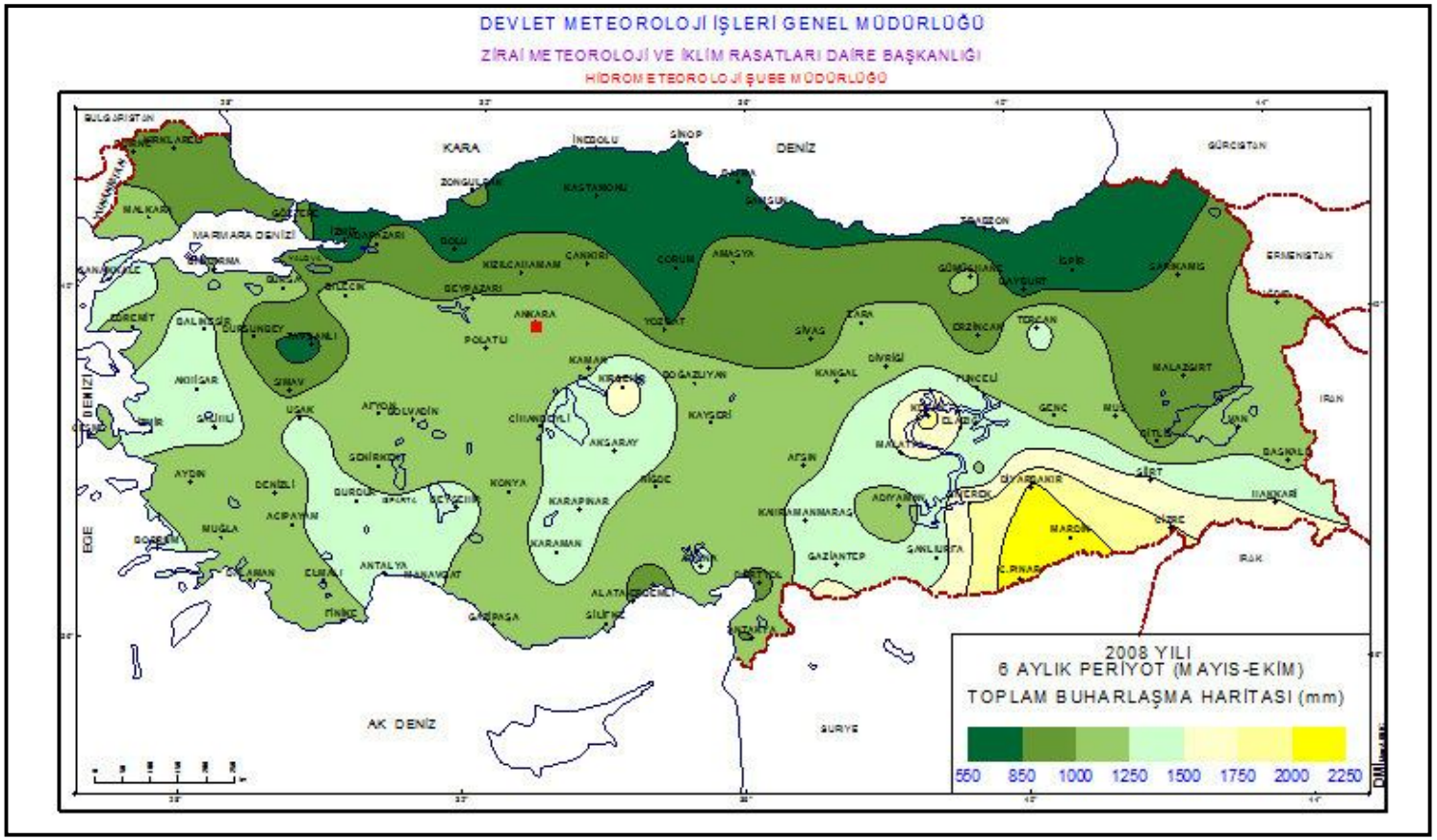


Figure 36. Total Evaporation in 6 Months Period in 2008 (mm)

4.1.2. Tourism in Antalya

Foreign tourist arrivals increased substantially in Turkey between 1998 and 2005, from 9,7 million to 21,2 million, which made Turkey a top-10 destination in the world for foreign visitors. In 2007, Turkey has been settled to the 9th order in terms of tourist numbers. Turkey as an important destination of sun and coast in Europe has experienced a development at a rate of 18% with a strong recovery after the decreasing in 2006. The numbers of the foreign tourist in 2007 in Turkey is saved as 22.2 million (homepage, kvmgm.kulturturizm.gov.tr/.../DosyaGoster.aspx?...sonturizmraporu..., last accessed at September 2009) (Table 5).

Table 5: The Numbers of the Foreign Tourists, The First 10 in 2007

Rank	Countries	Million
1	France	81,9
2	Spain	59,2
3	The USA	56,0
4	China	54,7
5	Italy	43,7
6	United Kingdom	30,7
7	Germany	24,4
8	Ukraine	23,1
10	Mexico	21,4

Source: Ministry of Culture and Tourism

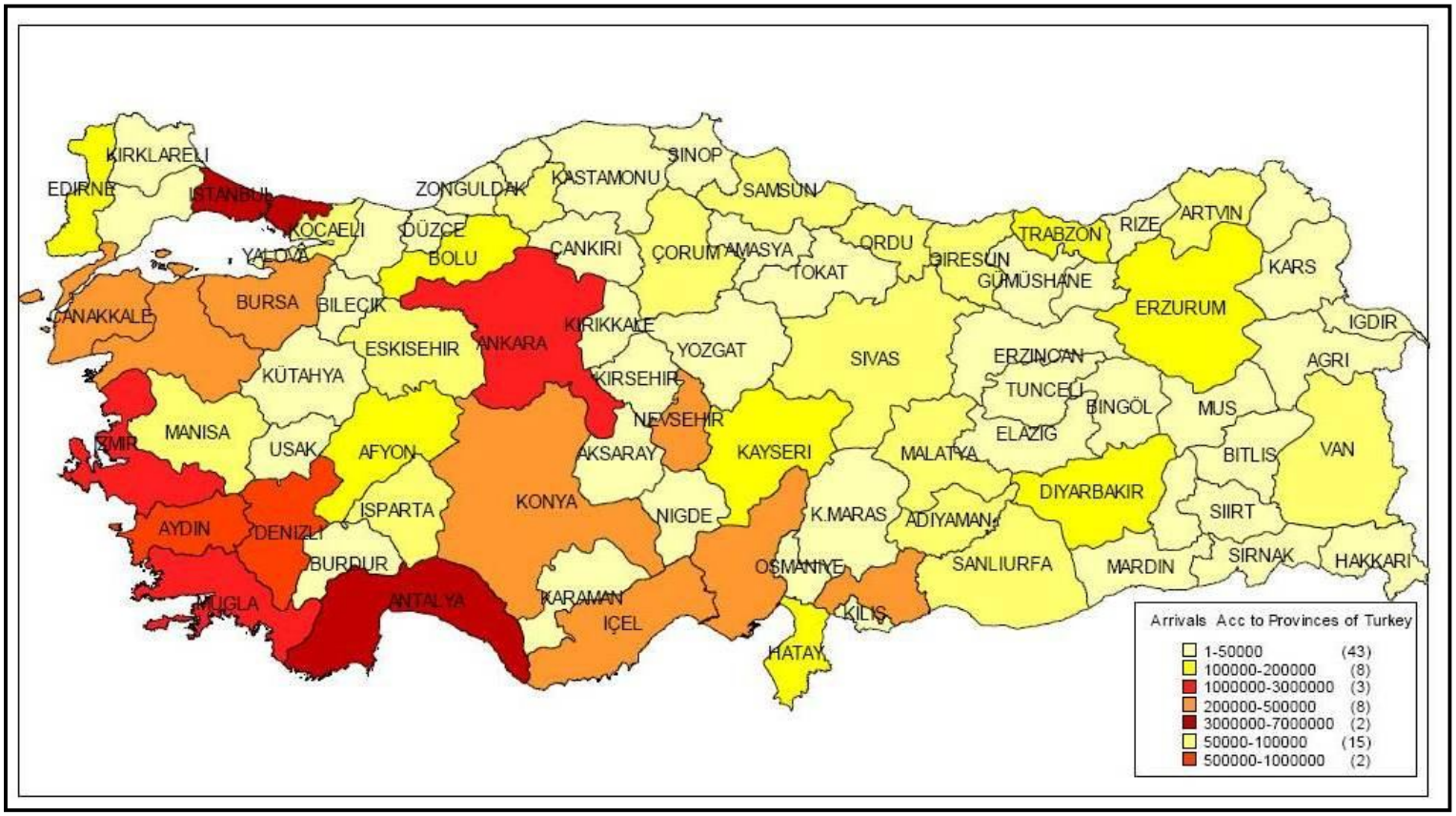
Tourism receipts are also give opinion about the importance of tourism as a local economic activity. In terms of revenues, the values of the year 2005 are US$17.5 billion which made Turkey the top-10 biggest revenue owners in the world (homepage, http://en.wikipedia.org/wiki/Tourism_in_Turkey, last accessed at September 2009). In 2007, there has been some changing in the ranking of the first ten countries that have the most tourism receipts of the world. Turkey has settled in the 10th order. The tourism receipts in 2007 in Turkey is saved as 18.5 billion US$ with an increase 9,7% compared to the previous year (homepage, kvmgm.kulturturizm.gov.tr/.../DosyaGoster.aspx?...sonturizmraporu..., last accessed at September 2009) (Table 6).

Table 6: The Tourism Receipts, The First 10 in 2007

Rank	Country	Billion $
1	United States	96,7
2	Spain	57,8
3	France	54,2
4	Italy	42,7
5	China	41,9
6	United Kingdom	37,6
7	Germany	36,0
8	Australia	22,2
9	Austria	18,9

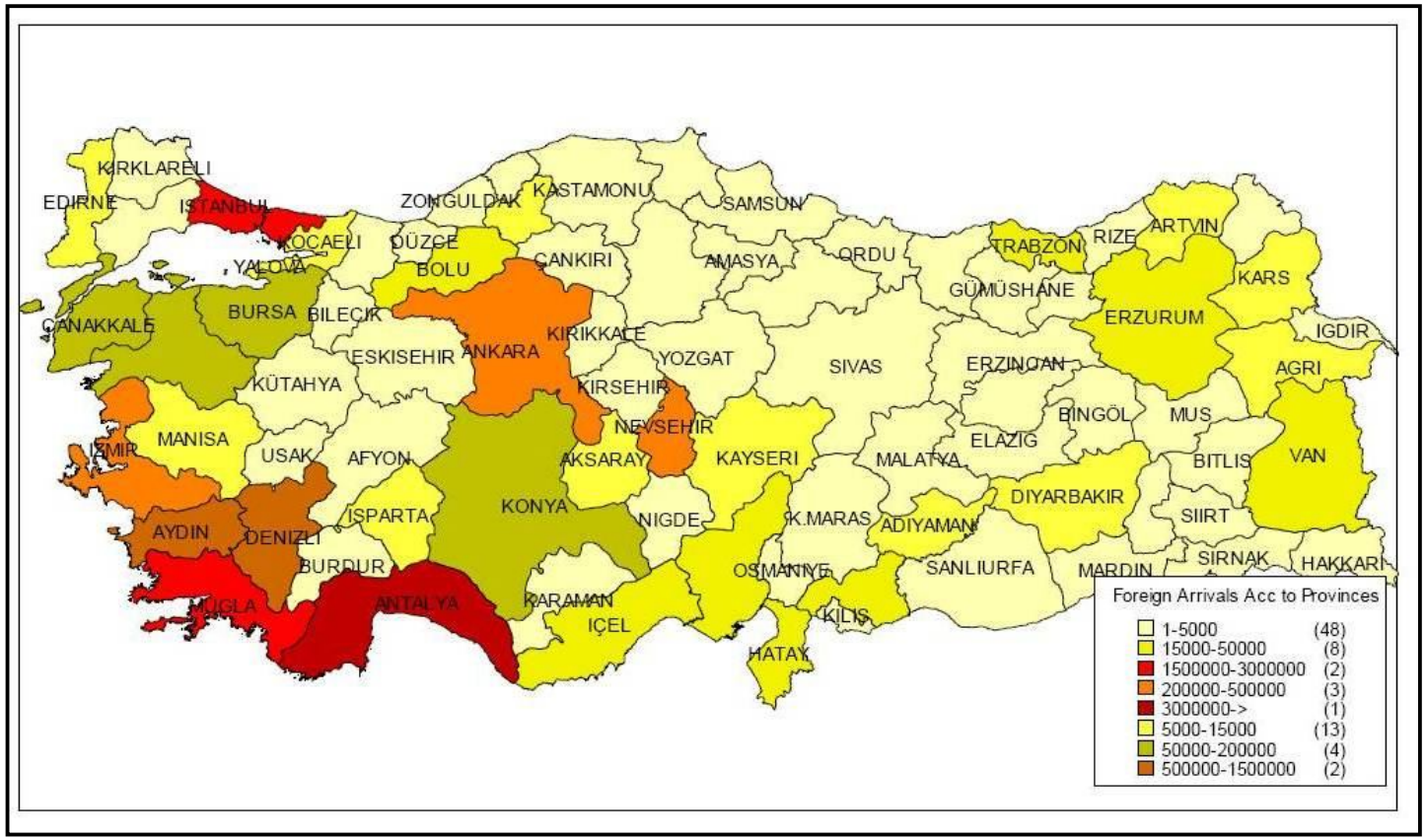
Source: Ministry of Culture and Tourism

Antalya has been the major tourism destination of Turkey since the beginning of 1980s (Ministry of Culture and Tourism, 2003). According to the tourism development indicators of 1994, Antalya was the second tourists attracting city. After 1995, Antalya has become the first city where tourists have visit (Ministry of Culture and Tourism web page) (Erkuş Öztürk, H., 2008, p: 108). The number visitors have been increasing rapidly in recent years and the number of arrivals increased from 3.518.100 in the year of 2000 to 7.264.896 in year 2005 (Unpublished Statistics of Turkey Statistics Institution) (Figure 37 and 38). In 2007 and 2008 statistics, the percentage of the tourist numbers coming to Antalya is approximately 32-33% of that coming to Turkey. The most tourists come between the months May and October in a year (Table 7).



Source: Erkuş Öztürk, H., 2008, p: 109

Figure 37. Geographical Distribution of Arrivals According to the Provinces of Turkey (2000)



Source: Erkuş Öztürk, H., 2008, p: 109

Figure 38. Geographical Distribution of Foreign Arrivals According to the Provinces of Turkey (2005)

Table 7: The Foreign Tourists Coming to Antalya and Turkey (2007–2008)

Months	2007			2008		
	ANTALYA	TURKEY	THE SHARE OF ANTALYA	ANTALYA	TURKEY	THE SHARE OF ANTALYA
	Month	Month	Month (%)	Month	Month	Month (%)
January	105 584	714 425	14.78	121 458	782 786	15.52
February	134 207	787 048	17.05	152 011	896 482	16.96
March	225 024	1 099 960	20.46	291 077	1 305 297	22.30
April	421 626	1 520 954	27.72	473 912	1 647 903	28.76
May	801 861	2 287 645	35.05	1 037 877	2 748 564	37.76
June	1 043 007	2 774 076	37.60	1 282 156	3 305 832	38.78
July	1 213 745	3 624 319	33.49	1 444 204	4 084 764	35.36
August	1 228 820	3 384 065	36.31	1 430 502	3 762 136	38.02
September	1 082 107	2 799 276	38.66	1 206 548	2 981 044	40.47
October	662 198	2 152 908	30.76	772 849	2 462 497	31.38
November	234 414	1 177 475	19.91	230 038	1 267 996	18.14
December	138 763	1 018 923	13.62	121 881	1 091 376	11.17
T O TAL	**7 291 356**	**23 341 074**		**8 564 513**	**26 336 677**	

Source**:** Ministry of Culture and Tourism

In addition, in terms of municipality licensed accommodation establishments, Antalya is the first in the list of the number of establishments and beds in Mediterranean Region, one of the seven geographical regions in Turkey, with the number of 991 establishments and 87.200 beds according to the statistics of 2006 (Table 8, Figure 39 and 40).

Table 8: Number of Municipality Licensed Establishments' Rooms and Beds

Provinces	Number of Estab.	Number of Rooms	Number of Beds
ADANA	50	1 109	2 461
ANTALYA	991	33 413	87 200
BURDUR	18	406	861
HATAY	40	869	1 945
MERSİN	216	3 734	9 126
ISPARTA	46	759	1 753
K.MARAŞ	148	2 534	7 641
OSMANIYE	6	162	317
TOTAL	**1 515**	**42 986**	**111 304**

Source: Ministry of Culture and Tourism

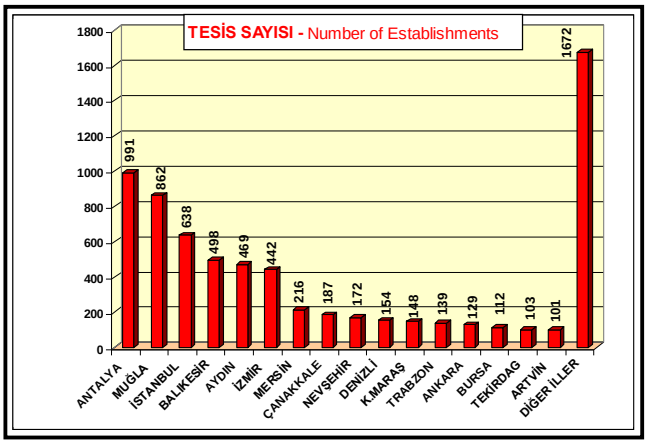


Figure 39. Number of Establishments by Provinces (2006)

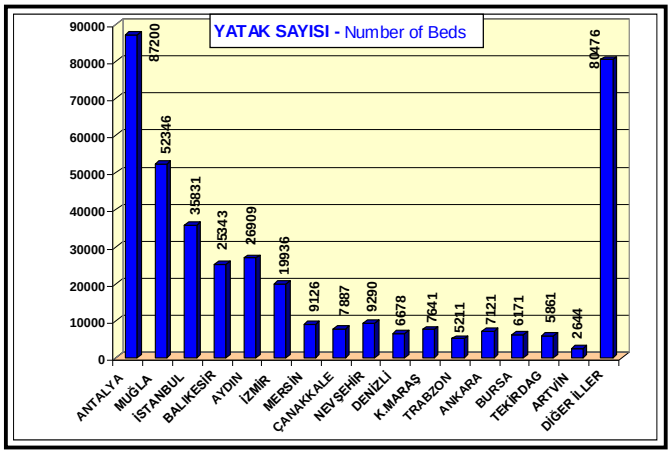


Figure 40. Number of Beds by Provinces (2006)

Tourism licensed accommodation establishments can be categorized into two: operation and investment licensed establishments. In Antalya, for the year 2008, the number of operation licensed accommodation establishments are 641, which includes the whole province. The number of rooms are 122.108 while the number of beds 262.232 in that establishments (Table 9). In addition, the number of investment licensed accommodation establishments are 175 and the number of beds are 40.180 and the number of beds are 87.625 in the city (Table 10).

Table 9: Tourism Licensed Establishments in Antalya (Operation Licensed)

Areas	Number of Establishments	Number of Rooms	Number of Beds
MERKEZ	84	10 684	22 580
KUNDU	4	2 761	5 927
SERİK/BELEK	55	18 517	39 703
MANAVGAT	112	30 859	66 633
ALANYA	226	30 467	65 328
BELDİBİ	25	6 161	14 030
KEMER	111	21 160	44 759
KUMLUCA	3	464	1 139
FİNİKE	2	371	750
KAŞ	19	664	1 383
TOTAL	**641**	**122 108**	**262 232**

Source: Ministry of Culture and Tourism

Table 10: Tourism Licensed Establishments in Antalya (Investment Licensed)

Areas	Number of Establishments	Number of Rooms	Number of Beds
MERKEZ	14	3 579	7 789
KUNDU	3	1 106	2 574
SERİK/BELEK	18	6 161	13 482
MANAVGAT	58	15 462	33 252
ALANYA	38	7 242	15 501
BELDİBİ	4	445	942
KEMER	34	5 735	13 031
KUMLUCA	4	267	622
KAŞ	2	183	432
TOTAL	**175**	**40 180**	**87 625**

Source: Ministry of Culture and Tourism

Antalya has been the major tourism destination of Turkey. The number visitors have been increasing rapidly in recent years and with this increasing; the tourism sector in Antalya has developed sharply in these years. The infrastructure services such as accommodation have been developed in the city. As it seen above, the statistics of municipatlity and tourism licensed accommodation establishments are the first between the important tourism cities and also in Turkey. The city has developed very rapidly in terms of tourism sector in recent years due to the investments that have been made to the city and now, the condition that the city is in shows that the accommodation and the other services have very important capacity. When climate change is occured in the city, then, these capacities and the sector is affected economically because there is a strong relationship between them. Therefore, the sector is under threat of the climate change and its effects.

4.1.3. The Importance of Other Statistics in Antalya

Tourism positively effects the development of Antalya not only by attracting foreign tourists, but also by creating new tourism enterprises. In other words, Antalya is the leading tourism province of Turkey. Especially from the second half of this century, tourism has been taken as a solution to solve the economic problems of countries. Via accelerating socio-economic and cultural development, increasing employment is observed not only in tourism but also in tourism supported service activities, and by providing foreign exchange input and foreign capital; sector of tourism has triggered economic development (The Report of Development Bank, 2000).

Antalya as an important tourism city in Turkey has a crucial role for the economy of Turkey in service activities. Since 1970s, important shifts are observed in the sectoral distribution of employment of Antalya. While the share of labor was high in social services, industry, agriculture and services in 1970s, the share of employed population in industry and agriculture has decreased in time and tourism and the supporting activities of tourism such as trade, financial activities and transport has increased. After 1980s, this change transforms sectoral structure and identity of Antalya from agriculture to services and tourism activities (Erkuş Öztürk, H., 2008, p: 131) (Table 11).

As it is seen from the data between 1992 and 2002, Antalya has higher share than the average share of Turkey in the employment of commerce, hotel & restaurant, transportation & communication and social & individual services in 2002 values. When the shares of sectors are compared with the values of 1992 and 2002, it is observed that service related sectors show a remarkable increase (Erkuş Öztürk, H., 2008, p: 132) (Table 12).

Table 11: Sectoral Distribution of Employed People in Antalya Province

	1970		1980		1990		2000	
	Labor	**%**	**Labor**	**%**	**Labor**	**%**	**Labor**	**%**
Agriculture, Forestry, Fishing	217347	79.43	248913	70.8	316658	56.97	377654	49.85
Mining	291	0.11	420	0.12	572	0.1	596	0.08
Manufacturing Industry	13923	5.09	19657	5.59	33099	5.95	39518	5.22
Electric, Gas, Water	133	0.05	501	0.14	1558	0.28	1685	0.22
Construction	6583	2.41	14584	4.15	39122	7.04	40151	5.3
Trade and Tourism	**9000**	**3.29**	**16207**	**4.61**	**65405**	**11.77**	**137276**	**18.12**
Transportation and Communication	5252	1.92	8411	2.39	18217	3.28	27806	3.67
Financial Institutions	1580	0.58	4764	1.35	12377	2.23	24651	3.25
Social and Individual Services	**16967**	**6.2**	**36343**	**10.34**	**64811**	**11.66**	**106519**	**14.06**
Not well defined activities	2570	0.94	1796	0.51	4040	0.73	1658	0.22
TOTAL	**273646**	**100**	**351596**	**100**	**555859**	**100**	**757514**	**100**

Source: Calculated from Turkish Statistical Institute data

Table 12: Employment Shares according to the Sectoral Distribution of Antalya and Turkey between 1992 and 2002

		Total Emp	Manufacturing	Construction	Commerce	Hotel& Restaurant	Transport& Communic	Financial Intermediary Institutions	Real Estate Rent-work activity	Other Social individual services
2002	Antalya	210108	22699	7012	67509	58949	23224	3779	11783	6641
		%	10,80	3,34	32,13	28,06	11,05	1,80	5,61	3,16
	Turkey	6497040	2183286	224874	1876525	545167	612814	183169	339502	177924
		%	33,60	3,46	28,88	8,39	9,43	2,82	5,23	2,74
1992	Antalya	60465	6849	1605	22620	15819	1553	111	1944	8786
		%	11,33	2,65	37,41	26,16	2,57	0,18	3,22	14,53
	Turkey	2746566	735202	110571	1238350	325816	69815	13686	106997	146129
		%	26,77	4,03	45,09	11,86	2,54	0,50	3,90	5,32

Source: Calculated from Turkish Statistical Institute data_ (İşyeri sayısı istatistikleri)

The share of tourism for supplying the deficiency of foreign trade increased from 11,7% in 1983 to 83,7% in 1994. However, the share reduced to 30–35% for the last few years due to increasing trade deficit. Between the periods of 1983–1997, hotel and restaurant services have been the highest growth sector with 6,6% average growth rate per year. In spite of this increase in growth rates of tourism sector, growth rate of GDP is still around 5,4% (The report of Development Bank, 2000). However, increasing share of tourism and transportation services in the GDP from 4,05% to 6,07% between the years of 1987 to 2001 shows the importance of these sectors in the economy of Antalya (Unpublished Statistics of Turkish Statistical Institute). There are some controversial thoughts, but in terms of the growth rates in tourism sector, tourism can be taken as "a locomotive of the economy" of Antalya (Erkuş Öztürk, H., 2008, p: 135).

