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CLIMATE CHANGE IMPACTS AND IMPLICATIONS FOR TOURISM IN PROTECTED AREAS

Abstract:

Tourism, as a distinct field of activity, is strongly linked to climate change: in a positive way - by providing the necessary resources and factors to reduce the action of climate change through the use of alternative energy technologies with low environmental impact, and the controlled development of tourist flows – and a negative one – through energy consumption, visitors transportation, the quantities of waste.

Among the solutions mentioned, the present research has focused on protected areas since the argument was less debated in the scientific literature, but also in business practice. As the main service providers regarding ecosystems and biological resources, protected areas meet the requirements to preserve species worldwide and are vulnerable to climate change.

Tourism in protected may became a tourist travel motive more prominent in the future as the natural environment and the species from protected areas are threatened by climate change. Therefore, the paper explains different climate change impacts and implications for tourism in protected areas. The research field proposed aimed to assess the direct and indirect impact of climate changes for tourism in protected areas. The objectives were related to: determine the level of importance of different modifications in the structure of the major components of tourism in protected area under the direct climate change impact; indicate the importance level of changes in natural characteristics of environments which could influence negative tourism by reducing the perceived attractiveness of a protected area, under indirect climate change impact; highlight the importance level of modifications, induced by indirect climate change impact, in socioeconomic environment of local communities in protected areas which could affect tourism. Based on the research findings were elaborated proposals for an appropriate strategy in the field of climate change mitigation . This work was supported by the project “Excellence academic routes in the doctoral and postdoctoral research – READ” co-funded from the European Social Fund through the Development of Human Resources Operational Programme 2007-2013, contract no. POSDRU/159/1.5/S/137926.

Keywords:

tourism; protected areas; climate change; impact

JEL Classification: Q26, Q56, L83

Introduction

The fight against climate change is one of the biggest challenges of this century, as it has implications for humans, animals, plants and natural environments. It is estimated that the current rate of emissions of greenhouse gases will lead to a greater average increase of 2°C in global temperatures, which will probably irreversibly change all life on earth. Rising sea levels, forest fires, floods, droughts and storms will be more common and 30% of animal and plant species on the planet might disappear. Climate variations have natural causes, but humans represent the main cause of climate change today (Dorise, 2010, p. 5).

Hydrological systems are transformed by the changing precipitation or melting snow and ice, which affect water resources as regards quantity and quality. Glaciers continue to diminish almost globally as a consequence of climate change, affecting runoff and water resources downstream. Climate change is causing permafrost warming and thawing in high - latitude regions and in high - elevation regions. Various terrestrial, freshwater and marine species have changed their geographic ranges, seasonal activities, migration patterns, abundances, and species interactions in reaction to current climate change (Climate Change 2014: Impacts, Adaptation, and Vulnerability, 2014, p. 6-7).

Understanding climate change requires the inclusion of a wide spectrum of perspectives on interdisciplinary dialogues, because it is a systemic and complex knowledge, referring to the need for a consistent environmental rationality compatible to the reading and interpretation of natural and social phenomena in disparate rhythms and intensities. Therefore the study of climate is directly related to the field of knowledge that has as its central analytical unit the relationship between society and nature (Grimm, Prado, Giacomitti, Mendonça, 2012, p. 55-56).

Warned by the disasters that could arise, many countries started their fight against global warming, and studies and protection plans were launched on a global scale (Kyoto Protocol 1997 or Copenhagen in 2009), as well on regional, national scales. The threat of climate change is being addressed globally by the United Nations Framework Convention on Climate Change UNFCCC, which has as long-term objective the stabilization of atmospheric greenhouse gas concentrations at a level that would avoid dangerous anthropogenic intervention on the climate system. This kind of level should be achieved within a time frame adequate to permit ecosystems to adapt naturally to climate change, to guarantee that food production is not threatened and to enable economic growth to continue in a sustainable way (Climate change, impacts and vulnerability in Europe 2012, 2012, p.33).

Protected areas - cornerstones of conservation and sustainable tourism

Protected areas represent an essential part of the global response to climate change as they help to address the causes of climate change, protecting the natural ecosystems and reducing greenhouse gas emissions through carbon storage. They can also help the

society to count the effects of such changes, maintaining the essential services of ecosystems that the populations depend on. These are proven natural solutions, "green" and cost advantageous against the climate crisis.

Identified for most than two