According to the data in 2005, Antalya has been the first province in tourism investment due to a share of 60%. According to the distributions of tourism investments in Turkey between the period of 2000 and 2005, Antalya, as in the first rank, has been takes 409 tourism encouragement certificates with a value of 4.785.000.000 TL investment (Unpublished statistics of Ministry of Culture and Tourism). According to the entire statistics, it can be considered that Antalya is "the leading province" of Turkey in terms of tourism (Erkuş Öztürk, H., 2008, p: 136).

> "Antalya contains assets that cater for a wide range of interests. Its coastal areas are ideal for sun-sea-sand tourism. … Besides the different types of tourism activities, the range of accommodation is broad for different type of clusters, including high quality 5- and 7-star hotels at the top end of the market, relatively large holiday villages and small boutique hotels in the middle range and hostels at the lower end.

> Although there are signs for post-fordist flexible tourism development in Antalya, fordist type of tourism production such as mass tourism, packaged holidays and charter flights are still dominant in the organization of tourism. In line with fordist type of development supported also by government, still mass tourists are dominant in Antalya motivated especially by low price." (Erkuş Öztürk, H., 2008, p: 136-137).

All of these statistics show that Antalya is very important city in terms of tourism in Turkey and has very important position economically, socially and institutionally in the country. After 1980s, the development of the sector in the city has been very rapid and this causes new developments in the other related sectors such as service sector as mentioned above or activities in the city. In addition, tourism sector provided a lot of growth in institutional structure and spatial construction. Lots of projects and investments have been made in the city to attract tourists and institutions have started to be effective in the city in terms of making decisions that are related t the sector. Therefore, climate change and its impacts on the sector in the city or that whether the actors are aware of these impacts and they develop any responses started to be very crucial in terms of the tourism life of the city.

In addition, Antalya is an important tourism destination that has an increasing in institutional structure such as increase in tourism associations in Turkey such as in the case of GATAB (South Antalya Tourism Development and Infrastructure Management) in Kemer, MATAB (Manavgat Tourism Development and Infrastructure Association) in Manavgat, AKTOB (Akdeniz Tourism Hoteliers' Association) in Antalya center, BETUYAB (Belek Tourism Investors' Corporate) in Belek-Serik. Tourism agents such as hotels, tour operators, travel agencies and tourism associations are the other stakeholders which are interested in the tourism sector in Antalya.

The tourism sector is considered having such an importance economically for the local areas as understood from statistics such as tourists' numbers, tourism receipts, employement,etc… then, the factors that affect the activities or the developments in the sector have become very fundamental for the countries and their future. Since tourism has impacts on economic, social, environmental, etc life of the local, the factors that affect the sector will have impact automatically on the local. Therefore, it is necessary to think about the whole factors that can affect tourism on the local.

It could be claimed that tourism has gained crucial importance for economic development of Turkey, which is one of the popular tourism destination in Mediterranean Region. Therefore, government takes tourism as a part of the development policy for cities. It is increasingly

observed that, recently new institutional set-ups such as non-governmental organizations have been appeared by implementations and collaborative projects with tourism firms (Erkuş Öztürk, H., 2008, p: 7).

In Antalya, that is one of the most important tourism destination in Turkey, tourism firms have started to collaborate and cooperate for promotion by these tourism associations and their network relations with other firms (Erkuş Öztürk, H., 2008, p: 5). Besides having important historical and cultural places, Antalya is the first visited sun-seas and tourist destination in Turkey (Erkuş Öztürk, H., 2008, p: 7).

All of these mean that the sector has a very important in the city and has developed in recent years very rapidly. The sector provides contribution economically and socially to the city but, nowadays, it is under threat of climate change.

4.2. Method and Data

This study aims to identify to examine the awareness and responses of the actors about the impacts of climate change on tourism in Antalya. The first part of the study is based on data, collected from the decision makers that are interested in the sector and the second one is based on data collected from firms. The analysis is based on data collection through interviews and questionnaires on the field. The interviews were personally done with managers or the officers in a high position in the firm.

Antalya is a tourism province where governance practices including various collaborative linkages on tourism development among governmental and non-profit organizations are becoming increasingly important. In this context, the related actors of the study represent the unit of analysis of this thesis. These actors in the work are defined as firms that include hotels in the city and the decision makers that include tour operators, local government, NGOs and the university in the city.

The questionnaires are prepared for firms and decision makers separately. The basic parts of these questionnaires are worked on by one of the team of Urban-Net Full Research Projects that is working on Urban Tourism and Climate Change and then, they are developed. The questionnaire prepared for the firms have six parts. The first part of questionnaire is related to general information about firm. The second part of questionnaire aims to find out

"knowledge about climate change", and the third part aims to explore "the awareness about climate change". The purpose of the fourth part is getting some information about the firm. The fifth part aims "to measure the contribution of tourism to the climate change"; and the sixth part aims "to examine the awareness of relation between tourism and climate change". The sample questionnaire and the Turkish version are attached to Appendix D.

The list of tourism firms in Antalya was provided by the Ministry of Culture and Tourism. Among 822 tourism firms, it could be managed to reach 40 firms. Interviews were carried out with managers, but some interviews had to be done with mid-level managers. The firms in the questionnaires are categorized as less than 3 star hotel, 3 Star, 4 Star, 5 Star, Boutique Hotels (Table 13).

Table 13: The Number of the Tourism Units and Questionnaires of Tourism Firms

Tourism Units	**Number of Units**	**Number of Questionnaires**
1 Star	36	10
2 Star	158	
3 Star	191	10
4 Star	223	8
5 Star	184	5
Boutique Hotels	30	7
Total	**822**	**40**

The questionnaire prepared for the decision makers interested in the sector have five parts. The first part of questionnaire is related to general information about the person who has made the questionnaire. The second part of questionnaire aims to find out "knowledge about climate change", and the third part aims to explore "the awareness about climate change". The purpose of the fourth part is "getting some information about the institution" and the fifth part aims "to examine the awareness of relation between tourism and climate change". The sample questionnaire and the Turkish version are attached to Appendix D.

It could be managed to reach 12 decision makers, but 2 of them are tour operators. They are considered as decision makers due to policy making and directing the sector. Interviews were carried out with Governor/vice governors, Head of Directorate/Department or Administrative staff. The actors in the questionnaires are categorized as Public sector, Non-profit/NGO (National or International), Research Institute/University (Table 14). The list of actors that are called decision makers is attached to Appendix E.

Table 14: The Number of the Questionnaires of Decision Makers

Tourism Units	Number of Questionnaires
Tour Operators	2
Local/central Government	4
NGOs	5
University	1
TOTAL	**12**

4.2.1. Analysis and Results

During the interviews, it is analyzed, separately, the awareness of the decision makers and firms about climate change. In the questionnaires, the impacts of the climate change on tourism are asked to the actors whether they are aware of these impacts or not is examined. In addition, the responses that the actors developed are tried to be researched in the interviews.

4.2.1.1. The Awareness of the Decision Makers and Their Responses

The second part of the questionnaire prepared for the decision makers examine the knowledge of the decision makers about the climate change. According to the answers, out of 12, 9 of them (75% of surveyed decision makers) said that "already, there is an increase in temperature on the Earth". 2 decision makers (16,67% of surveyed decision makers) think that "climate change is something that will happen in the future", while 1 of them (8,33% of surveyed decision makers) answered as "unsure, don't know" about climate change (Table 15).

Table 15: The Knowledge of the Decision Makers about Climate Change

OPTIONS	NUMBER OF QUESTIONNAIRES	PERCENTAGES
Already, there is an increase in temperature on the Earth	9	75
Climate change is something that will happen in the future	2	16.67
Unsure, don't know	1	8.33
No climate change has occurred and none will	0	0
TOTAL	12	100

The other question is about the signs indicating climate change in Antalya. The most general sign is said as “change in temperature” in Antalya with the highest percentage of 37,49 (Table 16 and Figure 41).

Table 16: The Signs Indicating Climate Change in Antalya According to the Decision Makers

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
Change in temperature	9	37.49
Change in river flow and risk of drought	6	25
Change in precipitation	6	25
Change in flora-fauna/vegetation	1	4.17
Change in flood frequency	1	4.17
Change in agricultural production	1	4.17
TOTAL	24	100

*: One decision maker can be able to indicate more than one choice.

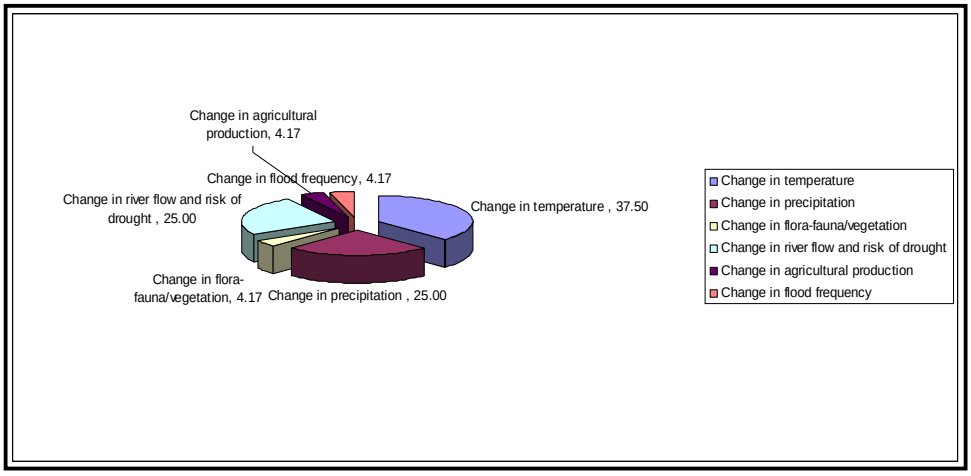


Figure 41. The Signs Indicating Climate Change in Antalya According to the Decision Makers

In the fifth part of the questionnaire, the awareness about the relation between the climate change and tourism is tried to be examined and in the next few decades, the possible effects of climate change on tourism are asked. According to the results, the most possible effect is seen as “the loss of natural resources” with the percentage of 20,94 and in the second rank

"decrease the tourism income due to change in tourist composition" is seen as possible with the percentage of 18,60 (Table 17 and Figure 42).

Table 17: The Possible Effects of Climate Change on Tourism According to the Decision Makers

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
The loss of natural resources	9	20.94
Decrease the tourism income due to change in tourist composition	8	18.60
The change in the lifestyle of the local people	7	16.28
The decline in the economy of Antalya	7	16.28
Decrease the total number of tourists	6	13.95
Out-migration	6	13.95
Other	0	0
TOTAL	43	100

*: One decision maker can be able to indicate more than one choice.

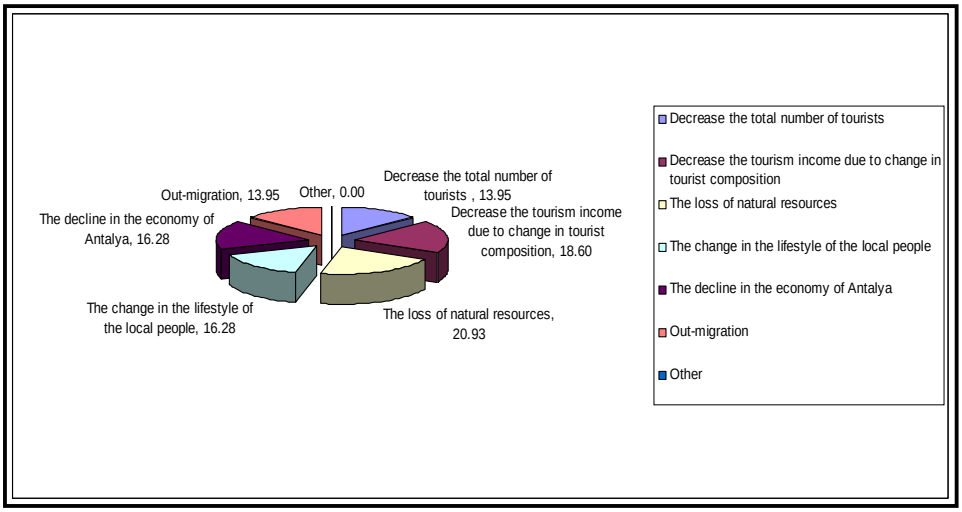


Figure 42. The Possible Effects of Climate Change on Tourism According to the Decision Makers

In this part, also, that what the politics/strategies of the institutions basically aim is asked in terms of development of the tourism sector in order to explore the awareness of them. In terms of development of the tourism sector, "to build partnership with related institutions to ensure an effective strategic tourism approach" and "to enhance and conserve the region's

natural, heritage and cultural assets" are the most general aims of the surveyed decision makers (Table 18 and Figure 43).

Table 18: The Aims of the Politics/Strategies of the Decision Makers (In terms of Development of the Tourism Sector)

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
To build partnership with related institutions to ensure an effective strategic tourism approach	10	14.93
To enhance and conserve the region's natural, heritage and cultural assets	10	14.93
To improve the promotion and marketing strategies	9	13.43
To improve the quality of infrastructure	8	11.94
To improve the skills of the tourism workforce	7	10.45
To increase visitors expenditure	7	10.45
To increase the number of tourists	6	8.95
To change the tourist profile	6	8.95
To increase labor wages and job opportunities	4	5.97
To increase the range and number of tourism facilities which attract visitors	0	0
Other	0	0
TOTAL	67	100

*: One decision maker can be able to indicate more than one choice.

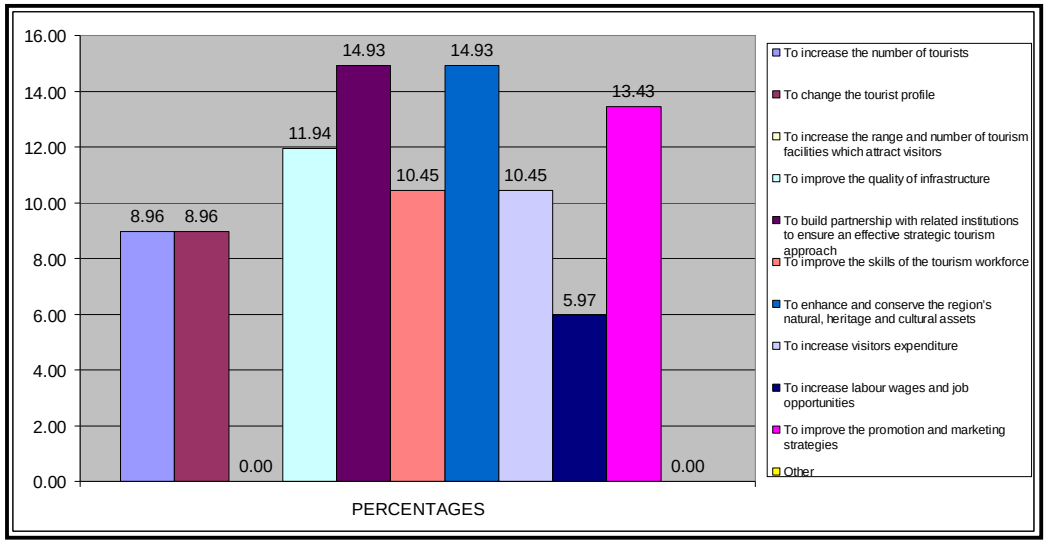


Figure 43. The Aims of the Politics/Strategies of the Decision Makers (In terms of Development of the Tourism Sector)

In terms of the contribution to the climate change, “to decrease the consumption of the energy” is the most general aim of the surveyed decision makers. In the second rank, “to save about water using”, “to minimize the loses/damaging of natural resources”, and “to work on developing systems that are sensitive to the environment” are signed as the aims of the policies/strategies of surveyed decision makers (Table 19 and Figure 44).

Table 19: The Aims of the Politics/Strategies of the Decision Makers (In terms of the Contribution to the Climate Change)

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
To decrease the consumption of the energy	10	12.97
To save about water using	9	11.68
To minimize the loses/damaging of natural resources	9	11.68
To work on developing systems that are sensitive to the environment	9	11.68
To provide waste management	7	9.08
To encourage using the alternative energy resources	6	7.79
To decrease the emissions of CO2 and the GHGs	6	7.79
To develop implementation about recycling	6	7.79
To work on awareness of the relation between the climate change and tourism	5	6.49
To organize education programs and seminars	5	6.49
To provide efficient management of water resources	4	5.19
Others	1	1.29
TOTAL	77	100

*: One decision maker can be able to indicate more than one choice.

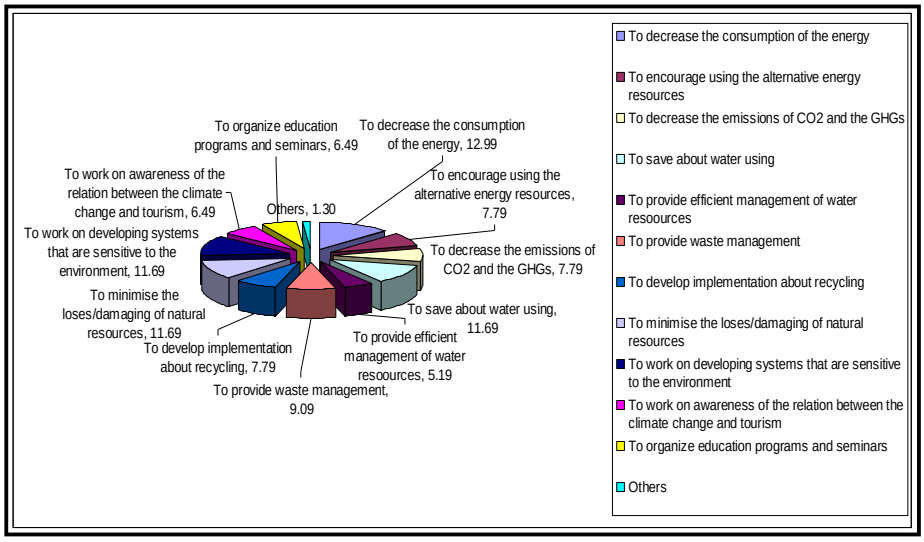


Figure 44. The Aims of the Politics/Strategies of the Decision Makers (In terms of the Contribution to the Climate Change)

After learning about their aims, the current plan/projects directly/indirectly related to tourism development that the surveyed institutions have are asked. As seen in Table 20 and Figure 45 "tourism-related plans/projects" and "projects/studies for tourism promotion" are the main projects of the decision makers that are surveyed.

Table 20: The Current Plan/Projects of Decision Makers Directly/Indirectly Related to Tourism

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
Tourism-related plans/projects	8	21.62
Projects/studies for tourism promotion	8	21.62
Environment-related plans/projects	5	13.52
Infrastructure projects	5	13.52
Projects/studies about energy efficiency/clean energy	4	10.82
Projects/studies for awareness raising	3	8.10
Projects/studies about pollution prevention/eradication	3	8.10
Biodiversity and habitat conservation	1	2.70
Other…….	0	0
TOTAL	37	100

*: One decision maker can be able to indicate more than one choice.

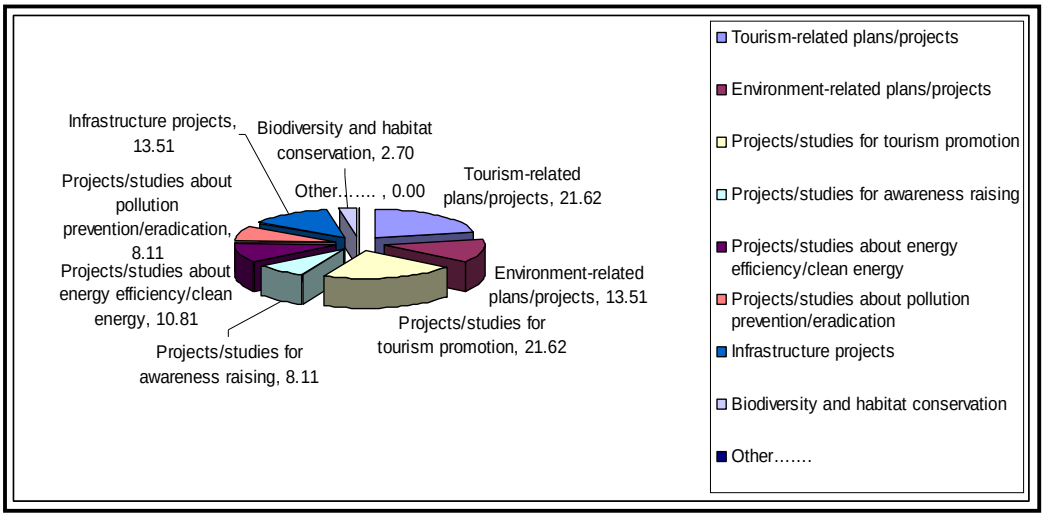


Figure 45. The Current Plan/Projects of Decision Makers Directly/Indirectly Related to Tourism

In terms of the aims and plan/projects of the surveyed decision makers, it can be seen that while the relation between climate change and tourism and the impacts of climate change on tourism are seen as important for the decision makers, activities that are related to these subjects are not in their plan/projects. Therefore, it can be said that they are aware of the climate changing in the city and its impacts on tourism, but they do not include this issue in their plan and projects.

In addition, when they are asked whether these plans/projects include any policies regarding environmental conservation/climate change or not, 83,33% of them said “No” which means that the most of the surveyed decision makers do not care the climate change although they know about it. In the questionnaire, it is asked whether the institution have any tools to encourage environmentally friendly tourism or not. 34.80% of them said “standards defined by legislation”, while 30.44% of them said “new measures (blue flag, green star, etc.)” as an answer (Table 21 and Figure 46).

Table 21: The Tools that Decision Makers Use to Encourage Environmentally Friendly Tourism

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
Standards defined by legislation	8	34.80
New measures (blue flag, green star, etc.)	7	30.44
Innovative projects	3	13.04
Projects to raise public awareness	3	13.04
No, my institution does not have any tools to encourage environmentally friendly tourism.	1	4.34
Other…….	1	4.34
TOTAL	23	100

*: One decision maker can be able to indicate more than one choice.

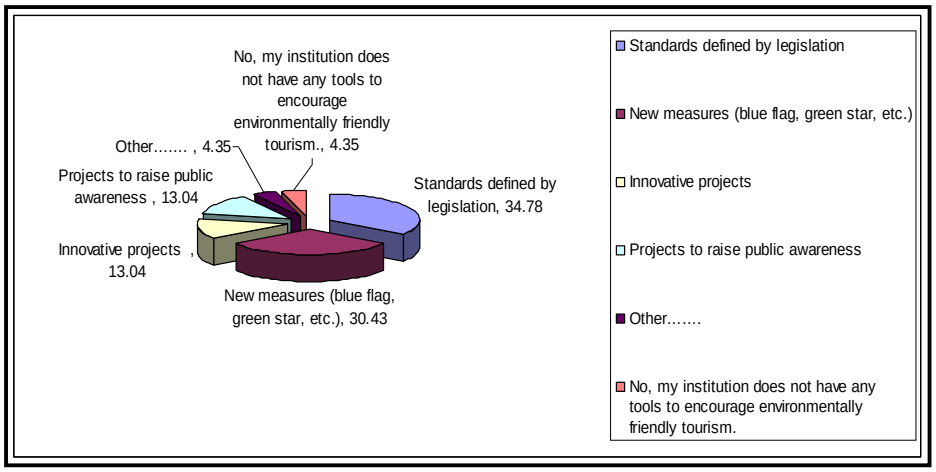


Figure 46. The Tools that Decision Makers Use to Encourage Environmentally Friendly Tourism

In order to understand their responses, the measures, considering tourism, being taken to cope with climate change are asked to the decision makers. These measures are asked in two different aspects: (1) about the impacts of the climate change on tourism and (2) about the contribution of tourism activities to the climate change. Two (2) tour operators said that there are no measures being taken to cope with climate change by them. However, in terms of the impacts of the climate change on tourism, 50% of them said that "to provide and support organizing education programs and programs that raise awareness" is taken as a measure to cope with climate change. In addition, it is reported that 30% of them said that "to encourage coopeartions in activities" is taken to cope with climate change (Table 22 and Figure 47).

Table 22: The Measures, Considering Tourism, being Taken to Cope with Climate Change by Decision Makers (About the Impacts of the Climate Change on Tourism)

OPTIONS	NUMBER OF QUESTIONNAIRE*	PERCENTAGES
To provide and support organizing education programs and programs that raise awareness	5	50
To encourage coopeartions in activities	3	30
To provide preparing action and management plans	1	10
Others.....	1	10
To provide development of monitoring and evaluation programs	0	0
TOTAL	10	100

*: Two (2) tour operators as decision makers said that there are no measures.

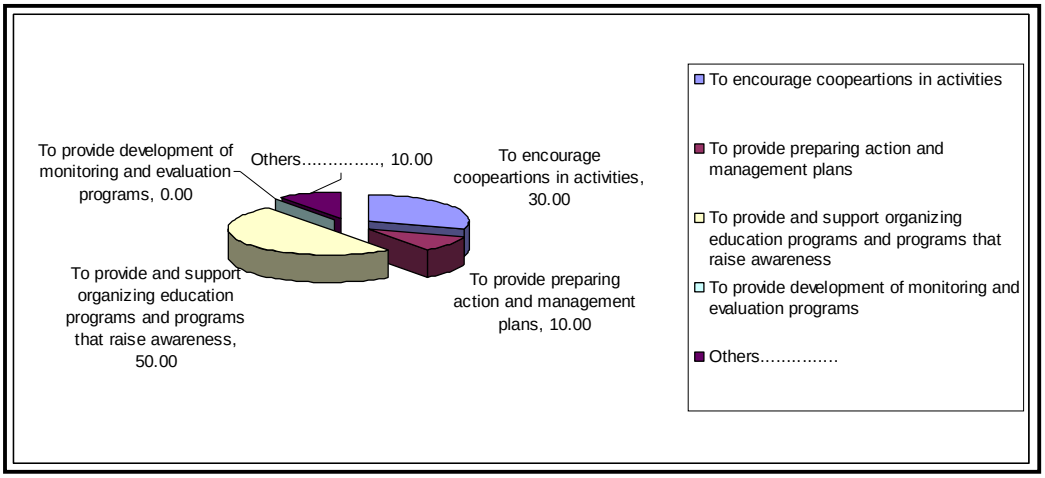


Figure 47. The Measures, Considering Tourism, being Taken to Cope with Climate Change by Decision Makers (About the Impacts of the Climate Change on Tourism)

In the part that is about the contribution of tourism activities to the climate change, 28,57% of them said that “to proceed workings of information about using energy resources” is taken as a measure to cope with climate change. Moreover, in the second rank, “to take measures that provide savings related with water resources” and “to provide and support organizing education programs and programs that raise awareness” are the other measures with the percentages of 21,43 (Table 23 and Figure 48).

Table 23: The Measures, Considering Tourism, being Taken to Cope with Climate Change by Decision Makers (About the Contribution of Tourism Activities to the Climate Change)

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
To proceed workings of information about using energy resources	4	28.57
To take measures that provide savings related with water resources	3	21.43
To provide and support organizing education programs and programs that raise awareness	3	21.43
To encourage using alternative energy resources	2	14.29
To provide decreasing emissions of GHGs	1	7.14
Others.....	1	7.14
TOTAL	14	100

*: One decision maker can be able to indicate more than one choice.

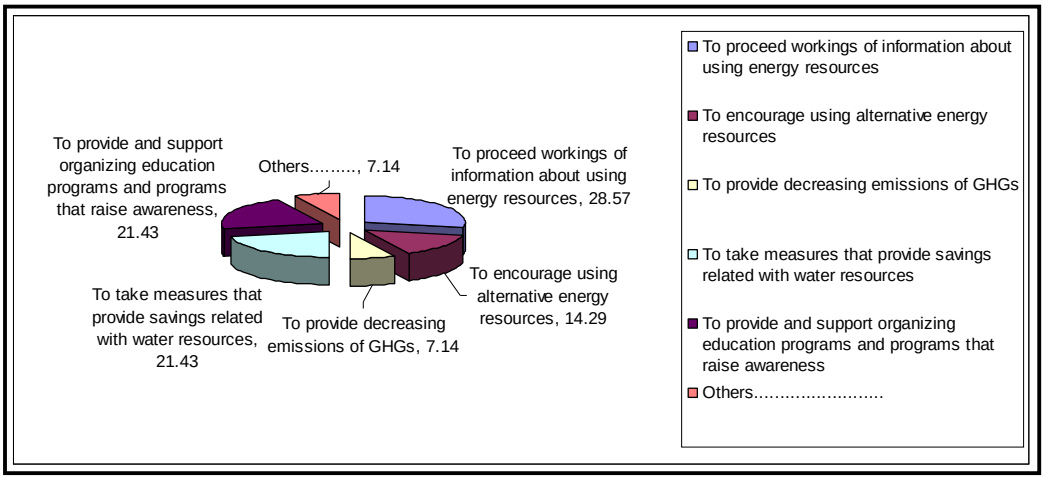


Figure 48. The Measures, Considering Tourism, being Taken to Cope with Climate Change by Decision Makers (About the Contribution of Tourism Activities to the Climate Change)

In the last part of the questionnaire, Future Scenarios for year 2071 are explained and it is asked to evaluate the trouble of visiting Antalya with these conditions and the seasons in terms of positiveness. According to the Future Scenario 1, temperature increase of 3 °C (based on the trends between 1961-1990) and precipitation decrease of 20 mm monthly; average daytime temperature of 31 °C (1975-2006 average values in July and August is 28 °C) in July and August and 13 °C (1975-2006 average values in December, January and February is 10 °C) in winter; warmer winters; higher frequency of heat waves are the

conditions that are seen. According to the Future Scenario 2, temperature increase of 5 °C with an average daytime temperature of 33°C in July and August and precipitation decrease of 30 mm monthly; almost no winters with an average temperature of 15,5 °C; warmer summer; higher frequency and longer heat waves are the conditions that are seen.

In the questionnaire, 50% of the surveyed decision makers agree and 33.33% of them completely agree with the idea that "the scenario is negative for visiting Antalya with that temperature increase" (Table 24) and they considered, with the percentage of 33,33, that the scenario is positive for visiting Antalya with that temperature increase during the seasons of "autumn and winter" (Table 25 and Figure 49). However, if the answers that they gave are examined, then, it is seen that autumn is included in all of them except for the answer "winter" which composes 16.67% of the answers.

Table 24: The Evaluation of the Scenarios by Decision Makers (In terms of Visiting Antalya)

CATEGORIZATION*	NUMBER OF QUESTIONNAIRES	PERCENTAGES
AGREE	6	50
COMPLETELY AGREE	4	33.33
COMPLETELY DISAGREE	2	16.67
TOTAL	12	100

*: It is categorization of the responses to the idea that "the scenario is negative for visiting Antalya with temperature increase in Future Scenarios".

Table 25: The Evaluation of the Scenarios by Decision Makers (In terms of Seasons)

OPTIONS*	NUMBER OF QUESTIONNAIRES	PERCENTAGES
AUTUMN, WINTER	4	33.33
AUTUMN, SPRING	3	25
AUTUMN, WINTER, SPRING	2	16.67
WINTER	2	16.67
AUTUMN	1	8.33
TOTAL	12	100

*: They are options about the question that "during what seasons the scenario is positive for visiting Antalya with that temperature increase".

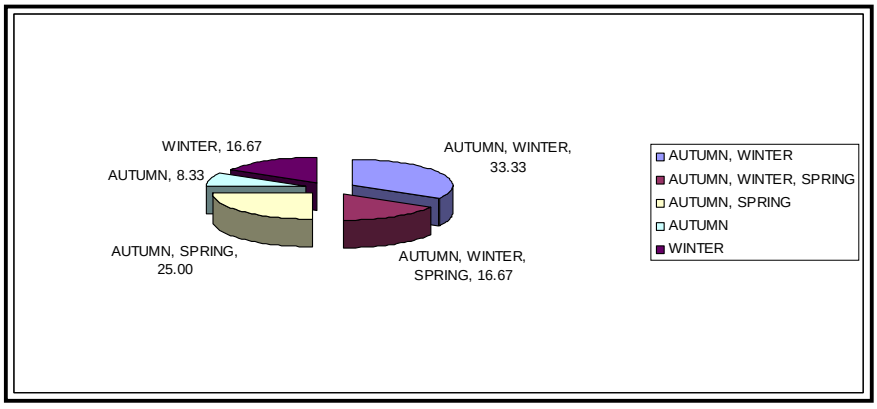


Figure 49. The Evaluation of the Scenarios by Decision Makers (In terms of Seasons)

4.2.1.2. The Awareness of the Firms and Their Responses

The second part of the questionnaire prepared for the firms, which is the same as the decision makers, examine the knowledge of the firms about the climate change. According to the answers, out of 40, 21 (52,5% of surveyed firms) firms think that that "already, there is an increase in temperature on the Earth". 11 (27,5% of surveyed firms) of them said that "climate change is something that will happen in the future", while 8 (20% of surveyed firms) of them answered as "no climate change has occurred and none will" about climate change (Table 26).

Table 26: The Knowledge of the Firms about Climate Change

OPTIONS	NUMBER OF QUESTIONNAIRES	PERCENTAGES
Already, there is an increase in temperature on the Earth	21	52.5
Climate change is something that will happen in the future	11	27.5
No climate change has occurred and none will	8	20
Unsure, don't know	0	0
TOTAL	40	100

The other question is about the signs indicating climate change in Antalya. The most general sign is said as “change in precipitation” in Antalya with the highest percentage of 38,37 (Table 27 and Figure 50).

Table 27: The Signs Indicating Climate Change in Antalya According to the Firms

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
Change in precipitation	33	38.37
Change in river flow and risk of drought	25	29.07
Change in temperature	18	20.93
Change in flora-fauna/vegetation	6	6.98
Change in agricultural production	3	3.49
Change in flood frequency	1	1.16
TOTAL	86	100

*: One firm can be able to indicate more than one choice.

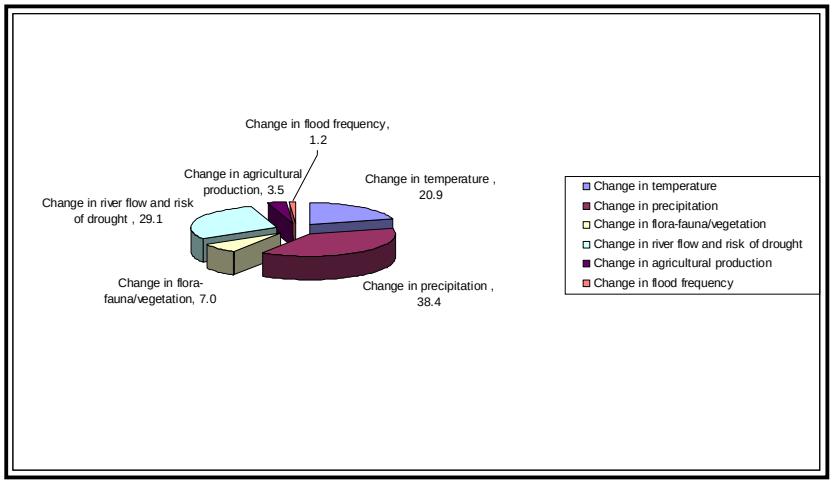


Figure 50. The Signs Indicating Climate Change in Antalya According to the Firms

In the part six, the last part, the awareness about the relation between the climate change and tourism is tried to be researched. One of the questions is that whether the firms have changed their practices to address environmental issues to understand the response mechanisms. 36 of them (90% of the surveyed firms) said “Yes”. After that, to the question of “Which way”, the 28,26% of them answered with the choice of “new procedures in energy consumption” and

26,09 of them answered with the choice of “new procedures in water consumption and treatment” (Table 28 and Figure 51).

Table 28: The Practices of the Firms to Address Environmental Issues

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
New procedures in energy consumption	26	28.26
New procedures in water consumption and treatment	24	26.09
Using products less damaging for the environment	20	21.74
Promoting eco-friendly consumption patterns in your costumers	14	15.22
New procedures in waste treatment	3	3.26
Using environmental best practices as a marketing strategy	3	3.26
Developing the supply of nature-based activities	1	1.09
Using environmental accredited certifications (e.g. ISO 14000)	1	1.09
TOTAL	92	100

*: One firm can be able to indicate more than one choice.

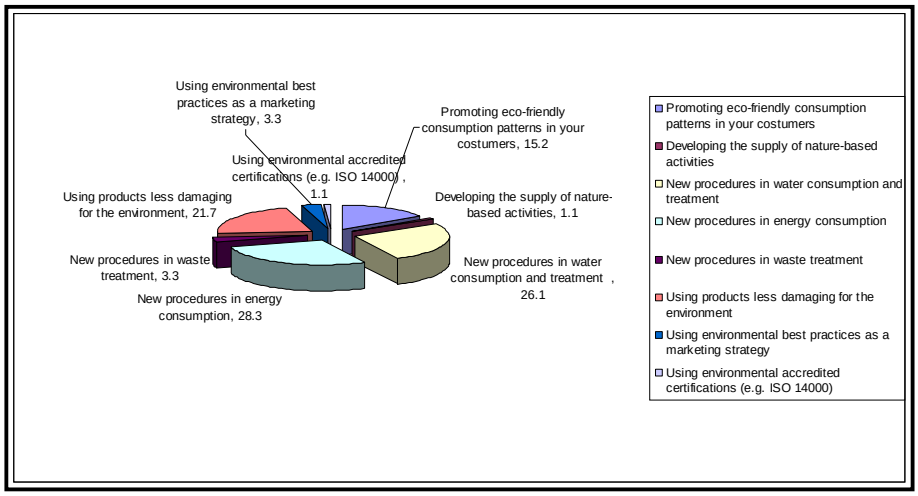


Figure 51. The Practices of the Firms to Address Environmental Issues

The other question is about whether the perceptions on climate changes have an impact on the tourist demand or not. 57,5% of the surveyed firms said that they do not have impact on

demand, while 42,5% of them said that they do. This means that the general thought about climate change is that it does not have impacts on tourist demand but it is necessary to look at the answers of the firms that said the perceptions on climate change having impacts. The question, actually, ask the changes in the tourism volume, in seasonality (summer, winter, and intermediate seasons), and in tourist practices (summer and winter). In tourism volume, 94.11% of the firms saying that the perceptions on climate change have impacts on tourist demand consider that the number of tourists will decrease. In seasonality, again 94,11% of them think that the number of tourist will decrease in summers and increase in winters but there is no difference in the intermediate seasons. In tourist practices, 94,11% of the firms said that in summers they prefer more indoor activities, and all of them (100%) said that, in winters, they prefer also more indoor activities.

After that, the question about whether the climate change will impact on tourist preferences or not is answered by firms. 57,5% of the firms said "No" to this question which means that climate change will not affect tourism industry in Antalya.

In order to understand their responses, the measures, considering tourism, being taken to cope with climate change were asked to the firms. It is reported that 75% of the firms have not taken any measures to cope with climate change. In general, since they think that there is no impacts of climate change on tourism, they do not take any measures. After that, it was asked whether to plan any measures to cope with climate changes in the next few decades or not. However, 87,5% said that they will not plan any measures, too. In other aspect, the firms were asked to whether there are any precautions taken by the firms to prevent the contribution of tourism activities to the climate change or not. 77.5% of the answers were "Yes" which means that the firms think that they can take measures to prevent contribution of the sector. 44.29% of the answers show "to decrease the consumption of the energy" as the measure that they took and 35,71% of them show "to save about water using" as the measure that is in second rank (Table 29 and Figure 52).

Table 29: The Precautions Taken by the Firms to Prevent the Contribution of Tourism Activities to the Climate Change

OPTIONS	NUMBER OF RESPONSES*	PERCENTAGES
To decrease the consumption of the energy	31	44.29
To save about water using	25	35.71
To work on developing systems that are sensitive to the environment	3	4.29
To work on awareness of the relation between the climate change and tourism	3	4.29
To encourage using the alternative energy resources	2	2.86
To provide efficient management of water resources	2	2.86
To provide waste management	1	1.43
To develop implementation about recycling	1	1.43
To minimize the loses/damaging of natural resources	1	1.43
To organize education programs and seminars	1	1.43
To decrease the emissions of CO2 and the GHGs	0	0
Others	0	0
TOTAL	70	100

*: One firm can be able to indicate more than one choice.

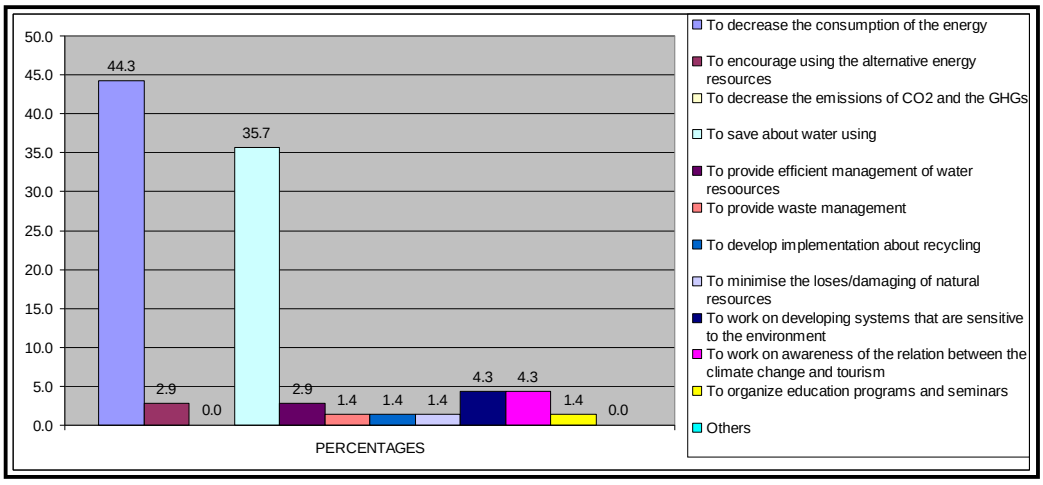


Figure 52. The Precautions Taken by the Firms to Prevent the Contribution of Tourism Activities to the Climate Change

In other question, that whether they plan to take any precautions, for future, by the firms to prevent the contribution of tourism activities to the climate change or not was asked and 92,5% of the firms said that they have no plan about measures for the future.

In the last part of the questionnaire, as in the decision makers, Future Scenarios for year 2071 are explained and it is asked to evaluate the trouble of visiting Antalya with these conditions and the seasons in terms of positiveness. In the questionnaire, 62,5% of the surveyed firms completely agree with the idea that "the scenario is negative for visiting Antalya with that temperature increase" (Table 30) and they considered, with the percentage of 45, that the scenario is positive for visiting Antalya with that temperature increase during the seasons of "autumn" (Table 31 and Figure 53). However, if the answers that they gave are examined, then, it is seen that autumn is included in all of them except for the answers "summer" and "winter" which composes 7,5% of the answers.

Table 30: The Evaluation of the Scenarios by Firms (In terms of Visiting Antalya)

CATEGORIZATION*	NUMBER OF QUESTIONNAIRES	PERCENTAGES
COMPLETELY AGREE	25	62.5
COMPLETELY DISAGREE	9	22.5
DISAGREE	4	10
AGREE	2	5
TOTAL	40	100

*: It is categorization of the responses to the idea that "the scenario is negative for visiting Antalya with temperature increase in Future Scenarios".

Table 31: The Evaluation of the Scenarios by Firms (In terms of Seasons)

OPTIONS*	NUMBER OF QUESTIONNAIRES	PERCENTAGES
AUTUMN	18	45
AUTUMN, AND WINTER	10	25
AUTUMN, AND SPRING	5	12.5
AUTUMN, AND SUMMER	4	10
SUMMER	2	5
WINTER	1	2.5
TOTAL	40	100

*: They are options about the question that "during what seasons the scenario is positive for visiting Antalya with that temperature increase".

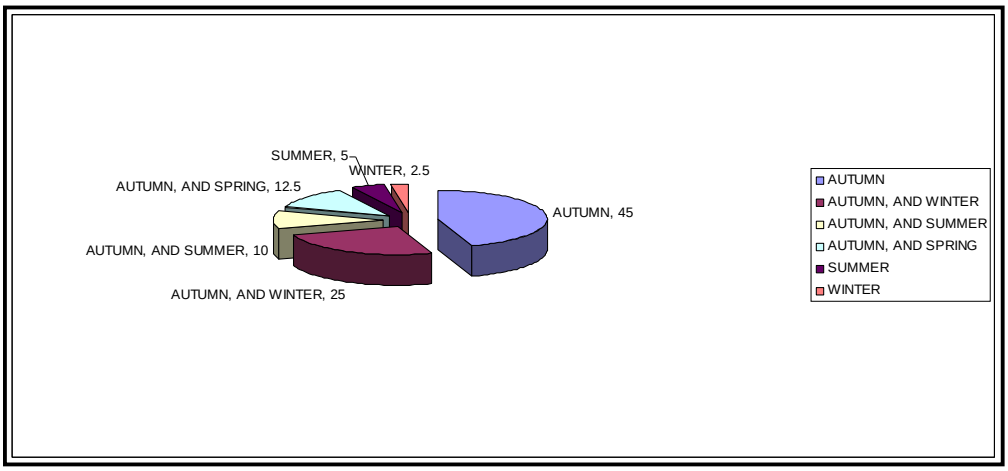


Figure 53. The Evaluation of the Scenarios by Firms (In terms of Seasons)

4.2.2. Evaluation of the Questionnaires

The answers of the questions about the knowledge of the decision makers show us that NGOs and local governments almost have the same opinion that already, there is an increase in temperature on the Earth. Firms that are surveyed also think of increasing in temperature. The NGOs consider that changes in temperature and precipitation are the signs indicating climate change in Antalya while local governments think that there are lots of signs such as changes in temperature, precipitation, flora/fauna, in agricultural production, etc. The firms consider the changes in precipitation as the signs of climate change.

The awareness about the relation between the climate change and tourism is tried to be examined in the questionnaires and in the next few decades, the possible effects of climate change on tourism are asked. According to the results, there is an almost equal distribution in their answers. Both of the local governments and NGOs think that all of the effects below can be realized:

- Decrease the total number of tourists,
- Decrease the tourism income due to change in tourist composition,
- The loss of natural resources,
- The change in the lifestyle of the local people,
- The decline in the economy of Antalya,
- Out-migration.

That what the politics/strategies of the institutions basically aim is asked in terms of development of the tourism sector in order to explore the awareness of the actors. The results show that according to NGOs, “to build partnership with related institutions to ensure an effective strategic tourism approach”, “to enhance and conserve the region’s natural, heritage and cultural assets”, and “to improve the promotion and marketing strategies” are the main politics while according to local governments, only “to enhance and conserve the region’s natural, heritage and cultural assets” is the most important and the others have the same importance. When it is looked at the results in terms of the contribution to the climate change, they show us that “to decrease the consumption of the energy” is the most important politics for NGOs. Local governments that are surveyed think that all of the politics such as “to decrease the consumption of the energy”, “to encourage using the alternative energy resources”, “to decrease the emissions of CO2 and the GHGs”, etc are the same importance.
When they are asked about the current plan/projects directly/indirectly related to tourism development, the surveyed NGOs said that “Tourism-related plans/projects”, “Environment-related plans/projects”, “Projects/studies for tourism promotion”, and “Projects/studies for awareness raising” are most important but the local governments said that “Infrastructure projects” is the most important one.

It is asked whether the institutions have any tools to encourage environmentally friendly tourism or not. According to NGOs, “New measures (blue flag, green star, etc.)” are important tools for them and local governments that are surveyed said “Standards defined by legislation” and “New measures (blue flag, green star, etc.)” are main tools for them.

In order to understand their responses, the measures, considering tourism, being taken to cope with climate change are asked to the decision makers. These measures are asked in two different aspects: (1) about the impacts of the climate change on tourism and (2) about the contribution of tourism activities to the climate change. NGOs said that “To encourage cooperation in activities” and “To provide and support organizing education programs and programs that raise awareness” are the main impacts of it while local governments said that “To provide and support organizing education programs and programs that raise awareness” is the main.

“To proceed workings of information about using energy resources” and “To provide and support organizing education programs and programs that raise awareness” are considered as measures mainly by NGOs in terms of the impacts about contribution of the climate change.

However, according to the local governments, all of them as measures have same importance.

One of the questions that were asked to the firms is that whether the firms have changed their practices to address environmental issues to understand the response mechanisms. They answered this question with the choice of “new procedures in energy consumption” and “new procedures in water consumption and treatment”.

The other question that was asked to the firms is about whether the perceptions on climate changes have an impact on the tourist demand or not. The general thought is that it does not have impacts on tourist demand. The question, actually, ask the changes in the tourism volume, in seasonality, and in tourist practices. In tourism volume, most of them saying that the perceptions on climate change have impacts on tourist demand consider that the number of tourists will decrease. In seasonality, again, most of them think that the number of tourist will decrease in summers and increase in winters. After that, firms were asked that whether the climate change have impacts on tourist preferences and most of them think that climate change will not affect tourism industry, especially tourist preferences in Antalya.

In order to understand their responses, the measures, considering tourism, being taken to cope with climate change were asked to the firms. It is reported that 75% of the firms have not taken any measures to cope with climate change. In general, since they think that there is no impacts of climate change on tourism, they do not take any measures.

In the last part of the questionnaire, Future Scenarios for year 2071 are explained and it is asked to evaluate the trouble of visiting Antalya with these conditions and the seasons in terms of positiveness. In the questionnaire, the surveyed NGOs and local governments and also firms agree with the idea that “the scenario is negative for visiting Antalya with that temperature increase”. In addition, while local governments and NGOs think that the scenario is positive for visiting Antalya during the seasons of “autumn, and winter” in the future, the firms think that “autumn” is more convenient.

CHAPTER 5

CONCLUSION

In the developing the concept of the climate change in the literature, it can be seen that it has been on the agenda since 1970s. However, it is later to be recognized climate change as a global problem. After that, in the world, the conferences have been organized and protocols have been signed about climate change. Conventions which highlight the climate change as a global problem and the importance of the precautions in terms of increasing emissions of the GHGs have been ratified by parties in this time and reports have been prepared. The aim of this thesis is not to review this extensive literature. However, it is tried to focus on the relation between the climate change and tourism; the impacts of climate change on the sector; the awareness of the actors in terms of this impacts and response mechanisms of them. It can be seen tourism and climate change as a dichotomy: Tourism can be affected by climate change, which requires taking action through adaptation measures. In this structure, the climate change has some negative impacts on the sector because of sensibility of tourism in terms of climate and weather.

Urban tourism has increased since the early 1980s and today tourism is one of the largest economic sectors. It is very important sector for the local areas economically. However, tourism, especially outdoor tourism, is climate sensitive sector and therefore, all changes in the climate of the world affect the sector. Since the tourism industry and destinations, as it is seen, are clearly sensitive to climate variability and change in terms of temperature rising, droughtness, increasing diseases, etc…, the length and quality of tourism seasons are affected and it plays a major role in destination choice and tourist spending.

In the awareness of the actors and the responses of them, in the literature, the actors which are interested in tourism develop two types of response mechanisms; mitigation and

adaptation. The first one can lead to reductions in greenhouse gas emissions. Mitigation, in general, in the tourism sector can be achieved by reducing energy use, for instance through changing travel behavior, by improving energy efficiency, increasing the use of renewable energy, carbon offsetting strategies, sustainable destination planning and management. In general mitigation policies are adopted by firms, tour operators, entrepreneurs, etc… because they are interested in energy using or green house gases directly and they can be active in these type of policies or strategies.

The second one is developed to adapt the conditions that climate change cause in the sector in the long-term. Additional adaptation measures will be required to reduce the adverse impacts of projected climate change and variability. Adaptation, actually, can reduce vulnerability. It is now recognized that there is an inevitable need for societies around the world to adapt to unavoidable changes in climate. It is essential to emphasize that all tourism businesses and destinations will need to adapt to climate change in order to minimize associated risks and capitalize upon new opportunities, in an economically, socially and environmentally sustainable manner. They all are affected by climate change so they should develop adaptation strategies to continue activities in the sector effectively and to tackle down the conditions that will become with climate change. In general, government bodies can be effective in these policies. They, also, can develop guiding policies for other institutions in the long term.

Climate change is already influencing decision-making within the tourism sector, and forward looking tourism businesses and investors, and international tourism organizations. The next generation of tourism professionals will need to contend with virtually all of the broad range of impacts. WMO Secretary-General M. Michel Jarraud (2007) said that “given that climate change is expected to pose an increasing threat to tourism operations in many destinations […], WMO urges governments and the private sector to increasingly use climate information […], and to take additional steps towards incorporating climate considerations in tourism policies, development and management plans”. Therefore, this is the time now for the tourism community to collectively formulate a strategy to address what must be considered the greatest challenge to the sustainability of tourism in the 21st century.

To be most effective, at least some of the preventing/planning efforts should be made at the national and regional level, but perhaps they can be most effectively coordinated through international non-governmental organizations or inter-governmental agencies. In addition,

local actors are necessary to be active in implementation. For effective mitigation, for example, in the transport sector there is a need to implement a mix of measures, technological improvements and market based measures. Tour operators as mentioned above, also, could play a central role in mitigation, through their capacity in influencing the whole tourism supply chain, and shape demand patterns. They could play a role in customers' awareness raising and soft mobility product development. In addition, in terms of the accommodation sector, good energy management should mean good business for tourist establishments, due to the savings in the energy bill. An increasing number of hotel chains, motivated by external and internal drivers are documenting their energy use and taking action in order to improve energy-efficiency, reduce energy use and apply renewable energy sources.

In Antalya, the actors are asked that whether there is climate change or not and most of them answered that there is increasing in temperature on the Earth. In addition, increasing in temperature and decreasing in precipitation are said as indicators of climate change. In the questionnaires, it can be seen that the actors believe that there is and will be negative impacts of climate change on the sector. The actors consider that some impacts like below can become in the city as a result of the climate change:

- Decrease the total number of tourists,
- Decrease the tourism income due to change in tourist composition,
- The loss of natural resources.

Since most of them are aware of these impacts the issues related with climate change are taken into consideration in the policies and strategies of the actors. However, in the implementation, the plan and projects have not been made yet. In addition, any action or programme will not be planned for the future by these actors. They only take some measurements about the energy or water saving that is effective in terms of climate change.

In addition, some of the actors are not aware of these impacts of the climate change on tourism and do not develop effectively adaptation policies as responses. Since the actors can not be able to effective on these policies, the negative effects of climate change on the tourism industry can not be able to be prevented or decreased in the current picture of the city. In Antalya, the actors said that there is climate change, which means that they are partially aware of the problem but they are compelled to develop only adaptation policies not mitigation policies because they were not strong in implementation of policies. To develop mitigation policies, it is necessary, as it said before, strong actors but in Antalya, there is no

such an institutional structure about preventing climate change. They are seen not to have any relations with the other institutions in their plan or projects. Therefore, they try to develop some adaptation strategies to decrease the sensibility of the sector in terms of the climate change and so the negative effects of the climate change.

In questionnaires that are made with stakeholders in Antalya within the research, the actors are reported that there is no plan or projects about the measures taken to prevent the contribution of the industry and the impacts of the climate change. However, one of the most effective methods by which the climate change can be prevented is to make plans or projects or to be included the measurements politics in the plans that are made for tourism and to organize the economy and investment strategies in this regard. Actors in Antalya think about the climate change and its impacts on tourism but have no action. They consider that the education programs or organizations awareness programs or energy saving methods are the most important methods to prevent the impacts of climate change on tourism in the city but now these are not in their agenda except for some saving politics of entrepreneurs.

In the questionnaire, the other issue is about whether the perceptions on climate changes have an impact on the tourist demand or not. The general thought about climate change is that it does not have impacts on tourist demand but it is necessary to look at the answers of the firms that said the perceptions on climate change having impacts. The question, actually, ask the changes in the tourism volume, in seasonality (summer, winter, and intermediate seasons). In tourism volume, 94.11% of the firms saying that the perceptions on climate change have impacts on tourist demand consider that the number of tourists will decrease. In seasonality, again 94,11% of them think that the number of tourist will decrease in summers and increase in winters but there is no difference in the intermediate seasons.

From the results of the questionnaires, it is appeared that the actors actually are aware of the changing that will become as a result of the impacts of the climate change on tourism in the long term in Antalya and that they have some foresights about this subject. For example, they can estimate that the seasonal changes will become in the future. They consider that the seasons in which the tourist flows are occurred can change and these changes can affect the tourism seasons in the city. However, they do not think that this condition is negative for the sector or the city so they do not make any action. They do not develop any responses such as adaptation policies that provide them to be prepared for these conditions but they take some measurements to save energy or water in the sector in terms of economic concern.

Since they estimate some changes in the long term it can be said that these actors will take measurements if they see as necessary. They will take into consideration these impacts and changes when they make decisions that will affect the development of the sector and they will evaluate the conditions in terms of the city because of the economic and social benefit. Since they now think that the impacts on tourist preferences are not crucial for the sector or that there is no change on preferences of tourists because of climate change the actors do not have any measurements or responses except basic adaptation policies such as energy saving, water saving, etc…

In this regard, all impacts of climate change on tourism that are mentioned and the decisions that should be made can be achieved by plans and implementation. Effective spatial planning is one of the many elements required in a successful response to climate change but used positively it has a significant contribution to make. It is set out how spatial planning, in providing for the new buildings or infrastructure needed by sector, should help shape places with lower carbon emissions. Spatial planning, regionally and locally, provides the framework for integrating new development with other programmes that influence the nature of places and how they function, which result in decreasing the greenhouse gases.

Development plan policies should take account of environmental issues that affect the tourism sector in the city such as:

- mitigation of the effects of, and adaptation to, climate change through the reduction of greenhouse gas emissions and the use of renewable energy; air quality and pollution; land contamination; the protection of groundwater from contamination; and noise and light pollution;
- the potential impact of the environment on proposed developments by avoiding new development in areas at risk of flooding and sea-level rise, and as far as possible, by accommodating natural hazards and the impacts of climate change.

For example, each of the adaptation plans will have, in general, expected the following issues:

- all premises potentially at risk from extreme weather events (flooding, loss of essential services in winter, drought, heat wave, fire) to be identified, and emergency plans;

- "support protected area management, and other means of the conservation of coastal ecosystems in order to enhance their resilience" (Climate Change and Tourism, Responding to Global Challenges, 2008, p: 7)
- enhanced design, sitting standards and planning guidelines for tourism establishments;
- the structural, or architectural design of new buildings to cater for potential extremes of temperature and moisture;
- capacity building, and climate change and environment related education for the accommodation establishments; such as architecture, construction and engineering;
- integration of climate change factors into regulatory frameworks for tourism development;
- implementation of tourism development plans and spatial planning such as zoning;
- water conservation techniques, such as rainwater storage or waste-water recycling;
- "education/awareness raising among tourism businesses and their staff" (Climate Change and Tourism, Responding to Global Challenges, 2008, p: 7);
- encourage partnerships between different transport and tourism stakeholders to reduce emissions;
- awareness and preparedness to face extreme climatic events and disasters at the national and local levels;
- "Energy conservation and efficiency in buildings and tourist attractions:
  — setting targets and benchmarking, apply certification;
  — integrating sustainability and customer comfort;
  — motivating employees and customers through awareness-raising and through incentives for energy reduction;
  — use of energy-efficient appliances (light bulbs, heat exchangers, etc.)" (Climate Change and Tourism, Responding to Global Challenges, 2008, p: 11);
- use of alternative fuels and renewable energy sources (e.g., wind, solar, thermal, and waste).

Regional planning bodies and all planning authorities should prepare and deliver spatial strategies that:

- make a full contribution to energy policies, and in doing so contribute to global sustainability;

- in enabling the provision of new buildings for the sector and infrastructure, secure the highest viable standards of resource and energy efficiency and reduction in carbon emissions;
- deliver patterns of urban growth that help secure the fullest possible use of sustainable transport for moving freight, public transport, cycling and walking.

(Planning Policy Statement: Planning and Climate Change, Supplement to Planning Policy Statement 1, 2006, p: 13).

In the planning and implementation process in tourism sector, the actors with planners can be active in the development and realization of the following:

• Delivery of buildings those are well-designed,
• Making the best use of land,
• Making use of new building technologies to deliver sustainable development,
• Facilitate multi-purpose journeys.

Planning authorities should be concerned with the environmental performance of new development and because of this, with the impact of individual buildings on climate change. Planning authorities should, therefore, engage constructively and imaginatively with developers to encourage the delivery of sustainable buildings. Planning authorities should:

- expect applicants to use landform, layout, building orientation and landscaping to minimise energy consumption, including maximising cooling and avoiding solar gain in the summer, and maximise natural ventilation taking into account the likely local noise environment and ambient air quality;
- give careful consideration to the extent to which the proposed massing of buildings, density and mix of development helps to minimize energy consumption,
- secure sustainable urban drainage systems, pay attention to the potential contribution to be gained to water harvesting from impermeable surfaces and encourage layouts that accommodate waste water recycling.

REFERENCES

[1] Amelung, B. et al. (2007), Implications of Global Climate Change for Tourism Flows and Seasonality, *Journal of Travel Research, 45* (3), pp: 285–296

[2] Advances in Tourism Climatology (2004), Berichte des Meteorologischen Institutes der Universität Freiburg, Nr. 12, in Matzarakis, A., de Freitas, C. R. & D. Scott (eds.), Freiburg

[3] Becken, S. & Patterson, M. (2006), Measuring National Carbon Dioxide Emissions from Tourism as a Key Step towards Achieving Sustainable Tourism, *Journal of Sustainable Tourism*, Vol. 14, No. 4

[4] Becken, S. (2002b), Analyzing International Tourist Flows to Estimate Energy Use Associated with Air Travel', *Journal of Sustainable Tourism*, 10 (2), pp: 114–131

[5] Becken, S. (2002a), *Energy use in the New Zealand tourism sector*, Lincoln University, Canterbury

[6] Bigano, A. et al. (2006), The Impact of Climate on Holiday Destination Choice, *Climatic Change, 76* (3–4), pp. 389–406.

[7] Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesi ve Kyoto Protokolü (2006), Texts and Basic Information, REC Turkey, Ankara

[8] Black, J. (2002), Critical Reflections on Regulation, *Australian Journal of Legal Philosophy* 27: 1–35.

[9] Bozkurt, Ö. (1996), Aydeniz Metodu'nun Türkiye'ye Uyarlanması, Adaptation of Aydeniz Method in Turkey, Master Thesis, A.Ü. Social Science Institute, Ankara

[10] Brahic, C. (2006), Carbon Emissions Rising Faster than Ever, NewScientist.com News Service, http://environment.newscientist.com/channel/earth/dn10507-carbon-emissions-rising-faster-than-ever.html.

[11] Caldeira, K. & Kasting, J. (1993), Insensitivity of Global Warming Potentials to Carbon Dioxide Emission Scenarios, *Nature* 366, 251–253

[12] Carbon Management: A Practical Guide for Suppliers (2009), Supplier Support and Information Initiative, University of Cambridge Programme

[13] Cegnar, T. (2007), Impacts of Climate Change on Tourism and Potential Adaptation Responses in Coastal and Alpine Regions, Environmental Agency of Slovenia, Berlin

[14] Climate Change Synthesis Report (2007), Summary for Policymakers

[15] Climate Change and Tourism: Responding to Global Challenges, Technical Report (2007), Commissioned for the Second International Conference on Climate Change and Tourism, Davos

[16] Climate Change and Tourism: Responding to Global Challenges, Through Education (2008), Amforth Forum, Lisbon

[17] Climate Change and Tourism: Responding to Global Challenges (2008), UNWTO-UNEPWMO, Madrid

[18] Communities and Local Government (2006), Planning Policy Statement: Planning and Climate Change, Supplement to Planning Policy Statement 1, Crown Copyright, London

[19] Demir, İ., Kılıç, G., Coşkun, M., Sümer, U.M. (2008), Türkiye'de Maksimum, Minimum ve Ortalama Hava Sıcaklıkları ile Yağış Dizilerinde Gözlenen Değişiklikler ve Eğilimler, The Climate Change Symposium of the Union of Chambers of Turkish Engineers and Architects , The Notice Book, 69-84, Ankara

[20] Dodman D. (2008), Climate Change and Tourism: The Policy Environment, International Seminar: Climate Change Adaptation and Mitigation in the Tourism Sector, International Institute for Environment and Development (IIED), London

[21] Erkuş Öztürk, H., 2008, *The Role of Local and Global Networking for Tourism Firms and Clusters: The Case of Antalya*, Middle East Technical University, Ankara

[22] First National Communication of Turkey on Climate Change (2007), Republic of Turkey, Under the United Nations Framework Convention on Climate Change, Coordinated by Ministry of Environment and Forestry

[23] Flannery, T. (2005), The Weather Makers. Atlantic Monthly Press, New York.

[24] Gaita, R. & Both, M., 2008, Climate Change and Local Awareness: a Comparative Study on Tourism Stakeholders in Zandvoort (NL) and Costa del Sol (ES), Sustainable Tourism III, Ecology and the Environment Books from WIT Press, UK

[25] Geographical, www.geographical.co.uk, last accessed at 2 June 2009

[26**]** Giannakopoulos, C., Bindi, M., Moriondo, M. and Tin, T., 2005, Climate Change Impacts in the Mediterranean Resulting from a 2 ºC Global Temperature Rise, A Report for WWF

[27] Giles, A. & Perry, A. (1998), The Use of a Temporal Analogue to Investigate the Possible Impact of Projected Global Warming on the UK Tourist Industry, *Tourism Management, 19,* 1, pp: 75–80

[28] Gomez, M. B. (2004), An Evaluation of the Tourist Potential of the Climate in Catalonia (Spain): A Regional Study, *Geografiska Annaler*, 86, pp: 249–264

[29] Gössling, S. et. al. (2005), The eco-efficiency of tourism, *Ecological Economics*, 54, 417–434

[30] Gössling, S. (2008), Carbon Neutral Destinations: A Conceptual Analysis, *Journal of Sustainable Tourism*, Vol. 17, No. 1, 17–37

[31] Gowdy, J. M. (2008), Behavioral Economics and Climate Change Policy, *Journal of Economic Behavior & Organization*, 68, 632–644, Journal homepage: www.elsevier.com/locate/econbase

[32] Haas, P. M. (2004), Climate Change Governance after Bali, *Global Environmental Politics* 8: 3,

[33] Haines, F. & Reichmann, N. (2008), The Problem That Is Global Warming: Introduction, *Law & Policy*, Vol. 30, No. 4

[34] Hamilton, J. M. (2005), *Tourism, Climate Change and the Coastal Zone*, Hamburg University, Hamburg

[35] Jones, G. et al. (2005), Climate Change and Global Wine Quality, *Climatic Change, 73* (3), pp: 319–343

[36] Jones, B. & Scott, D. (2006), Climate Change, Seasonality and Visitation to Canada's National Parks, *Journal of Parks and Recreation Administration*, 24 (2), pp: 42–62

[37] Kadıoğlu, S. & Dokumacı, O., 2005, İklim Değişikliği ve Türkiye, Ministry of Environment and Forestry

[38] Kasting, J. (1998), The Carbon Cycle, Climate, and the Long-Term Effects of Fossil Fuel Burning, *Consequences* 4, 15–27.

[39] Kayhan, M., Küresel İklim Değişikliği ve Türkiye

[40] Kundzewicz, Z. W., et al. (2008), Impacts of Climate Extremes on Activity Sectors-Stakeholders' Perspective, *Theor. Appl. Climatol*. 93: 117–132

[41] Leader of Brighton & Hove City Council (2006), Climate Change Action Plan for Brighton & Hove-Draft

[42] Maddison, D. (2001), In Search of Warmer Climates? The Impact of Climate Change on Flows of British Tourists, *Climatic Change, 49* (1/2), pp: 193–208.

[43] Makaleler, http://www.makaleler.com, last accessed at 19 May 2009

[44] Meze-Hausken, E. (2008), On the (im-)Possibilities of Defining Human Climate Thresholds, *Climatic Change* 89: 299–324

[45] National Snow and Ice Data Center, http://www-nsidc.colorado.edu/arcticmet/glossary/, last accessed at 5 May 2009

[46] Paavola, J. & Adger, W. N. (2006), *Justice and Adaptation to Climate Change*, Tyndall Centre for Climate Change Research Working Paper 23, visit also: http://www.tyndall.ac.uk/publications/working_papers/wp23.pdf, last accessed at 23 July 2009

[47] Patterson, T. (2004), *Knowledge Management for Tourism, Recreation and Bioclimatology: Mapping the Interactions (Part II)*, Advances in Tourism Climatology, Berichte des Meteorologischen Institutes der Universität Freiburg, Nr. 12, in Matzarakis, A., de Freitas, C. R. & D. Scott (eds.), Freiburg

[48] Patterson, M. G. & McDonald, G. (2004), *How Green and Clean is New Zealand Tourism?*, Lincoln: Manaki Whenua.

[49] Paul, A. (1972), Weather and the Daily Use of Outdoor Recreation Areas in Canada, in J. Taylor (ed.) *Weather Forecasting for Agriculture and Industry,* David and Charles Newton Abbott, pp: 132–146.

[50] Sahlins, M. (1996), The Sadness of Sweetness: a Native Anthropology of Western Cosmology, *Current Anthropology* 37, 395–428.

[51] Scott, D. et al. (2004), Climate Change and the Distribution of Climatic Resources for Tourism in North America, *Climate Research, 27* (2), pp: 105–117.

[52] Scott, D. et al. (2007d – in press), Climate Change Vulnerability of the Northeast US Winter Tourism Sector, *Mitigation and Adaptation Strategies to Global Change,*

[53] Sensoy, S. & Ulupınar, Y. (2007), İklim Sınıflandırmaları, Turkish State Meteorological Service, Ankara, Turkey

[54] Sensoy S., Demircan, M. & Alan, İ., 1971 - 2004 Yılları Arası Türkiye İklim İndisleri Trendleri, Turkish State Meteorological Service, Ankara, Turkey

[55] Sensoy, S., Demircan, M., Ulupınar Y. & Balta İ., Türkiye İklimi, Turkish State Meteorological Service, Ankara, Turkey

[56] Socolow, R., Hotinski, R., Greenblatt, J., Pacala, S. (2004), Solving the climate problem, *Environment* 46, 8–19.

[57] Talbot, L. M. (1989), Man's Role in Managing the Global Environment in Botkin D. E., Caswell M. F., Estes J. E. & Orio A. A. (eds), *Changing the global Environment,* Academic Press, Boston 15-34

[58] Technical Report Commissioned for the Third International Conference on Climate Change and Tourism (2007), Developments in Tourism Climatology, Climate, Tourism and Recreation, Matzarakis, A., de Freitas, C. R. & D. Scott (Eds.), Alexandroupolis, Greece

[59] The Report of Development Bank (2000)

[60] The Unpublished Report of Analysis of Tourism in Antalya (2004), The Work of Studio in the Department of City and Regional Planning in Middle East Technical University, Ankara, Turkey

[61] Unpublished Statistics of Turkey Statistics Institution, Turkey Statistics Institution

[62] The Ministry of Culture and Tourism, kvmgm.kulturturizm.gov.tr/.../DosyaGoster.aspx?...sonturizmraporu..., last accessed at 24 September 2009

[63] Thornes, J. (1995), Global Environmental Change and Regional Response: The European Mediterranean, *New Series*, Vol. 20, No. 3, 357-367, Blackwell Publishing on behalf of The Royal Geographical Society (with the Institute of British Geographers), Stable URL: http://www.jstor.org/stable/622656

[64] Turkish State Meteorological Service, http://www.dmi.gov.tr/iklim/iklim-degisikligi.aspx, last accessed at 22 September 2009

[65] Türkeş, M. (2001), Küresel İklimin Korunması, İklim Değişikligi Çerçeve Sözleşmesi ve Türkiye, Union of Chambers of Turkish Engineers and Architects, Chambers of Mechanical Engineers, Periodical 61: 14-29.

[66] Türkeş, M. (2001), Hava, İklim, Şiddetli Hava Olayları ve Küresel Isınma, The Seminars of 2000 of Turkish State Meteorological Service, Technical Presentations, Series of Seminars: 1: 187-205, Ankara

[67] Türkeş, M. & Kılıç, G. (2004), Avrupa Birligi'nin Iklim Değişikliği Politikaları ve Önlemleri (European Union Policies and Measures on Climate Change), *Çevre, Bilim ve Teknoloji*, Technical Periodical, 2: 35-52

[68] Türkeş, M., Sümer, U. M. & Çetiner, G. (2000), Kyoto Protokolü Esneklik Mekanizmaları (Flexibility Mechanisms Under the Kyoto Protocol), Installation Periodical 52: 84-100

[69**]** Viner, D. & Agnew, M. (1999), Climate Change and Its Impacts on Tourism, WWF-UK

[70] Wikipedia, The Free Encyclopedia, http://en.wikipedia.org/wiki/Climate_change, last accessed at 19 May 2009

[71] World Meteorological Organization (UNWMO), http://www.wmo.int/pages/themes/WMO_climatechange_en.html, last accessed at 13 July 2009

[72] World Tourism Organization, http://www.worldtourism.org, last accessed at 16 May 2009.

[73] World Tourism Organization, http://www.world-tourism.org/facts/eng/historical.htm, last accessed at 5 May 2009.

APPENDIX A

DEFINITIONS

Carbon Emissions: Emissions of the six greenhouse gases covered by the Kyoto Protocol.

Climate Change: The increase in the average temperature of the Earth's near-surface air and the oceans since the mid-twentieth century, and its projected continuation. There is now widespread scientific consensus that most of this observed temperature increase is due to greenhouse gas emissions caused by human activity. "Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Emission: It means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time.

Greenhouse Gases: Greenhouse gases are those which contribute to the greenhouse effect when present in the atmosphere. Six greenhouse gases are regulated by the Kyoto Protocol, as they are emitted in significant quantity by human activities and are key contributors to climate change. The six regulated greenhouse gases are carbon dioxide (CO_2), methane (CH4), nitrous oxide (N2O), hydro fluorocarbons (HFCs), per fluorocarbons (PFCs) and Sulphur hexafluoride (SF6). "Greenhouse gases" means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorbs and re-emits infrared radiation.

APPENDIX B

CLIMATE CAHANGE IN ANTALYA

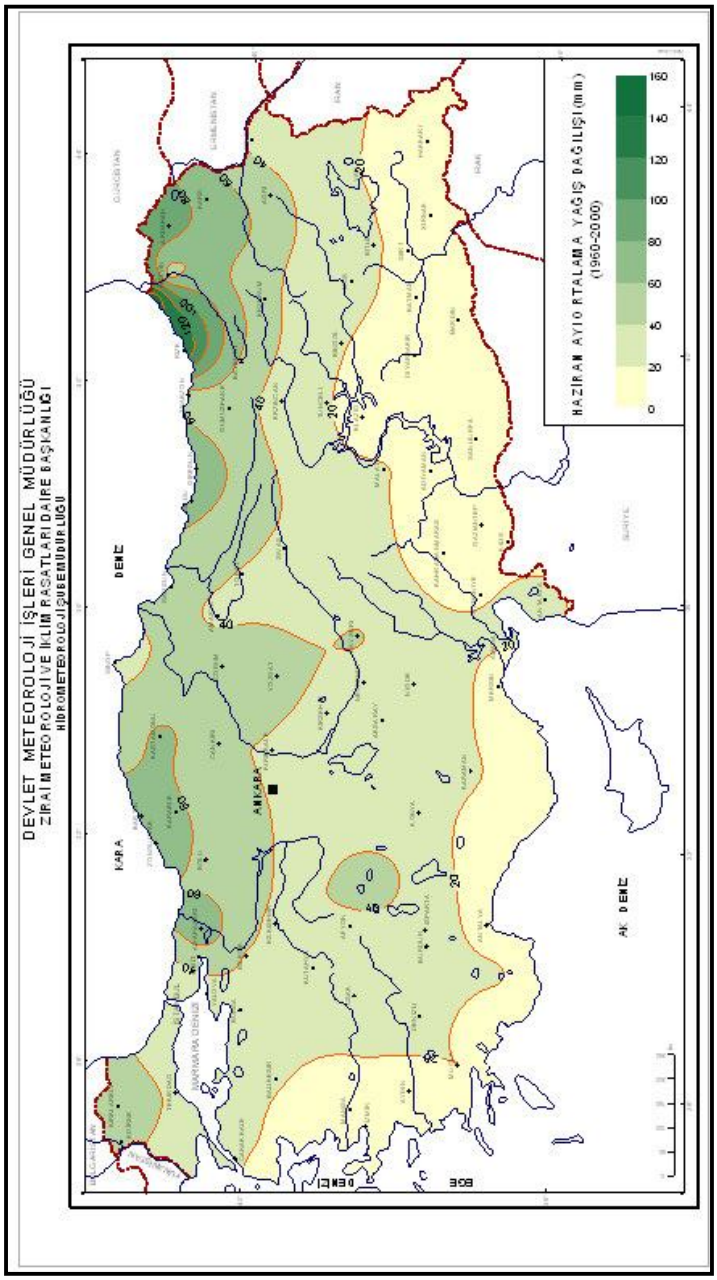


Figure 54. Distribution of Mean Precipitation of June in the Period of 1960 and 2000

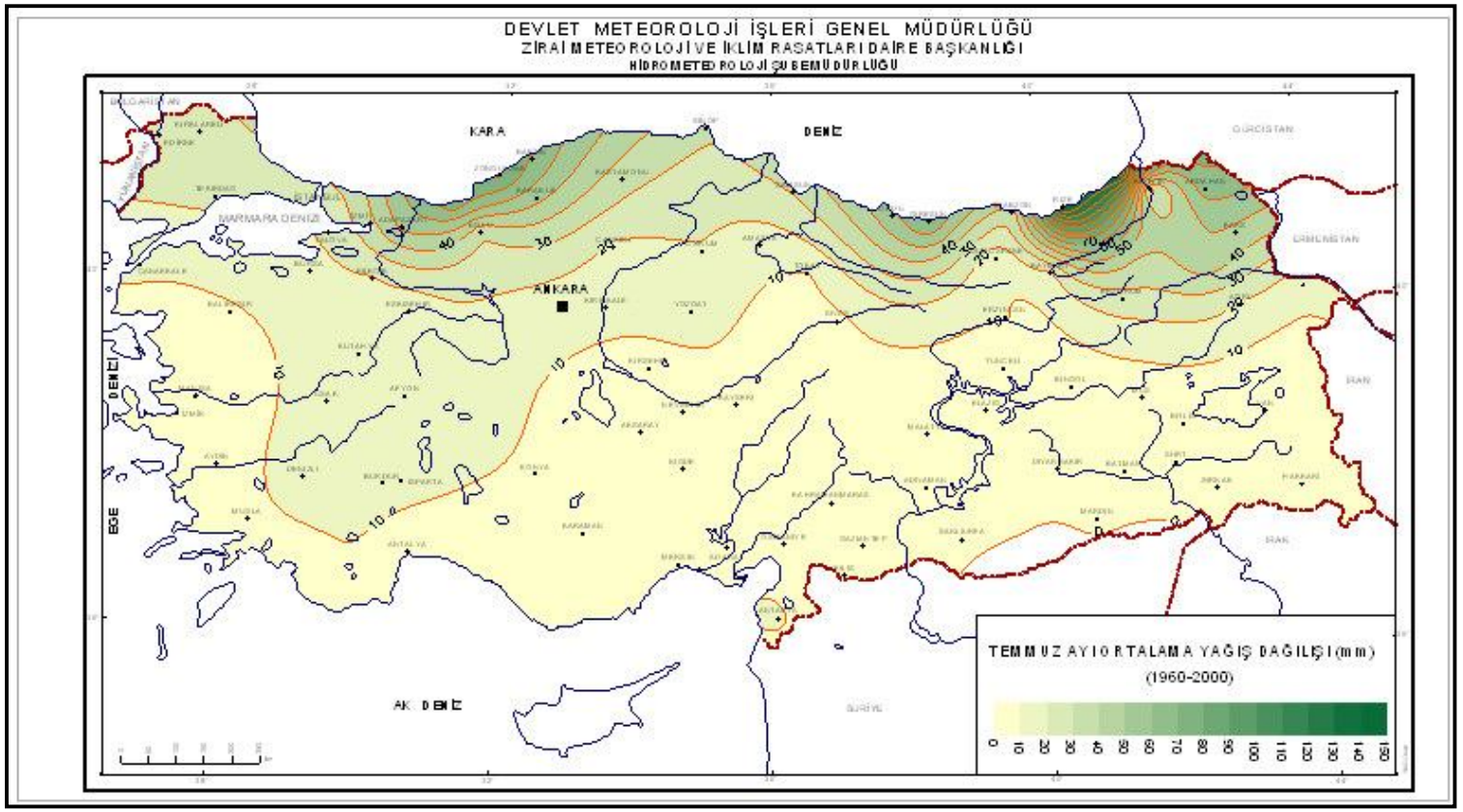


Figure 55. Distribution of Mean Precipitation of July in the Period of 1960 and 2000

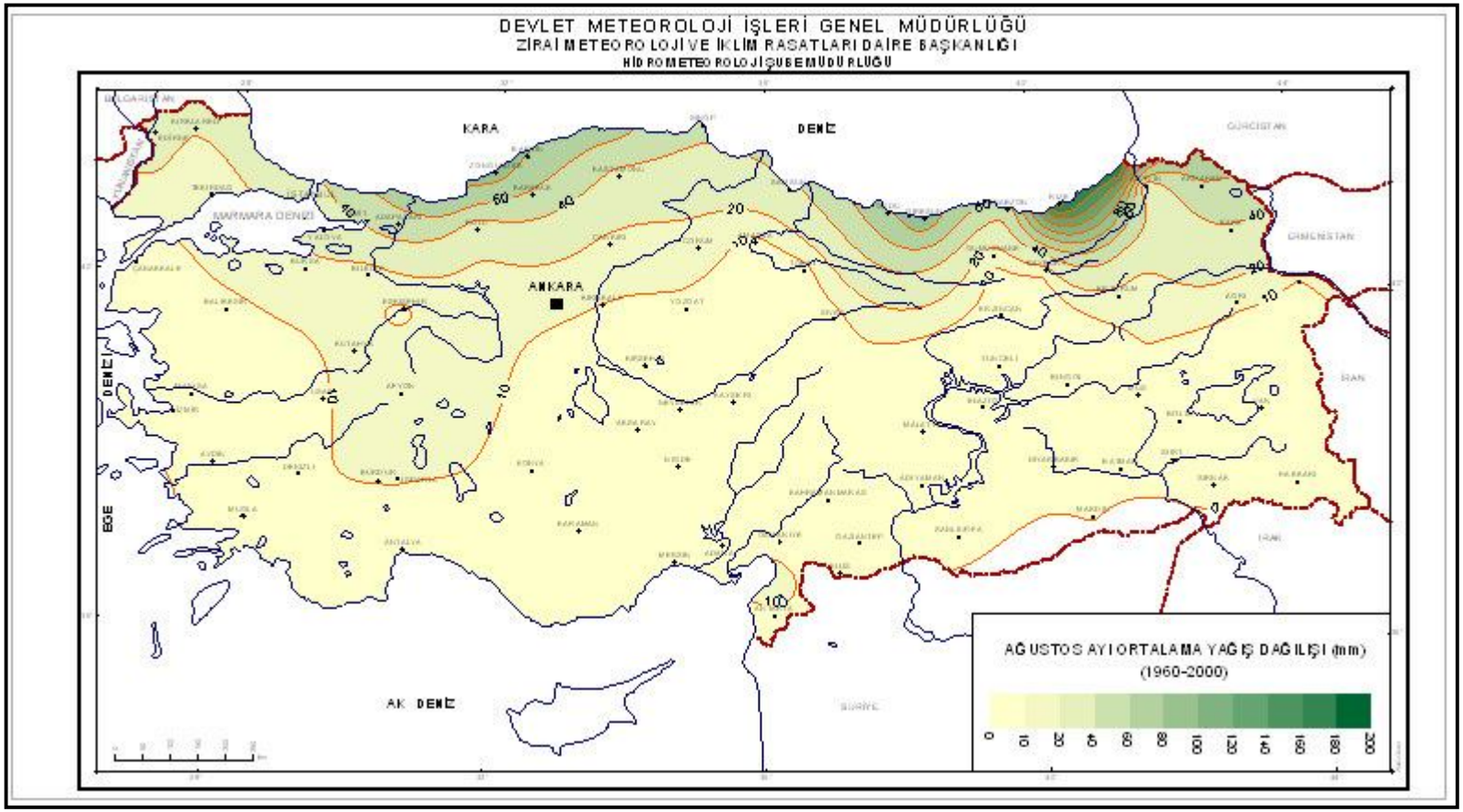


Figure 56. Distribution of Mean Precipitation of August in the Period of 1960 and 2000

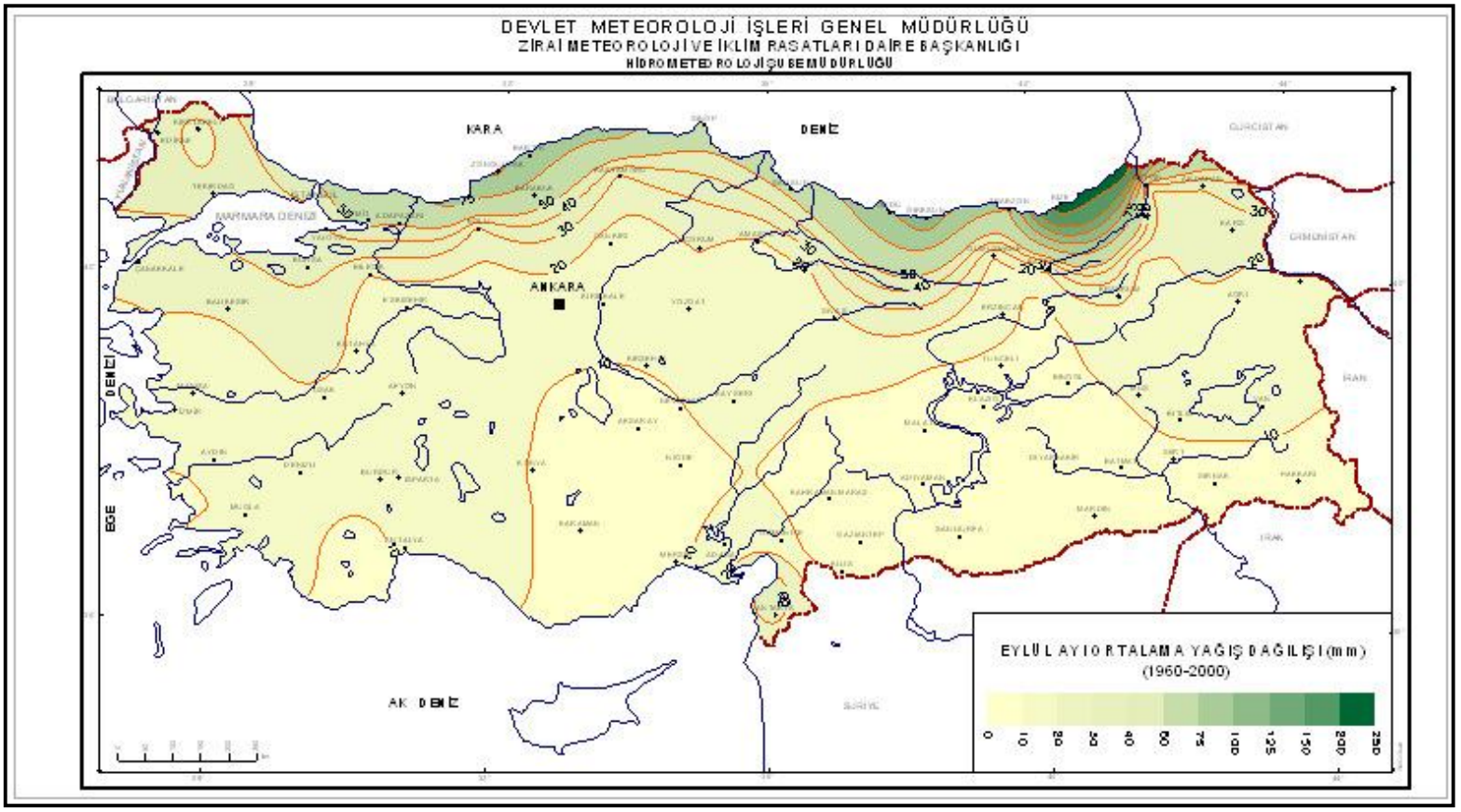


Figure 57. Distribution of Mean Precipitation of September in the Period of 1960 and 2000

Figure 58. Spatial Distribution of Annual Mean Relative Humidity in Turkey

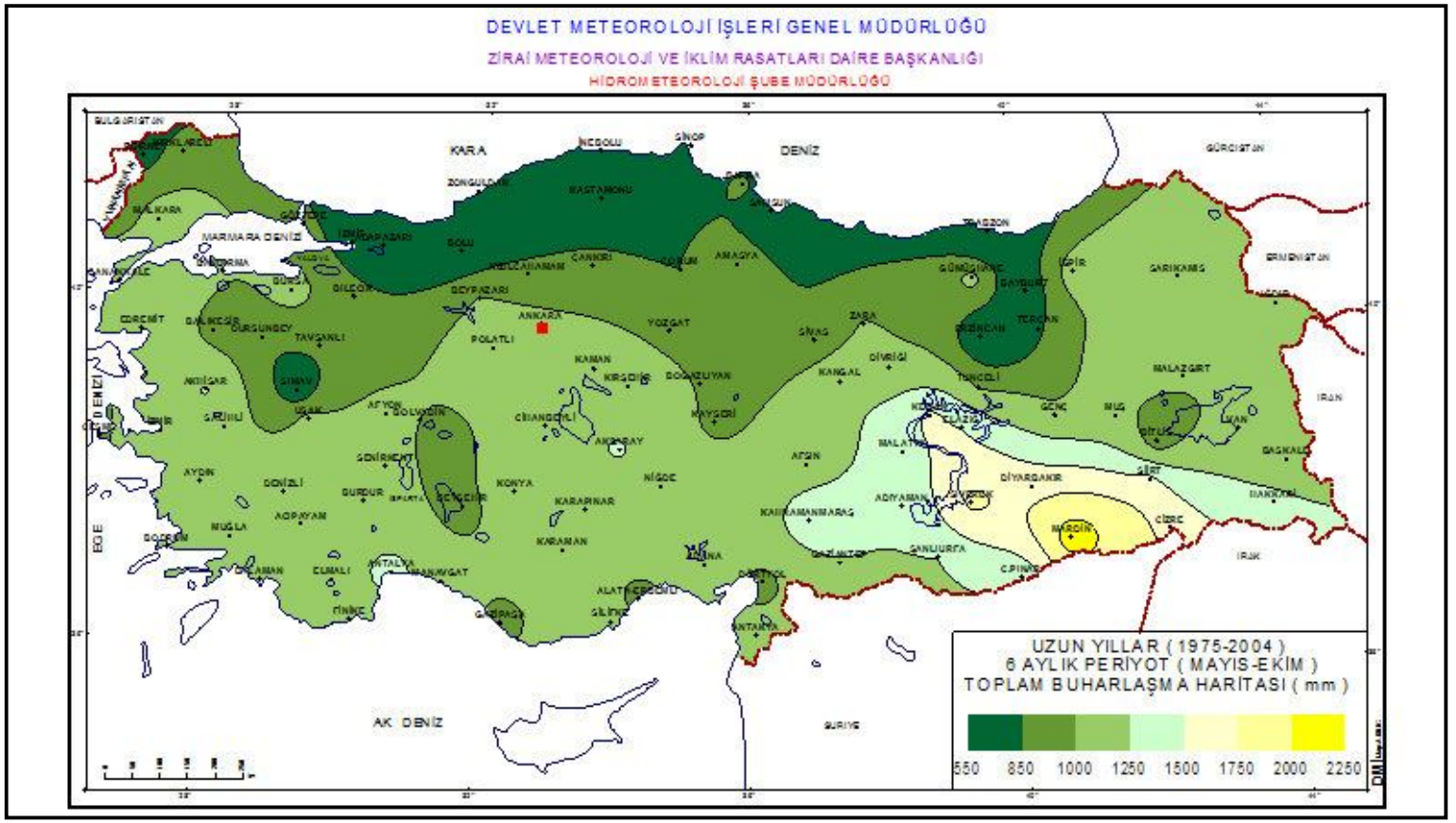


Figure 59. Total Evaporation in 6 Months Period for the Time Period Between 1975 and 2004 (mm)

Figure 60. Annual Mean Obscurity in Turkey

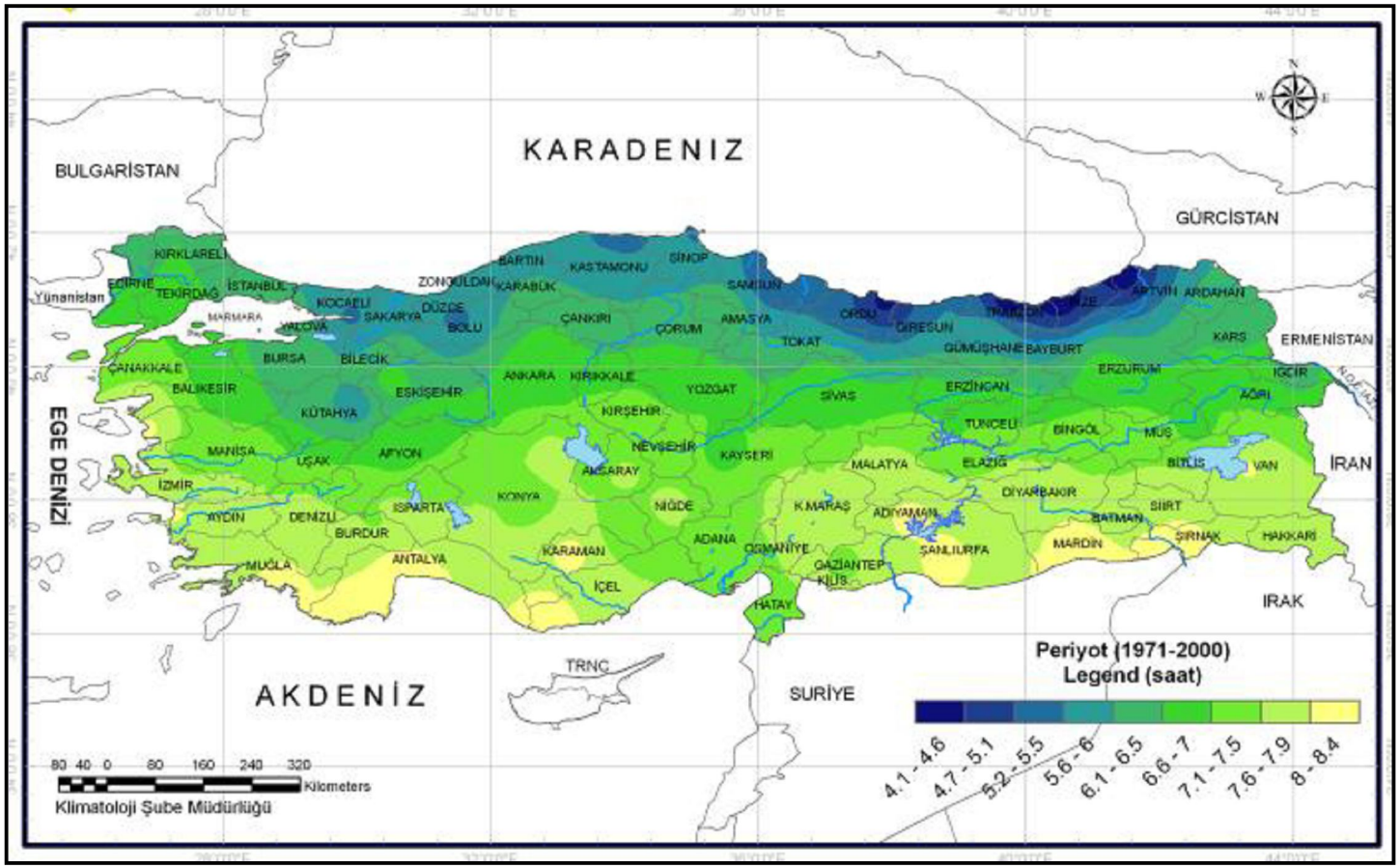


Figure 61. Annual Mean Sun Time in Turkey

Figure 62. Mean Number of Summer Days in Turkey for the Time Period Between 1971 and 2000

The Methods of Categorization of Drought

The first one is based on the formula that was developed by Prof. Dr. Akgün AYDENİZ in 1973. Aydeniz (1985), said that using only precipitation and temperatures parameters are not enough in especially defining the drought periods and indis. In addition, she claims that to take into account the relationships between humidity and precipitation and between temperature and sun time will give better results in getting values approximate to the real (Table 32).

Table 32: The Values of Indis According to the Method of Aydeniz

Nks	Kks	Indis
<0.40	>2.50	Desert
0.40–0.67	1.50–2.50	Very drought
0.67–1.00	1.00–1.50	Drought
1.00–1.33	0.75–1.00	Little drought
1.33–2.00	0.50–0.75	Little Humidity
2.00–4.00	0.25–0.50	Humidity
>4.00	<0.25	Wet

Source**:** Bozkurt, Ö., 1996, Aydeniz Metodu'nun Türkiye'ye Uyarlanması - Adaptation of Aydeniz Method in Turkey, Master Thesis, A.Ü. Social Science Institute, Ankara

Secondly, Standardized Precipitation Index-SPI is defined by dividing the difference between the precipitation in main period and the mean by standard deviation (McKee et. al., 1993). The analysis of drought for past can be made with the method SPI and also the expectations of drought for future can be made with this method (Kömüşçü et. al., 2000) (Table 33).

Table 33: Index Values and Categorization According to the Method SPI

SPI İNDİS DEĞERLERİ	SINIFLANDIRMA	CLASSIFICATION
2.0 ve fazla	Olağanüstü Nemli	Exceptionally Moist
1.60 ile 1.99	Aşırı Nemli	Extremely Moist
1.30 ile 1.59	Çok Nemli	Very Moist
0.80 ile 1.29	Orta Nemli	Moderately Moist
0.51 ile 0.79	Hafif Nemli	Abnormally Moist
0.50 ile -0.50	Normal Civarı	Near Normal
-0.51 ile -0.79	Hafif Kurak	Abnormally Dry
-0.80 ile -1.29	Orta Kurak	Moderately Dry
-1.30 ile -1.59	Şiddetli Kurak	Severely Dry
-1.60 ile -1.99	Çok Şiddetli Kurak	Extremely Dry
-2.0 ve düşük	Olağanüstü Kurak	Exceptionally Dry

Source: http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/spi.html

Thirdly, Percent of Normal Index-PNI is the most basic index of drought indexes and got in percentage by dividing the precipitation in main period by the mean. It is used 12 months or less periods of the precipitation to calculate PNI (Willeke et al., 1994) (Table 34).

Table 34: Index Values and Categorization According to the Method PNI

PERIOD	NORMAL AND OVER (No Risks)	ABNORMALLY DRY (Start to Monitoring)	MODERATELY DRY (Warning)	SEVERELY DRY (Emergency)
1	Bigger than %75	%65 – %75	%55 – %65	Smaller than %55
3	Bigger than %75	%65 – %75	%55 – %65	Smaller than %55
6	Bigger than %80	%70 – %80	%60 – %70	Smaller than %60
9	Bigger than %83,5	%73,5 – %83,5	%63,5 – %73,5	Smaller than %63,5
12	Bigger than %85	%75 – %85	%65 – %75	Smaller than %65

Source: Maryland Drought Information, Maryland Department of the Environment

APPENDIX C

THE CONTRIBUTION OF THE TOURISM TO THE CLIMATE CHANGE

WMO's commitment to explore the climate change-tourism relationship took on more momentum in November 2005, when the Commission for Climatology established its new Expert Team on Climate and Tourism. This team was tasked: i) to develop methodologies to establish statistical relationships between meteorological conditions and tourist frequency and destination; and ii) to assess the impact of climate variability and climate change on the tourism industry to include:

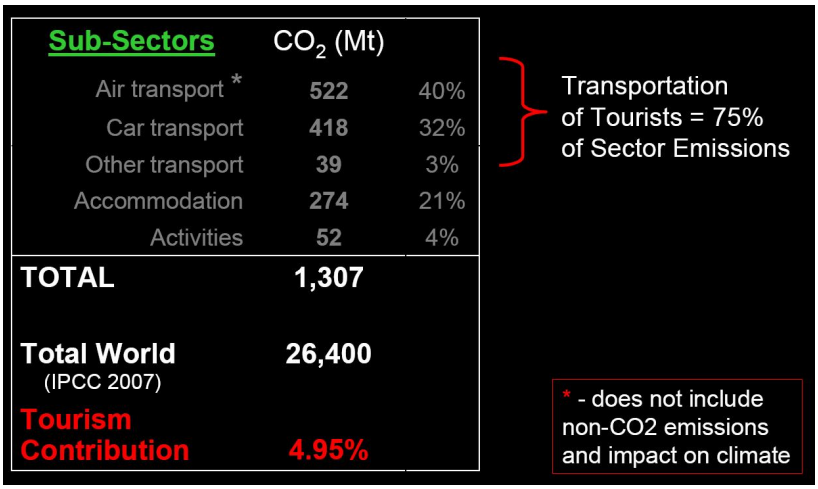
- changes in precipitation patterns and extremes;
- changes in ocean temperature as the latter contributes to coral bleaching and to high-energy tropical cyclones, amongst others;
- the impacts on tourism of sea-level rise, shifts in biodiversity, storm surge waves, erosion of shores and beaches, shifts in seasonality;
- the role of weather, climate and water in infrastructure damage and disruption to key services in terms of availability of water, energy and food.

This study outlines not only the impacts of climate change on tourism, but also recognizes that tourism activities are a contributor to greenhouse gas emissions, and recommends actions to mitigate these effects.

The tourism sector is a non-negligible contributor to climate change through GHG emissions derived especially from the transport and accommodation of tourists. Tourism must seek to significantly reduce its GHG emissions in accordance with the international community, which at the 'Vienna Climate Change Talks 2007' recognized that global emissions of GHG need to peak in the next 10-15 years and then be reduced to very low levels, well below half of levels in 2000 by mid-century. The tourism sector cannot address the challenge of climate change in isolation, but must do so within the context of the broader international sustainable development agenda. The critical challenge before the global tourism sector is to develop a coherent policy strategy that decouples the projected massive growth in tourism in the decades ahead from increased energy use and GHG emissions, so as to allow tourism growth (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 4).

According to Advanced Summary of Climate Change and Tourism: Responding to Global Challenges Report (2007), the contribution of tourism to human induced climate change has never been comprehensively assessed. It is represented that the first attempt to calculate emissions of CO_2 from three main tourism sub-sectors - transportation, accommodations, and activities - as well as the contribution to radiative forcing (i.e. including all greenhouses gases) (Table 35). Table 36 shows that, in 2005, transport generated the largest proportion of CO_2 emissions (75%) from global tourism, with approximately 40% of the total being caused by air transport alone. Emissions from accommodation and activities were estimated to be substantially lower than transport emissions, but emissions from the accommodation sub-sector are also not negligible (UNWTO-UNEP-WMO, Advanced Summary, 2007, p: 13).

Table 35: Global Tourism Emissions in 2005: CO_2 Only



Source: Climate Change and Tourism: Responding to Global Challenges, Technical Report, 2007

Table 36: If Tourism was a Country

Rank	Country	Percentage of total emissions (2005)
1	United States	22.2 %
2	China	18.4 %
-	*European Union*	11.4 %
3	Russia	5.6 %
-	**Global Tourism Sector**	**4.95%**
4	India	4.9 %
5	Japan	4.6 %
6	Germany	3.0 %
7	Canada	2.3 %
8	United Kingdom	2.2 %
9	South Korea	1.7 %
10	Italy	1.7 %

Source: Climate Change and Tourism: Responding to Global Challenges, Technical Report, 2007

International and domestic tourism emissions from three main sub-sectors are estimated to represent between 4.0% and 6.0% of global emissions in 2005, with a best estimate of 5.0% (Table 53). Globally, this estimation, and a significantly higher share of the radiative forcing caused by all greenhouse gases, is attributed to tourism (UNWTO-UNEPWMO, 2008). In industrialized countries, emissions from tourism may, however, be higher in both relative and absolute (per capita) terms than the global average (Becken, 2002b).

When considering the impact of global climate on tourism a duality becomes apparent: on the one hand, tourist destinations and the tourism industry are potential victims of climate change. On the other hand, the industry contributes to climate change in various ways, the best known being the emission of greenhouse gases by road and air travel.

Global priorities are shifting. Climate change is now seen as a fundamental issue with major implications for tourism, requiring tourism to reduce its contribution to greenhouse gas emissions and destinations to adapt to changes in the pattern of demand and in the type of tourism they can offer. In fact, quoting another Commission Communication, “Tourism can become the victim of its own success if it does not develop in a sustainable way”.

The identification of tourism as an important contributor to climate change has become both an important driver for efforts to develop more sustainable forms of tourism, and a challenge to the concept of sustainable tourism itself. Work to create more sustainable tourism has been designed to solve local issues, but climate change presents a new type of problem. Greenhouse gas emissions can impact destinations everywhere and these emissions are primarily created by travel between source markets and destinations (Gössling, S., 2008).

Emissions

Despite energy-efficiency and renewable-energy initiatives, tourism remains an energy-intensive industry and a significant emitter of greenhouse gases, especially CO_2. As mentioned above, air travel in particular is a major contributor to CO_2 emissions, and travel to a destination can contribute as much as 80% of an international tourist' total CO_2 emissions (Hart, P. et al.).

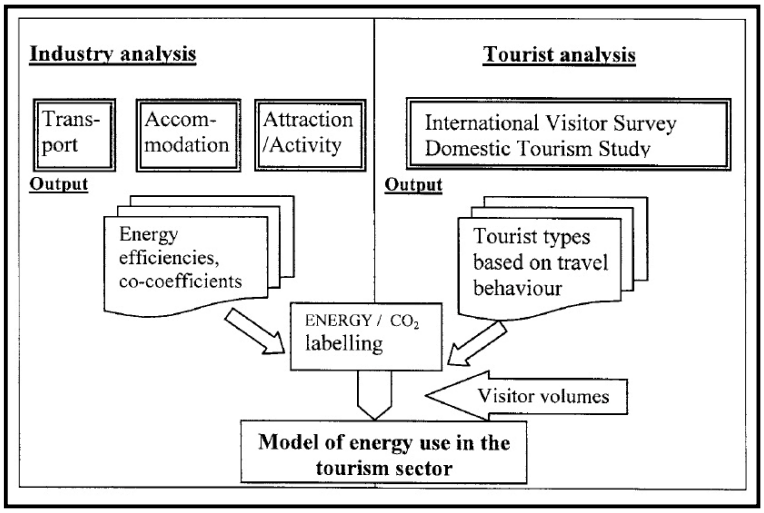
This part of the work is the first attempt to examine the methods of measuring CO_2 emissions from both international and domestic tourism and thus the contribution of tourism to human-induced climate change. It provides an overview of CO_2 emissions, using an approach specifying different tourism activities (transport, accommodation, and other activities). The goal is to provide a first baseline for the discussion on tourism's contribution to climate change.

Climate change is often expressed as a change in average surface temperatures, resulting from changes in the planetary radiative balance, and determined by the concentration of greenhouse gases in the atmosphere. In this part of the thesis, the contribution of tourism to climate change is assessed using CO_2 emissions. CO_2 is the most important greenhouse gas from human activities (Climate Change and Tourism: Responding to Global Challenges, 2008, p: 121).

This part suggests two approaches for accounting for carbon dioxide emissions from tourism: a bottom-up analysis involving industry and tourist analyses, and a top-down analysis using environmental accounting. In other words, it presents two different methodologies – bottom-up and top-down – for deriving an energy consumption and carbon dioxide emission profile for tourism.

Bottom-up Analysis

The bottom-up methodology entails separate analyses of energy consumption and carbon dioxide emissions by typical tourism industries and tourist behavior. These are integrated into a final model of energy-relevant travel behavior. The model enables us to examine the influence of the energy efficiency of industry and tourist behavior. The final model as shown in Figure 63 is described in more detail below (Becken, S. & Patterson, M., 2006, p: 325).



Source: Becken, S. & Patterson, M., 2006, p: 325

Figure 63. Bottom-up Approach to Analyze Energy Use of Tourism

The methodology does not include restaurants and other catering services, because of their heterogeneous nature, which would increase the sampling frame considerably, but probably would make little difference to the estimates of total emissions of carbon dioxide (Becken, S. & Patterson, M., 2006, p: 326).

Energy Intensities of Industries: Energy intensity, such as energy used per passenger kilometer, provides a valuable parameter to measure energy efficiency, whereby energy efficiency refers to the ratio between the energy input (e.g. electricity consumed by a light bulb) and the useful energy output (light energy provided by the bulb) (Becken, S. & Patterson, M., 2006, p: 326). In tourism, energy is used for transport, accommodation and activities. Transport includes travel to and from the destination (Origin to Destination, or O/D transport), as well as travel at the destination (Gössling, S. et. al., 2005, p: 419).

Transport: Generally, there exist national data on the energy intensity of most transport modes in the form of 'energy use per passenger kilometer' or 'energy use per vehicle kilometer' (Becken, S. & Patterson, M., 2006, pp: 326–327).

Accommodation: Each country has a characteristic mix of different accommodation categories, such as luxury hotels, all-inclusive resorts (e.g. UK CEED, 1998). Energy use data for different types of accommodation are usually not readily available, and therefore this information has to be collected from businesses (Becken, S. & Patterson, M., 2006, p: 328).

A survey should collect data on the annual consumption of electricity, fossil fuel and other solid fuel (usually wood, which can be ignored in terms of carbon dioxide emissions) directly consumed in running the accommodation building (and, if desired, business vehicles). Additionally, information on the business (i.e. number of visitor-nights in the year corresponding to the energy figures, operating time period, capacity, size, technology and amenities) is necessary to derive measures such as energy use per visitor-night and make optimum use of the energy information received. The total annual energy consumption and carbon dioxide emissions for each business are calculated by summing the energy consumed annually for each fuel type by that business and applying carbon dioxide conversion factors (Becken, S. & Patterson, M., 2006, p: 328).

The UNWTO (2001) distinguishes between a wide range of accommodation establishments, such as hotels, youth hostels or second homes, but there is no comprehensive data on the number of beds and energy use in each respective category. Any detailed calculation of emissions in the accommodation sector in a specific country would thus consider the various accommodation establishments, the numbers of guest nights spent in these, and multiply these by emissions per guest night. Energy use and corresponding emissions are difficult to estimate, as there is no comprehensive information available for the various categories.

Attractions and Activities: Energy data are typically not available for tourist attractions or activities, unless they are publicly owned operations, for example large museums. The mix of typical tourist activities and attractions depends on the type of tourist destination (e.g. Becken & Simmons, 2002), and decisions have to be made concerning the sampling frame, for example by using tourism directories. As described for the accommodation industry, a survey needs to be administered to collect energy-relevant information (Becken, S. & Patterson, M., 2006, p: 328).

Tourist Behavior: The tourists themselves are at the centre of the bottom-up analysis, because they are the source of the environmental impact resulting from their travel behavior. When attempting to analyze tourists' energy use and carbon dioxide emissions, however, it is impossible to collect this information directly from tourists. These new variables are called travel choices, measured – among others – as kilometers, number of nights, or number of visits. Both surveys include detailed information on tourists' itineraries, including every single overnight stop in the country, transport modes used on each travel sector, accommodation choices, and attractions visited.(i.e. distance [km] between A and B, etc.) (Becken, S. & Patterson, M., 2006, p: 329).

Integration of Industry and Tourist Analyses: This travel behavior is multiplied with average energy intensities obtained in the industry analyses to derive energy use per trip for each tourist type. The energy use per tourist type is extrapolated to the whole population of tourists, taking into account the mix of tourist types, known from the cluster analyses. Finally, the total energy used by tourism is determined by summing the energy use of all domestic and international tourist types in one year (Becken, S. & Patterson, M., 2006, p: 329).

Top-down Analysis

The fundamental idea is that the biophysical environment is both a source of resources for the tourism sector (energy) and a sink for its outputs (greenhouse gases). The framework provides a direct platform for the application of a number of analytical methods, such as lifecycle assessment of the tourism sector using input-output methods (e.g. Wright, 1975), eco-efficiency analyses, ecological footprint calculations (e.g. Bicknell et al., 1998) and scenario and forecasting analyses (Becken, S. & Patterson, M., 2006, p: 331).

Step-wise Methodology: This top-down analysis is based on constructing an input-output model with an embedded tourism sector (Patterson, M. G. & McDonald, G., 2004). The tourism sector purchases are represented by a column of data that quantifies purchases drawn from Intermediate Demand (Quadrant 1) and Primary Inputs (Quadrant 3). Tourism sector sales are represented by a row of data that quantifies sales to Intermediate Demand (Quadrant 1) and to Final Demand (Quadrant 2). Essentially, this enables the tourism sector interactions with other sectors in the economy to be quantified, along with its use of energy and its production of CO_2 emissions (Becken, S. & Patterson, M., 2006, p: 331).

Special Circumstances of Turkey about Greenhouse Gas Emissions and Removals

After looking at the methods about the measuring the contribution of tourism to climate change, it is sensible to make analysis for Antalya. However, before making, it is helpful to examine the statistics o Turkey. In Turkey, according to the First National Communication of Turkey on Climate Change (2007), the GHG emissions rose steadily between 1990 and 2004 due to Turkey's steady population growth and industrialization after the mid-1990s. However, the share of emissions from the energy sector within the total GHG emissions fell from 78% to 76,7% during this period. This fall is a result of several changes including:

i) A shift from coal to natural gas in electricity generation and residential consumption,
ii) The introduction of alternative fuel sources,
iii) New engine technology in the transport sector and the removal of old, polluting cars from the register.

Turkey's total GHG emissions rose from 170,1 Tg to 296,6 Tg CO_2 eq between 1990 and 2004 (First National Communication of Turkey on Climate Change, 2007, p: 63). While the amount of primary energy resourced CO_2 per capita in 1990 is 2,29, it increased to 2,77 in 2002. When it is compared with the average value of the OECD countries and Annex I and II, it can be said that it is low. In addition, the value of 2,77 are lower than the average of the world (Table 37).

Table 37: The Amount of Primary Energy Resourced CO_2 per capita (CO_2 ton / person)

Years	Turkey (OECD)	Korea (OECD)	Portuguese (OECD)	Annex-I Avr.	Annex-II Avr.	OECD Avr.	PEGU Avr.	World Avr.
1990	2.29	5.28	4.00	11.54	12.21	10.57	11.48	3.95
2000	3.02	9.10	5.83	11.12	12.86	11.04	8.14	3.88
2002	2.77	9.48	6.07	11.09	12.80	10.96	8.19	3.89

Source: IEA, 2004 Edition

Turkey as an Annex I country had the ratio of 3.3 ton CO_2 emissions per capita in 2003. The country is listed at the bottom among OECD, EU-15 countries and also below the world level holding respective ratios of 11.1, 9.0 and 4.0 ton CO_2 per capita in 2003 (First National Communication of Turkey on Climate Change, 2007, p: 64) (Table 38).

Table 38: GHG and CO_2 Emission Indicators for Turkey and Relative Parties of UNFCCC (2003)

	CO_2 Emissions (Tg)	CO_2 /Per capita (ton)	GHG Emissions without LUCF CO_2 eq (Tg)	GHG Emissions without LUCF /capita CO_2 eq (ton)
EU-15[1]	3,447	9.0	4,180	10.9
EU-25[1]	4,064	9.0	4,925	11.0
OECD[2]	12,780	11.1	NA	NA
Annex-I Countries[3]	14,289	12.2	17,288	14.7
Non-EIT[1] Parties[3]	11,633	13.4	13,855	16.0
World[4]	24,983	4.0	NA	NA
Turkey[5]	231,0	3.3	286.3	4.1

Source: [1] Emission data from EEA Report No:8/2005, Greenhouse Gas Emission Trends and Projections in Europe 2005, population data from EUROSTAT
[2] OECD Fact-book for year 2003
[3] UNFCCC Key GHG Data : GHG Emissions Data for 1990-2003
[4] Emission Data from OECD Statistics (2006), Population data from UNFPA (2006)
[5] GHG Data from Turkey's First GHG Inventory Submitted to UNFCCC in August 2006 population data from TURKSTAT(2006)

The Contribution of Tourism to the Climate Change in Antalya

In the analysis that has been made for Antalya, the bottom-up analysis was used and it is tried to examine that whether tourism has contribution on climate change in Antalya or not by using the questionnaires. The main purpose in here is to be appeared that the sector has a role in climate change of which it is discussed on the impacts. While making analysis, some acceptations are made and some data is taken from the questionnaires. In addition, some is not evaluated in the calculations or they are not taken into consideration because they can not be able to get due to the time and other restrictions. In this regard, the analysis and calculations that have been done for examining the contribution of tourism to the climate change in Antalya are below.

In the questionnaires, both decision makers and firms are asked whether they think that there is contribution of tourism sector to the climate change or not in order to understand the awareness of them. 83.33% of the decision makers said that there is contribution of tourism sector to the climate change and half of them show "high energy consumption" as the cause of this contribution (Table 39).

Table 39: The Cause of the Contribution of Tourism Sector to the Climate Change (According to Decision Makers)

OPTIONS	NUMBER OF QUESTIONNAIRE	PERCENTAGES
High energy consumption	10	50
High emissions of CO_2 and the other GHGs	6	30
Negative impacts on ozone layer	4	20
Other	0	0
TOTAL	20	100

55% of the firms said that there is no contribution. However, 54.6% of the firms thinking that there is contribution of the sector said that the cause of the contribution is "high energy consumption", which means that both decision makers and firms consider that the basic problem of the sector about climate change is related with high energy consumption (Table 40).

Table 40: The Cause of the Contribution of Tourism Sector to the Climate Change (According to Firms)

OPTIONS	NUMBER OF ANSWERS	PERCENTAGES
High energy consumption	18	54.6
Negative impacts on ozone layer	8	24.2
High emissions of CO_2 and the other GHGs	7	21.2
Others	0	0
TOTAL	33	100

To analyze the contribution of tourism to the climate change in Antalya, the bottom-up analysis, which was mentioned above, is planned to be used and to get the data necessary for the analysis, some questions were asked to the firms. In the questionnaires prepared for firms, to analyze the contribution of Antalya tourism to the climate change, the annual energy consumption and accommodation

statistics are asked. These values are necessary to calculate the energy consumption in Antalya in tourism sector. In one question, that how much electricity and other energy resources (fuel, gas, LPG, etc…) is consumed annually (according to the periods/seasons) is asked. The answers of these questions are reported as Turkish Liras (TL) for electricity consumption due to attainability. However, in the analysis, some calculations are made and converted the values of kilo watt (kWh).

In other question, accommodation statistics are asked to the firms. That how many customers are accommodated annually (according to the periods/seasons) is tried to examine. In accordance with these answers, the value of energy use per guest night for each firm (kWh CO2) was calculated. Then, the values of each surveyed firms are summed up and divided to 40 to find the average value. Thus, the average value of energy use per guest night was calculated. After that this value was converted to mega joule (MJ) value to use in the calculation of CO_2 emission (Table 41).

Table 41: The Measurement of the Energy Intensities

Type of Accommodation	Energy Use per Guest Night (kwh CO_2)*	Energy Use per Guest Night (MJ)
Hotels	0.327	1.1772

*: 1 kWh is 3.6 MJ (mega joule).

In addition, the other values that are necessary for the bottom-up analysis such as emissions from transportation and activities are very hard to calculate for Antalya in the research time due to time and money problems. In addition, in Turkey, Antalya, there are no such researches that can define the necessary values and help calculating the statistics that will be used in the analysis. Therefore, instead of proceeding the whole bottom-up analysis, only calculations that are related with accommodation part is decided to be made. Therefore, the values that are related with accommodation can be compared with the calculations in different countries and with the world values.

To be able to calculate the accommodation emission factor it is necessary the number of tourists and the emission factor. The calculation of emissions from accommodation can be achieved by multiplying the number of tourists and an emission factor (CO_2 per guest night). The total number of international guest nights is 6.642.079 and as an emission factor (CO_2 per guest night) value 19 kg/per guest night is used because UNWTO define this value for developing countries as CO_2 emission factor. Thus, according to the calculations, total CO_2 emissions associated with accommodation are estimated at 0,1261 Mt (Table 42).

Table 42: The Measurement of the Total CO_2 Emissions

THE NAME OF THE FACTORS	VALUES
Accommodation CO_2 Emission Factor*	19
Total Guest-Nights (billion)**	0.006642
Total CO_2 Emission (Mt)	0.1261

*: Source: UNWTO

**: Source: Ministry of Culture and Tourism (2007)

In the results, it can be seen that total CO2 emissions associated with accommodation are estimated at 0,1261 Mt while it is 274 for the total tourism in the world. Thus, the % of Antalya, as seen above, in contribution is 0,046.

APPENDIX D

QUESTIONNAIRES

QUESTIONNAIRE FORM FOR MARKET STRUCTURE

A. INFORMATION ABOUT THE RESPONDENTS

1) Age ☐ 35- ☐ 36-55 ☐ 56+

2) Gender ☐ Male ☐ Female

3) Education

☐ Primary education
☐ High School or equivalent (Vocational/technical school)
☐ Bachelor's degree ☐ Master's degree ☐ Doctoral degree

4) Name of the Company/Institution _____

5) What is the activity provided by your company/institution?

Accommodation

☐ 5 star hotel ☐ 4 star hotel ☐ 3 star hotel ☐ less than 3 star hotel
☐ hostel ☐ youth hostel ☐ camping park

☐ **Tour Operator**
☐ **Incoming Travel Agency**
☐ **Rent-a-car**
☐ **Yacht Club/Marina**
☐ **Convention Centre**
☐ **Museum**

	Events		
	Organization		**Casino**
	Golf Course		**Other:**

6) Position in the Company/Institution

	Directive Board		Administrator		Other

B.KNOWLEDGE ABOUT CLIMATE CHANGE

7) Do you believe we can already detect the occurrence of an increase in temperature or this is something we only suspect may occur in the future?

	Climate change is something that will happen in the future
	No climate change has occurred and none will
	Already, there is an increase in temperature on the Earth
	Unsure, don't know

8) Are there any signs indicating climate change in Antalya?

	Change in temperature
	Change in precipitation
	Change in flora-fauna/vegetation
	Change in river flow and risk of drought
	Change in agricultural production
	Change in flood frequency

C. THE AWARENESS ABOUT THE CLIMATE CHANGE

9)

1 (completely disagree) to 7 (completely agree)

- **Awareness of consequences for oneself**

1. Laws that protect environment limit my choices and personal freedom... ☐
2. Protecting the environment will threaten jobs for people like me... ☐

- **Awareness of consequences for others**

1. The effects of climate change on public health are worse than people realize ☐
2. Pollution generated in one country harms people all over the world... ☐

- **Awareness of consequences for biosphere**

1. Over the next several decades, thousand of species will vanish... ☐
2. Claims that there is a climate change is exaggerated (reversed statement)... ☐

10) Do you feel your costumers are aware of potential climate change? If yes, what is the level of their awareness and concern?

- ☐ No
- ☐ Yes, but minimal understanding of climate change implications
- ☐ Yes, but feel evidence is inconclusive that climate change is occurring
- ☐ Yes, people are aware of possible negative consequence of climate change

11) What climate change-related information would be of the main concern to your costumers?

- ☐ a) Don't know
- ☐ b)Public is not likely to be interested
- ☐ c) The public is interested and his main concerns are:
  - ☐ Loss of existing habitat and flora-fauna
  - ☐ The way life style of people will change
  - ☐ General climate change information
  - ☐ Parameters on precipitation and drought risk
  - ☐ Impact of climate change on agricultural production
  - ☐ Future water quantities
  - ☐ Future water quality
  - ☐ Effects on public health
  - ☐ Potential flooding frequency
  - ☐ Excessive heath in the summer

D. INFORMATION ABOUT THE INSTITUTION

12) The Organization is in:

☐ Public sector ☐ Private sector ☐ Other……..

13)

If public	**If private**
☐ National	☐ Private ownership
☐ Regional	☐ National corporation (several units)
☐ Local	☐ Transnational corporation

14) How do you qualify the following policies regarding your activity?

Policies/ Regulations	Very negative	Negative	Irrelevant	Positive	Very positive
Tax and Economy Laws					
Local Land Management and Planning					
Tourism Encouragement Law/Boosting Measures					
Quality and Security Regulation and Supervising					
Cultural and Heritage Conservation Laws					
Environmental Laws					
Coastal Laws					
Parks and Natural protected Areas					
Water Laws					

E. THE MEASURING THE CONTRIBUTION OF TOURISM SECTOR TO THE CLIMATE CHANGE

15) Do you think that there is contribution of tourism sector to the climate change?

☐ No ☐ Yes

If yes, please explain how……..

- ☐ High energy consumption
- ☐ Negative impacts on ozone layer
- ☐ High emissions of CO_2 and the other GHGs
- ☐ others

16) Do you know anything about which types of transportation do the customers prefer? Is there any research/work about this?

.....

17) Do you know anything about from where do the customers come? Is there any research/work about this?

.....

18) How much electricity and other energy resources (fuel, gas, LPG, etc…) is consumed annually in your hotel? (According to the periods/season)

.....

19) How many customers are accommodated annually in your hotel? (According to the periods/seasons)

.....

F. THE AWARENESS ABOUT THE RELATION BETWEEN THE CLIMATE CHANGE AND TOURISM

20) Do you feel that your costumers are increasingly concerned with the environment?

☐ Yes ☐ No ☐ Don't know

21) How does environmental awareness reflects in practices and consumptions:

☐	decrease in water consumption
☐	decrease in bath towels use
☐	decrease in the use of air-conditioning
☐	decrease in energy consumption
☐	concern with pool water treatment procedures
☐	stronger demand for eco-friendly transportation
☐	stronger demand of nature based activities (wild life watching, gardens and flowers, etc)
☐	increase in the number of complaints regarding environmental practices in my institution/company
☐	Other……..

22) Have you changed your practices to address environmental issues?

☐ No ☐ Yes

If so, in which way:

☐	Promoting eco-friendly consumption patterns in your costumers
☐	Developing the supply of nature-based activities
☐	New procedures in water consumption and treatment
☐	New procedures in energy consumption
☐	New procedures in waste treatment
☐	Using products less damaging for the environment
☐	Using environmental best practices as a marketing strategy

☐ Using environmental accredited certifications (e.g. ISO 14000)

23) Do you feel that perceptions on climate changes have an impact on the tourist demand?

In tourism volume	☐	more tourists
	☐	less tourists
In seasonality		
(Summer)	☐	more tourists
	☐	less tourists
(Winter)	☐	more tourists
	☐	less tourists
(Intermediate Seasons)	☐	more tourists
	☐	less tourists
In tourist practices		
(Summer)	☐	more indoor activities
	☐	more outdoor activities
(Winter)	☐	more indoor activities
	☐	more outdoor activities

24) Do you think that climate change will impact on tourist preferences?

☐ No ☐ Yes

25) Are there any measures being taken to cope with climate change?

☐ No ☐ Yes

Which measures? (e.g. changes in schedules, architectural changes)……

26) Are you planning any measures to cope with climate changes in the next few decades?

☐ No ☐ Yes

Which measures? (e.g. changes in schedules, architectural changes)……

27) Are there any precautions by your firm to prevent the contribution of tourism activities to the climate change?

☐ No ☐ Yes

If yes which types of precautions:

☐ To decrease the consumption of the energy

☐ To encourage using the alternative energy resources

☐ To decrease the emissions of CO_2 and the GHGs

☐	To save about water using
☐	To provide efficient management of water resources
☐	To provide waste management
☐	To develop implementation about recycling
☐	To minimize the loses/damaging of natural resources
☐	To work on developing systems that are sensitive to the environment
☐	To work on awareness of the relation between the climate change and tourism
☐	To organize education programs and seminars
☐	Others

28) Do you plan to take any precautions, for future, by your firm to prevent the contribution of tourism activities to the climate change?

☐ No ☐ Yes

If yes which types of precautions:

☐	To decrease the consumption of the energy
☐	To encourage using the alternative energy resources
☐	To decrease the emissions of CO_2 and the GHGs
☐	To save about water using
☐	To provide efficient management of water resources
☐	To provide waste management
☐	To develop implementation about recycling
☐	To minimize the loses/damaging of natural resources
☐	To work on developing systems that are sensitive to the environment
☐	To work on awareness of the relation between the climate change and tourism
☐	To organize education programs and seminars
☐	Others

FUTURE SCENARIOS for YEAR 2071

Future scenario 1

Temperature increase of 3 °C[1] and precipitation decrease of 20 mm monthly. Average daytime temperature of 31°C** in July and August and 13°C*** in winter. Warmer winters. Higher frequency of heat waves.

29) The above scenario is negative for visiting Antalya with a temperature increase of 3, 5-4 °C .....1 (completely disagree) to 7 (completely agree)

[1] based on the trends between 1961-1990

** 1975-2006 average values in July and August is 28°C

*** 1975-2006 average values in December, January and February is 10°C

30) The above scenario is positive for visiting Antalya with a temperature increase of 3,5-4 °C

- during summer … 1 (completely disagree) to 7 (completely agree)
- during autumn …
- during winter …
- during spring …

Future scenario 2

Temperature increase of 5 °C with an average daytime temperature of 33°C** in July and August and precipitation decrease of 30 mm monthly. Almost no winters with an average temperature of 15,5 °C*** . Warmer summer. Higher frequency and longer heat waves

31) It is negative for visiting Antalya with a temperature increase of 5 °C .....1 (completely disagree) to 7 (completely agree)

32) The above scenario is positive for visiting Antalya with a temperature increase of 5 °C

- during summer … 1 (completely disagree) to 7 (completely agree)
- during autumn …
- during winter …
- during spring …

KONAKLAMA VE DİĞER TURİZM FİRMALARI İLE YAPILACAK ANKET

A. CEVAPLAYAN KİŞİ HAKKINDA GENEL BİLGİ

1) Yaş ☐ 35- ☐ 36-55 ☐ 56+

2) Cinsiyet ☐ Erkek ☐ Kadın

3) Eğitim durumu

☐ İlköğretim
☐ Lise veya dengi(meslek lisesi/teknik okul)
☐ Üniversite ☐ Yüksek lisans ☐ Doktora

4) Kurumun adı …….....

5) Kurumunuz/firmanınz tarafından sağlanan hizmet nedir?

Konaklama

☐ 5 Yıldızlı Otel ☐ 4 Yıldızlı Otel ☐ 3 Yıldızlı Otel
☐ Butik Otel ☐ Tatil Köyü ☐ 3 Yıldızdan Az Otel

☐ **Tur Operatörü** ☐ **Yat Klubü**
☐ **Seyehat acentası** ☐ **Gösteri/Kongre merkezi**
☐ **Araç kiralama** ☐ **Müze**
☐ **Organizasyon Şirketi** ☐ **Eğlence yeri**
☐ **Golf Kursu** ☐ **Diğer.....**

6) Kurumdaki pozisyonu

☐ İdari Kadro ☐ Yönetici ☐ Diğer.....

B. İKLİM DEĞİŞİKLİĞİ HAKKINDA BİLGİ

7) Şimdiden hava sıcaklıklarında bir artış olduğunu düşünüyor musunuz yoksa bu durum sadece gelecekte olmasından süphelendiğimiz bir şey mi?

☐ İklim değişikliği gelecekte olacak bir durum
☐ İklim değişikliği şimdiye kadar olmadı, gelecekte de olmayacak
☐ Şimdiden etkisi oldu. Bütün dünyada hava sıcaklıklarına artış oldu.

☐ Emin değilim, bilmiyorum

8) Antalya'da iklim değişikliği belirtisi olarak nitelendirilebilecek herhangi bir işaret var mı?

☐ Hava sıcaklığında değişim
☐ Yağış miktarında değişim
☐ Flora-fauna/bitki örtüsünde değişim
☐ Akarsu akışında değişim, kuraklık riski
☐ Tarımsal üretimde değişim
☐ Sel sıklıklarında değişim

C. İKLİM DEĞİŞİKLİĞİ KONUSUNDA FARKINDALIK

9)

1 (kesinlikle katılmıyorum) - 7 (tamamen katılıyorum)

- **Kendisiyle ilgili sonuçlardan farkındalık**

1. Çevreyi koruyan kanunlar seçimlerimi ve kişisel özgürlüğümü sınırlandırıyor ☐
2. Çevreyi korumak benim gibi kişilerin işleri için tehdit yaratıyor ☐

- **Başkalarıyla ilgili sonuçlardan farkındalık**

1. İklim değikliğinin insan sağlığı üzerindeki etkisi farkedilenden çok daha fazla ☐
2. Bir ülkede yaratılan kirlilik bütün dünyadaki insanlara zarar verir ☐

- **Dünyayla ilgili sonuçlardan farkındalık**

1. Önümüzdeki yıllarda, binlerce tür canlı yokolacak. ☐
2. İklim değişikliği konusunun abartılıdığını düşünüyorum ☐

10) Müşterilernizin genel olarak potansiyel iklim değişikliğinin farkında olduğunu düşünüyor musunuz? Evetse, bu konudaki farkındalık ve kaygılarının derecesi nedir?

☐ Hayır
☐ Evet, ama iklim değişikliğnden doğabilecek zararların fazla farkında değiller
☐ Evet, ama iklim değişikliği olduğuna dair yeterli bulgu olmadığını düşünüyorlar
☐ Evet, insanlar iklim değişikliğinden doğabilecek olumsuz sonuçların farkındalar

11) Müşterilerinizi iklim değişikliğiyle ilgili en çok hangi bilgi endişelendirir?

☐ a) Bilmiyorum
☐ b)Toplum çok ilgili gözükmüyor
☐ c)Toplum ilgili ve başlıca endişeleri:

- ☐ Mevcut doğal çevrenin ve flora-faunanın yokolması
- ☐ İnsanların yaşam tarzlarının değişecek olması
- ☐ İklim değişikliği hakkında genel bilgi
- ☐ Yağış ve kuraklık parametreleri
- ☐ İklim değişikliğinin tarımsal üretim üzerindeki etkisi
- ☐ Gelecekteki su miktarı
- ☐ Gelecekteki su kalitesi
- ☐ İnsan sağlığı üzerindeki etkisi
- ☐ Potansiyel sel sıklıkları
- ☐ Yazın olabilecek aşırı sıcaklıklar

D. KURUM HAKKINDA GENEL BİLGİ

12) Firma/kurum

☐ Kamu kurumu ☐ Özel ☐ Diğer……..

13) Kamuysa

- ☐ Ulusal
- ☐ Bölgesel
- ☐ Yerel

Özelse

- ☐ Özel mülkiyet
- ☐ Ulusal ortaklık (çeşitli birimler)
- ☐ Uluslararası ortaklık

14) Kurumunuzun/firmanınız çalışma alanıyla ilgili olarak aşağıdaki politikaları nasıl değerlendiriyorsunuz?

Politikalar/ Uygulamalar	Çok Olumsuz	Olumsuz	İlgisiz	Olumlu	Çok Olumlu
Vergi ve Ekonomi Yasaları					
Yerel Arsa Düzenlemesi ve Planlaması					
Turizm Teşvik Yasası/ Destek tedbirleri					
Kalite ve güvenlik uygulamaları ve denetimi					
Kültürel miras ve koruma					

yasaları

Çevre Yasası					

Kıyı Kanunu

Parklar ve Doğal koruma alanları					

Su kanunu

E. TURIZM SEKTÖRÜNÜN IKLIM DEĞIŞIKLIĞINE KATKISININ ÖLÇÜLMESI

15) Turizm sektörünün iklim değişikliği üzerinde katkıları olduğunu düşünüyor musunuz?

☐ Hayır ☐ Evet

Evetse, nasıl olduğu konusunda detay veriniz……..

☐ Enerji tüketiminin yüksek olması

☐ Ozon tabakasına olumsuz etkilerinin olması

☐ CO_2 ve diğer sera gazlarının salınımının yüksek olması

☐ Diğer.....

16) Müşterilerinizin seyahat ederken tercih ettikleri ulaşım türlerini biliyor musunuz? Bu konuda yapılmış bir çalışma mevcut mu?

.....

17) Müşterilerinizin nerelerden geldikleri konusunda bilgi sahibi misiniz? Bu konuda yapılmış bir çalışma mevcut mu?

.....

18) Otelinizde yıllık tüketilen elektrik ve diğer enerji kaynakları (gaz, LPG, benzin, vb) ne kadardır? (Dönemlerine göre)

.....

19) Otelinizde yıllık toplam müşteri ve geceleme sayıları ne kadardır? (Dönemlerine göre)

.....

F. İKLİM DEĞİŞİKLİĞİ VE TURİZM ARASINDAKİ İLİŞKİ KONUSUNDA FARKINDALIK

20) Müşterilerinizin çevreye duyarlılığının arttığını düşünüyor musunuz?

☐ Evet ☐ Hayır ☐ Bilmiyorum

21) Uygulamada ve tüketimde çevreyle ilgili bilincin nasıl bir etkisi olur:

☐	Su tüketiminde azalma
☐	Banyo kağıt havlularının kullanımında azalma
☐	Klima kullanımda azalma
☐	Enerji tüketiminde azalma
☐	Havuz suyu arıtma prosedürlerine ilgi
☐	Çevre dostu ulaşıma daha fazla ihtiyaç
☐	Doğayla ilgili aktivitelere daha fazla ihtiyaç (doğal hayatı gözlemleme, bahçe ve çiçekler, vs.)
☐	Kurumun çevreyle ilgili uygulamalarına şikayetlerin artması
☐	Diğer……..

22) Uygulamalarınızda çevreyle ilgili konulara hitap edecek şekilde değişikler yaptınız mı?

☐ Hayır ☐ Evet

Evetse, ne şekilde:

☐	Müşterilerimize çevre dostu tüketim türlerini teşvik ederek
☐	Doğal kaynaklı aktivitelerin sağlanmasını geliştirerek
☐	Su tüketimi ve arıtımında yeni prosedürler uygulayarak
☐	Enerji tüketiminde yeni prosedürler uygulayarak
☐	Atık arıtımında yeni prosedürler uygulayarak
☐	Çevreye daha az zarar veren malzemeler ve maddeler kullanarak
☐	Pazarlama stratejisi olarak çevre dostu iyi örnekler/uygulamalar kullanarak
☐	Çevreyle ilgili sertifikalar kullanarak (örn. ISO 14000)

23) İklim değişikliğiyle ilgili algının turist taleplerinde farklılığa neden olacağını düşünüyor musunuz?

Turist Yoğunluğunda	☐	Daha fazla turist
	☐	Daha az turist
Sezonlarda		
(Yaz)	☐	Daha fazla turist
	☐	Daha az turist
(Kış)	☐	Daha fazla turist
	☐	Daha az turist
(Ara sezonlar)	☐	Daha fazla turist
	☐	Daha az turist

Turist aktivitelerinde

(Yaz)	☐	Daha fazla iç mekan aktivitesi
	☐	Daha fazla dış mekan aktivitesi
(Kış)	☐	Daha fazla iç mekan aktivitesi
	☐	Daha fazla dış mekan aktivitesi

24) İklim değişikliğinin turist terchilerinde değişikliğe neden olacağını düşünüyor musunuz?

☐ Hayır ☐ Evet

Nedenini açıklayın.....

25) Kurumunuzca, iklim değişikliğiyle başa çıkmak için alınan herhangi bir tedbir var mı?

☐ Hayır ☐ Evet

Hangi tedbirler? (örn. zaman planlarında değişiklikler, mimari değişiklikler).....

26)Önümüzdeki yıllarda, kurumunuz iklim değişikliğiyle başa çıkmak için herhangi bir tedbir almayı planlıyor mu?

☐ Hayır ☐ Evet

Hangi tedbirler? (örn. zaman planlarında değişiklikler, mimari değişiklikler).....

27) Kurumunuzca, turizm faaliyetlerinin iklim değişikliğine olan katkılarını önlemek amacıyla alınan herhangi bir tedbir var mı?

☐ Hayır ☐ Evet

Evetse ne tür tedbirler:

- ☐ Enerji tüketimini azaltmak
- ☐ Alternatif enerji kaynaklarının kullanımını teşvik etmek
- ☐ CO_2 ve diğer gazların salınımını azaltmak
- ☐ Su tüketimi konusunda tasarruf etmek
- ☐ Su kaynaklarının yönetimini sağlamak
- ☐ Atık yönetimini sağlamak
- ☐ Geri dönüşüm uygulamalarını geliştirmek
- ☐ Doğal kaynakların kaybını/ zarar görmesini en aza indirmek
- ☐ Çevreye duyarlı sistemlerin geliştirilmesi konusunda çalışmak
- ☐ Turizm ve iklim değişikliği arasındaki ilişki konusunda bilinçlendirme çalışmaları

	yürütmek
	Eğitim ve seminer programları düzenlemek
	Diğer…….

28) Önümüzdeki yıllarda, kurumunuz turizm faaliyetlerinin iklim değişikliğine olan katkılarını önlemek amacıyla bir tedbir almayı planlıyor mu?

☐ Hayır ☐ Evet

Evetse ne tür tedbirler:

	Enerji tüketimini azaltmak
	Alternatif enerji kaynaklarının kullanımını teşvik etmek
	CO_2 ve diğer gazların salınımını azaltmak
	Su tüketimi konusunda tasarruf etmek
	Su kaynaklarının yönetimini sağlamak
	Atık yönetimini sağlamak
	Geri dönüşüm uygulamalarını geliştirmek
	Doğal kaynakların kaybını/ zarar görmesini en aza indirmek
	Çevreye duyarlı sistemlerin geliştirilmesi konusunda çalışmak
	Turizm ve iklim değişikliği arasındaki ilişki konusunda bilinçlendirme çalışmaları yürütmek
	Eğitim ve seminer programları düzenlemek
	Diğer…….

2071 İÇİN GELECEK SENARYOLARI

Senaryo 1

Sıcaklıkta 3°C[2] artış ve yağış miktarında aylık 20 mm düşüş. Temmuz ve Ağustos aylarında ortalama gündüz sıcaklığı 31°C** ve kışın 13°C***. Daha ılık kışlar ve daha yüksek frekanslı sıcaklık dalgaları.

29) Yukarıdaki senaryo 3, 5-4 °C sıcaklık artışından dolayı Antalya'ya gelmek için olumsuzdur ..... 1 (kesinlikle katılmıyorum) to 7 (tamamen katılıyorum)

30) Yukarıdaki senaryo 3, 5-4 °C sıcaklık artışından dolayı Antalya'ya gelmek için uygundur,

- Yaz aylarında …..... 1 (kesinlikle katılmıyorum) to 7 (tamamen katılıyorum)
- Sonbahar aylarında …...
- Kış aylarında…...

[2] 1961-1990 yılları arasındaki eğilimleri temel almıştır.
** 1975-2006 yılları Temmuz ve Ağustos ayları içerisindeki ortalama değerler 28°C'dir.
*** 1975-2006 yılları Aralık, Ocak ve Şubat ayları içerisindeki ortalama değerler 10°C'dir.

- İlkbahar aylarında.....

Senaryo 2

Sıcaklıkta 5 °C artış ve yağış miktarında aylık 30 mm düşüş. Temmuz ve Ağustos aylarında ortalama gündüz sıcaklığı 33°C**. Kış aylarında 15,5 °C*** sıcaklıkla neredeyse hiç kış yaşanmaması . Daha yüksek frekanslı ve uzun sıcaklık dalgaları.

31) Yukarıdaki senaryo 5 °C sıcaklık artışından dolayı Antalya'ya gelmek için olumsuzdur..... 1 (kesinlikle katılmıyorum) to 7 (tamamen katılıyorum)

32) Yukarıdaki senaryo 5 °C sıcaklık artışından dolayı Antalya'ya gelmek için uygundur,

- Yaz aylarında …..... 1 (kesinlikle katılmıyorum) to 7 (tamamen katılıyorum)
- Sonbahar aylarında …...
- Kış aylarında…...
- İlkbahar aylarında.... …

QUESTIONNAIRE FORM FOR DECISION MAKERS

A. THE INFORMATION ABOUT THE RESPONDENTS

1) **Age** ☐ 35- ☐ 36-55 ☐ 56+

2) **Gender** ☐ Male ☐ Female

3) **Education**

☐ Primary education
☐ High School or equivalent (Vocational/technical school)
☐ Bachelor's degree ☐ Master's degree ☐ Doctoral degree

4) **Name of the Institution …….....**

5) **The Institution is in:**

☐ Public sector ☐ Private sector Non-profit/NGO ☐ National ☐ International

☐ Research Institute/University ☐ International Institutions ☐ Other

6) **Position in the institution**

☐ Mayor/vice mayor ☐ Governor/vice governor ☐ Head of Directorate/Department
☐ Administrative staff ☐ Expert ☐ Consultant ☐ Researcher

B. KNOWLEDGE ABOUT CLIMATE CHANGE

7) **Do you believe we can already detect the occurrence of an increase in temperature or this is something we only suspect may occur in the future?**

☐ Climate change is something that will happen in the future
☐ No climate change has occurred and none will
☐ Already, there is an increase in temperature on the Earth
☐ Unsure, don't know

8) Are there any signs indicating climate change in Antalya?

- ☐ Change in temperature
- ☐ Change in precipitation
- ☐ Change in flora-fauna/vegetation
- ☐ Change in river flow and risk of drought
- ☐ Change in agricultural production
- ☐ Change in flood frequency

C. AWARENESS ABOUT CLIMATE CHANGE

9)

1 (completely disagree) to 7 (completely agree)

- **Awareness of consequences for oneself**

1. Laws that protect environment limit my choices and personal freedom... ☐
2. Protecting the environment will threaten jobs for people like me... ☐

- **Awareness of consequences for others**

1. The effects of climate change on public health are worse than people realize ☐
2. Pollution generated in one country harms people all over the world... ☐

- **Awareness of consequences for biosphere**

1. Over the next several decades, thousand of species will vanish... ☐
2. Claims that there is a climate change is exaggerated (reversed statement)... ☐

10) Do you feel the general public in your community is aware of potential climate change? If yes, what is the level of their awareness and concern?

- ☐ No
- ☐ Yes, but minimal understanding of climate change implications
- ☐ Yes, but feel evidence is inconclusive that climate change is occurring
- ☐ Yes, people are aware of possible negative consequence of climate change

11) What climate change-related information would be of the main concern to the public in your community?

- ☐ a) Don't know
- ☐ b)Public is not likely to be interested
- ☐ c) The public is interested and his main concerns are:
  - ☐ Loss of existing habitat and flora-fauna
  - ☐ The way life style of people will change
  - ☐ General climate change information

- ☐ Parameters on precipitation and drought risk
- ☐ Impact of climate change on agricultural production
- ☐ Future water quantities
- ☐ Future water quality
- ☐ Effects on public health
- ☐ Potential flooding frequency
- ☐ Excessive heath in the summer

D. INFORMATION ABOUT THE INSTITUTION

12) What is the mission and scope of your organization with regard to tourism and environment?

☐ National ☐ Regional ☐ Local

- ☐ Decision making/Policy formulation
- ☐ Planning
- ☐ Service provision in different fields
- ☐ Implementation/Management
- ☐ Lobbying
- ☐ Other……..

Please define your rights and responsibilities with respect to tourism. .....

13) Which actors does your institution collaborate with?

- **Collaboration with public institutions**

- ☐ Municipalities in the city-region
- ☐ Central government institutions in the city-region
- ☐ Central public institutions
- ☐ Private institutions-firms in the city-region
- ☐ International institutions

- **Collaboration with different associations**

- ☐ Accommodation units
- ☐ Tourism related services (Restaurants, Entertainment facilities, Sports

	facilities, Congress centers, Airlines, Car rentals)
	Tourism related associations: specify names.....
	Environment related associations: specify names.....
	Travel agencies, Tour operators, Tourist guides
	Tourism investment unions: specify names.....
	Tourism infrastructure unions: specify names.....
	NGOs in the city-region
	National NGOs
	Professional Associations (chambers, unions)
	Foreign municipalities
	Foreign institutions-NGOs
	Tourism related associations

14) In which fields of activity does your institution collaborate with other actors?

	Collaborative/ Joint projects	Cultural facilities	Consultancy
Municipalities in the city-region			
Public institutions in the city-region			
Central government institutions			
Private institutions-firms in the city-region			
International institutions			
NGOs in the city-region			
National NGOs			
Professional Associations (chambers, unions)			
Foreign municipalities			
Foreign institutions-NGOs			
Other.....			

	Information transaction	Financial support	Machinery/ technical support	Other (Specify.... .....)
Municipalities in the city-region				
Public institutions in the city-region				

Central public institutions				
Private institutions-firms in the city-region				
International institutions				
NGOs in the city-region				
National NGOs				
Professional Associations (chambers, unions)				
Foreign municipalities				
Foreign institutions-NGOs				
Other.....				

15) Which international agreements (on environmental conservation and climate change) impact on your activities? How?

	Legally binding	Voluntary	No Knowledge
The Brundland Report or United Nation Commission on Environment and Development			
Rio Earth Summit			
Rio Declaration			
Agenda 21			
Forest Principles (Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests)			
United Nations Framework Convention on Climate Change			
Habitat Declaration			
Kyoto Protocol			
Convention on Biological Diversity, Rio de Janerio			
Convention to Combat Desertification			
Millennium Development Goals			
The Convention on Wetlands (RAMSAR)			
United Nations Convention to Combat Desertification in the Countries under the treat of draught specifically the ones in Africa.			

Paris International Convention for the Protection of Birds			
Convention for the Protection of the World Cultural Heritage (Paris)			
Convention on the Conservation of European Wildlife and Natural Habitats			
Convention for the Protection of the Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer			
Nations Conference on the Human Environment and its Declaration. Stockholm			
Nordwijk Declaration for Atmospheric Pollution and Climate Change			
Other			

E. THE AWARENESS ABOUT THE RELATIN BETWEEN THE CLIMATE CHANGE AND TOURISM

16) **In the next few decades what are the possible effects of climate change on tourism?**

- ☐ Decrease the total number of tourists
- ☐ Decrease the tourism income due to change in tourist composition
- ☐ The loss of natural resources
- ☐ The change in the lifestyle of the local people
- ☐ The decline in the economy of Antalya
- ☐ Out-migration
- ☐ Other

17) **Do you think that there is contribution of tourism sector to the climate change?**

☐ No ☐ Yes

If yes, please explain how……..

- ☐ High energy consumption
- ☐ Negative impacts on ozone layer
- ☐ High emissions of CO_2 and the other GHGs
- ☐ Others

18) What do the politics/strategies of your institution basically aim?

- **In terms of development of the tourism sector:**

	To increase the number of tourists
	Change the tourist profile
	To increase the range and number of tourism facilities which attract visitors
	To improve the quality of infrastructure
	To build partnership with related institutions to ensure an effective strategic tourism approach
	To improve the skills of the tourism workforce
	To enhance and conserve the region's natural, heritage and cultural assets
	To increase visitors expenditure
	To increase labor wages and job opportunities
	To improve the promotion and marketing strategies
	Other……..

- **In terms of the contribution to the climate change:**

	To decrease the consumption of the energy
	To encourage using the alternative energy resources
	To decrease the emissions of CO_2 and the GHGs
	To save about water using
	To provide efficient management of water resources
	To provide waste management
	To develop implementation about recycling
	To minimize the loses/damaging of natural resources
	To work on developing systems that are sensitive to the environment
	To work on awareness of the relation between the climate change and tourism
	To organize education programs and seminars
	Others

19) Which current plans/projects directly/indirectly related to tourism development does your institution has?

	Tourism-related plans/projects
	Environment-related plans/projects
	Urban development plans
	Urban design projects
	Projects/studies for tourism promotion
	Projects/studies for awareness raising

	Projects/studies about energy efficiency/clean energy
	Projects/studies about pollution prevention/eradication
	Infrastructure projects
	Biodiversity and habitat conservation
	Other…….

20) Do these plans/projects include any policies regarding environmental conservation/climate change?

	No		Yes

If yes, please give information.....

21) Does your institution have any tools to encourage environmentally friendly tourism?

	Standards defined by legislation
	New measures (blue flag, green star, etc.)
	Innovative projects
	Projects to raise public awareness
	Other…….
	No, my institution does not have any tools to encourage environmentally friendly tourism.

22) Considering tourism, are there any measures being taken to cope with climate change?

- **About the impacts of the climate change on tourism;**

.....

	To encourage coopeartions in activities
	To provide preparing action and management plans
	To provide and support organizing education programs and programs that raise awareness
	To provide development of monitoring and evaluation programs
	Others.....

- **About the contribution of tourism activities to the climate change;**

.....

	To proceed workings of information about using energy resources
	To encourage using alternative energy resources
	To provide decreasing emissions of GHGs
	To take measures that provide savings related with water resources
	To provide and support organizing education programs and programs that raise awareness

☐ Others.....

23) **Does your institution have a current work/research on the possible impact of climate change on tourist preferences?**

☐ No ☐ Yes

If yes, please give detail.....

24) **Do you think that climate change will impact on tourist preferences?**

☐ No ☐ Yes

Explain why? .....

FUTURE SCENARIOS for YEAR 2071

Future scenario 1

Temperature increase of 3 °C[3] and precipitation decrease of 20 mm monthly. Average daytime temperature of 31°C** in July and August and 13°C*** in winter. Warmer winters. Higher frequency of heat waves.

25) The above scenario is negative for visiting Antalya with a temperature increase of 3, 5-4 °C .....1 (completely disagree) to 7 (completely agree)

26) The above scenario is positive for visiting Antalya with a temperature increase of 3,5-4 °C

- during summer … 1 (completely disagree) to 7 (completely agree)
- during autumn …
- during winter …
- during spring …

Future scenario 2

Temperature increase of 5 °C with an average daytime temperature of 33°C** in July and August and precipitation decrease of 30 mm monthly. Almost no winters with an average temperature of 15,5 °C*** . Warmer summer. Higher frequency and longer heat waves

27) It is negative for visiting Antalya with a temperature increase of 5 °C .....1 (completely disagree) to 7 (completely agree)

28) The above scenario is positive for visiting Antalya with a temperature increase of 5 °C

- during summer … 1 (completely disagree) to 7 (completely agree)
- during autumn …
- during winter …
- during spring …

[3] based on the trends between 1961-1990

** 1975-2006 average values in July and August is 28°C

*** 1975-2006 average values in December, January and February is 10°C

KARAR VERİCİLERLE YAPILACAK ANKET

A. CEVAPLAYAN KİŞİ HAKKINDA GENEL BİLGİ

1) Yaş ☐ -35 ☐ 36-55 ☐ 56+

2) Cinsiyet ☐ Erkek ☐ Kadın

3) Eğitim durumu

☐ İlköğretim
☐ Lise ve ya dengi(meslek lisesi/teknik okul)
☐ Üniversite ☐ Yüksek lisans ☐ Doktora

4) Kurumun adı …….....

5) Kurum

☐ Kamu kurumu ☐ Özle kurum STK ☐ Ulusal ☐ Uluslararası

☐ Araştırma Merkezi/Üniversite ☐ Uluslararası Kurum ☐ Diğer.....

6) Kurumdaki pozisyonu

☐ Belediye başkanı/yardımcısı ☐ Vali/yardımcısı ☐ Kurum/departman müdürü
☐ İdari kadro ☐ Uzman ☐ Danışman ☐ Araştırmacı

B. İKLİM DEĞİŞİKLİĞİ HAKKINDA BİLGİ

7) Şimdiden hava sıcaklıklarında bir artış olduğunu düşünüyor musunuz yoksa bu durum sadece gelecekte olmasından süphelendiğimiz bir şey mi?

☐ İklim değişikliği gelecekte olacak bir durum
☐ İklim değişikliği şimdiye kadar olmadı, gelecekte de olmayacak
☐ Şimdiden etkisi oldu. Bütün dünyada hava sıcaklıklarına artış oldu.
☐ Emin değilim, bilmiyorum

8) Antalya'da iklim değişikliği belirtisi olarak nitelendirilebilecek herhangi bir işaret var mı?

- [ ] Hava sıcaklığında değişim
- [ ] Yağış miktarında değişim
- [ ] Flora-fauna/bitki örtüsünde değişim
- [ ] Akarsu akışında değişim, kuraklık riski
- [ ] Tarımsal üretimde değişim
- [ ] Sel sıklıklarında değişim

C. İKLİM DEĞİŞİKLİĞİ KONUSUNDA FARKINDALIK

9)

1 (kesinlikle katılmıyorum) - 7 (tamamen katılıyorum)

- **Kendisiyle ilgili sonuçlardan farkındalık**

1. Çevreyi koruyan kanunlar seçimlerimi ve kişisel özgürlüğümü sınırlandırıyor ☐
2. Çevreyi korumak benimgibi kişilerin işleri için tehdit yaratıyor ☐

- **Başkalarıyla ilgili sonuçlardan farkındalık**

1. İklim değikliğinin insan sağlığı üzerindei etkisi farkedilenden çok daha fazla ☐
2. Bir ülkede yaratılan kirlilik bütün dünyadaki insanlara zarar verir ☐

- **Dünyayla ilgili sonuçlardan farkındalık**

1. Önümüzdeki yıllarda, binlerce tür canlı yokolacak. ☐
2. İklim değişikliği konusunun abartılıdığını düşünüyorum ☐

10) Toplumunuzdaki insanların genel olarak potansiyel iklim değişikliğinin farkında olduğunu düşünüyor musunuz? Evetse, bu konudaki farkındalık ve kaygılarının derecesi nedir?

- [ ] Hayır
- [ ] Evet, ama iklim değişikliğnden doğabilecek zararların fazla farkında değiller
- [ ] Evet, ama iklim değişikliği olduğuna dair yeterli bulgu olmadığını düşünüyorlar
- [ ] Evet, insanlar iklim değişikliğinden doğabilecek olumsuz sonuçların farkındalar

11) Toplumunuzdaki insanları iklim değişikliğiyle ilgili en çok hangi bilgi endişelendirir?

- [ ] a) Bilmiyorum
- [ ] b)Toplum çok ilgili gözükmüyor
- [ ] c)Toplum ilgili ve başlıca endişeleri:
  - [ ] Mevcut doğal çevrenin ve flora-faunanın yokolması
  - [ ] İnsanların yaşam tarzlarının değişecek olması
  - [ ] İklim değişikliği hakkında genel bilgi

- ☐ Yağış ve kuraklık parametreleri
- ☐ İklim değişikliğinin tarımsal üretim üzerindeki etkisi
- ☐ Gelecekteki su miktarı
- ☐ Gelecekteki su kalitesi
- ☐ İnsan sağlığı üzerindeki etkisi
- ☐ Potansiyel sel sıklıkları
- ☐ Yazın olabilecek aşırı sıcaklıklar

D. KURUM HAKKINDA GENEL BİLGİ

12) Çevre ve turizmle ilgili olarak kurumunuzun faliyet alanı ve misyonu nedir?

☐ Ulusal ☐ Bölgesel ☐ Yerel

- ☐ Karar merci/ Politika oluşturmak
- ☐ Plan yapmak
- ☐ Farklı alanlarda hizmet sağlamak
- ☐ Uygulama ve Yönetim
- ☐ Lobi yapmak
- ☐ Diğer……..

Turizmle ilgili haklarınızı ve sorumluluklarınızı tanımlayınız.....

13) Kurumunuz hangi aktörlerle işbirliği yapıyor?

- **Kamu/Özel kurumlar**

- ☐ Kent bölgedeki belediyeler
- ☐ Kent bölgedeki merkezi yönetim kurumları
- ☐ Merkezdeki kamu kurumları
- ☐ Özel kurumlar, kent bölgedeki firmalar
- ☐ Uluslarası kurumlar

- **Diğer çeşitli kuruluşlar**

- ☐ Konaklama birimleri
- ☐ Turizmle ilgili hizmet birimlerl(restoranlar, eğlence yerleri, spor tesisleri, kongre

	merkezleri, havaalanları, araç kiralama yerleri)
	Turizmle ilgili kurum/dernekler: isim belirtiniz.....
	Çevreyle ilgili kurum/dernekler: isim belirtiniz.....
	Seyehat acentaları, tur operatörleri, turist rehberleri
	Turizm yatırım dernekleri isim belirtiniz.....
	Turizm altyapı dernekleri isim belirtiniz.....
	Kent bölgedeki STKlar
	Ulusal STKlar
	Profesyonel Kuruluşlar (odalar, sendikalar)
	Yabancı belediyeler
	Yabancı kuruluşlar-STKlar
	Turizmle ilgili kuruluşlar

14) Kurumunuz hangi alanlarda diğer aktörlerle işbirliği yapıyor?

	Ortak projeler	Kültürel aktiviteler	Danışmanlık
Kent bölgedeki belediyeler			
Kent bölgedeki kamu kurumları.			
Merkezdeki kamu kurumları			
Kent bölgedeki özel kurumlar, firmalar			
Uluslarası kurumlar			
Kent bölgedeki STKlar			
Ulusal STKlar			
Profesyonel Kuruluşlar (odalar, sendikalar)			
Yabancı belediyeler			
Yabancı kuruluşlar-STKlar			
Diğer.....			

	Bilgi alışverişi	Finansal yardım / destek	Makine ve Teknik Yardım	Diğer (Belirtiniz... .....)
Kent bölgedeki belediyeler				
Kent bölgedeki kamu kurumları				
Merkezdeki kamu kurumları				
Kent bölgedeki özel kurumlar,				

firmalar				
Uluslarası kurumlar				
Kent bölgedeki STKlar				
Ulusal STKlar				
Profesyonel Kuruluşlar (odalar, sendikalar)				
Yabancı belediyeler				
Yabancı kuruluşlar-STKlar				
Diğer.....				

15) Hangi uluslararası antlaşmalar (çevre koruma ve iklim değişikliğiyle ilgili) kurumunuzun çalışmalarını etkiliyor? Nasıl?

	Yasal olarak	Gönüllü olarak	Bilmiyor
Brundland Raporu veya Birleşmiş Milletler Dünya Çevre Kalkınma Komisyonu			
Rio Yeryüzü Zirvesi			
Rio Bildirgesi			
Gündem 21			
Orman İlkeleri Bildirgesi			
İklim Değişikliği Çerçeve Sözleşmesi			
Doğal Yaşam Bildirgesi			
Kiyoto Protokolü			
Biyolojik Çeşitlilik Sözleşmesi, Rio de Janerio			
Birleşmiş Milletler Çölleşme ile Mücadele Sözleşmesi			
Birleşmiş Milletler Binyıl Kalkınma Hedefleri			
Sulak alanlar Sözleşmesi (RAMSAR)			
Özellikle Afrika'da Ciddi Kuraklık ve/veya Çölleşmeye Maruz Ülkelerde Çölleşmeyle Mücadele İçin Birleşmiş Milletler Sözleşmesi			
Kuşların Korunması Hakkında Uluslararası Sözleşme, Paris			
Dünya Kültürel ve Doğal Mirasının Korunmasına ilişkin Sözleşme (Paris)			

Avrupa Vahşi Yaşamının ve Doğal Habitatlarının Korunması Sözleşmesi			
Ozon Tabakasının Korunması Sözleşmesi ve Ozon Tabakasını İncelten Maddelerle İlgili Montreal Protokolü			
Birleşmiş Milletler İnsan Çevresi Konferansı Stockholm Deklarasyonu			
Atmosferik Kirlilik ve İklim Değişikliği Nordwijk Bildirgesi			
Diğer.....			

E. İKLİM DEĞİŞİKLİĞİ VE TURİZM ARASINDAKİ İLİŞKİ KONUSUNDA FARKINDALIK

16) Önümüzdeki yıllarda, iklim değişikliğinin turizm üzerinde nasıl bir etkisi olabilir?

- ☐ Toplam turist sayısında azalma
- ☐ Turist yapısındaki değişiklikten dolayı turizm gelirlerinde azalma
- ☐ Doğal kaynakların kaybı/zarar görmesi
- ☐ Yerel halkın yaşam tarzında değişiklik
- ☐ Antalya'nın ekonomisinde düşüş
- ☐ Antalya dışına göçün artması
- ☐ Diğer.....

17) Turizm faaliyetlerinin iklim değişikliğine katkıları olduğunu düşünüyor musunuz?

☐ Hayır ☐ Evet

Evetse, nasıl olduğu konusunda detay veriniz……..

- ☐ Enerji tüketiminin yüksek olması
- ☐ Ozon tabakasına olumsuz etkilerinin olması
- ☐ CO_2 ve diğer sera gazlarının salınımının yüksek olması
- ☐ Diğer.....

18) Kurumunuzun stratejisi/politikası temel olarak neyi hedeflemektedir?

- **Turizm Sektörünün Gelişimi Açısından:**

- ☐ Turist sayısını arttırmak
- ☐ Turist profilini değiştirmek
- ☐ Turistleri çeken turizm tesislerinin çeşidini ve sayısını arttırmak

	Altyapı kalitesini arttırmak
	Etkin bir turizm startejisi oluşturmak için ilgili kurumlarla ortaklıklar kurmak
	Turizmde çalışan işgücünün niteliğini arttırmak
	Bölgenin doğal ve kültürel mirasını korumak ve değerlendirmek
	Gelen ziyaretçilerin harcamalarını arttırmak
	Çalışan gelirlerini ve iş olanaklarını arttırmak
	Tanıtım ve reklam startejilerini geliştirmek
	Diğer…….

- **İklim Değişikliğine olan Katkısı Açısından:**

	Enerji tüketimini azaltmak
	Alternatif enerji kaynaklarının kullanımını teşvik etmek
	CO_2 ve diğer gazların salınımını azaltmak
	Su tüketimi konusunda tasarruf etmek
	Su kaynaklarının yönetimini sağlamak
	Atık yönetimini sağlamak
	Geri dönüşüm uygulamalarını geliştirmek
	Doğal kaynakların kaybını/ zarar görmesini en aza indirmek
	Çevreye duyarlı sistemlerin geliştirilmesi konusunda çalışmak
	Turizm ve iklim değişikliği arasındaki ilişki konusunda bilinçlendirme çalışmaları yürütmek
	Eğitim ve seminer programları düzenlemek
	Diğer…….

19) Kurumunuzun turizmle doğrudan veya dolaylı olarak ilgili hangi plan/projeleri var?

	Turizmle ilgili plan/projeler
	Çevreyle ilgili plan/projeler
	Turizm tanıtım projeleri/çalışmaları
	Bilinçlendirme projeleri/çalışmaları
	Enerji verimliliği/temiz enerji projeleri/çalışmaları
	Kirliliğin önlenmesi veya korunulması hakkında projeler/çalışmalar
	Altyapı projeleri
	Biyolojik çeşitlilik ve yeryüzü koruma çalışmaları
	Diğer.....

20) Bu plan/projeler çevre koruma/iklim değişikliğiyle ilgili herhangi bir politika içeriyor mu?

☐ Hayır ☐ Evet

Evetse, detay veriniz.....

21) Kurumunuzun çevre dostu turizmi desteklemeyi amaçlayan herhangi bir yöntem/aracı var mı?

☐	Yasayla belirlenen standartlar
☐	Yeni önlemler (mavi bayrak, yeşil yıldız gibi)
☐	Yenilikçi projeler
☐	Halkı bilinçlendirmeyi amaçlayan projeler
☐	Diğer.....
☐	Hayır, kurumumun çevre dostu turizmi desteklemeyi amaçlayan herhangi bir yöntem/aracı yok

22) Turizm konusundaki çalışmaları düşünerek, kurumunuzun iklim değişikliği ile ilgili aldığı herhangi bir önlem var mı?

- **İklim değişikliğinin turizm üzerindeki etkileri konusunda;**

.....

☐	Faaliyetlerde ortaklık/işbirliklerini teşvik etmek.
☐	Eylem ve yönetim planlarının hazırlanmasını sağlamak.
☐	Eğitim ve bilinçlendirme programlarının düzenlenmesini sağlamak ve desteklemek.
☐	İzleme ve değerlendirme programları geliştirilmesini sağlamak.
☐	Diğer.....

- **Turizm faaliyetlerinin iklim değişikliğine olan katkıları konusunda;**

.....

☐	Enerji kaynaklarının kullanımı konusunda bilgilendirme çalışmalarını yürütmek.
☐	Alternatif enerji kaynaklarının kullanımını teşvik etmek.
☐	Sera gazları salınımının azaltılmasını sağlamak.
☐	Su kaynaklarının kullanımı konusunda tasarruf sağlayıcı önlemler alınmasını sağlamak.
☐	Eğitim ve bilinçlendirme programlarının düzenlenmesini sağlamak ve desteklemek.
☐	Diğer.....

23) Kurumunuzun, iklim değişikliğinin turist tercihleri üzerindeki etkisiyle ilgili mevcut bir çalışması/araştırması var mı?

☐ Hayır ☐ Evet

Evetse, detay veriniz.....

24) İklim değişikliğinin turist terchilerinde değişikliğe neden olacağını düşünüyor musunuz?

☐ Hayır ☐ Evet

Nedenini açıklayın.....

2071 İÇİN GELECEK SENARYOLARI

Senaryo 1

Sıcaklıkta 3°C[4] artış ve yağış miktarında aylık 20 mm düşüş. Temmuz ve Ağustos aylarında ortalama gündüz sıcaklığı 31°C** ve kışın 13°C***. Daha ılık kışlar ve daha yüksek frekanslı sıcaklık dalgaları.

25) Yukarıdaki senaryo 3, 5-4 °C sıcaklık artışından dolayı Antalya'ya gelmek için olumsuzdur..... 1 (kesinlikle katılmıyorum) - 7 (tamamen katılıyorum)

26) Yukarıdaki senaryo 3, 5-4 °C sıcaklık artışından dolayı Antalya'ya gelmek için uygundur,

- Yaz aylarında …..... 1 (kesinlikle katılmıyorum) - 7 (tamamen katılıyorum)
- Sonbahar aylarında …...
- Kış aylarında…...
- İlkbahar aylarında.…

Senaryo 2

Sıcaklıkta 5 °C artış ve yağış miktarında aylık 30 mm düşüş. Temmuz ve Ağustos aylarında ortalama gündüz sıcaklığı 33°C**. Kış aylarında 15,5 °C*** sıcaklıkla neredeyse hiç kış yaşanmaması . Daha yüksek frekanslı ve uzun sıcaklık dalgaları.

27) Yukarıdaki senaryo 5 °C sıcaklık artışından dolayı Antalya'ya gelmek için olumsuzdur..... 1 (kesinlikle katılmıyorum) - 7 (tamamen katılıyorum)

28) Yukarıdaki senaryo 5 °C sıcaklık artışından dolayı Antalya'ya gelmek için uygundur,

- Yaz aylarında …..... 1 (kesinlikle katılmıyorum) - 7 (tamamen katılıyorum)
- Sonbahar aylarında …...
- Kış aylarında…...
- İlkbahar aylarında.…

[4] 1961-1990 yılları arasındaki eğilimleri temel almıştır.
** 1975-2006 yılları Temmuz ve Ağustos ayları içerisindeki ortalama değerler 28°C'dir.
*** 1975-2006 yılları Aralık, Ocak ve Şubat ayları içerisindeki ortalama değerler 10°C'dir.

APPENDIX E

THE LIST OF DECISION MAKERS

TOUR OPERATORS

1 ETS Tour

2 ÖGER Tour

LOCAL GOVERNMENTS

3 Antalya Culture and Tourism Provincial Directorate

4 Antalya Environment and Forestry Provincial Directorate

5 Antalya Metropolitan Municipality

6 Antalya Governorship

NGOs

7 Foundation of Education of Environment, Turkey -TÜRÇEV

8 Foundation of Protection of Environment, Antalya

9 Chambership of Hotel and Board House Owners

10 Association of Turkish Travel Agencies-TURSAB

11 Association of Professional Managers of Hotels-POYD

UNIVERSITY

12 The Mediterranean University Tourism and Hotel Management High School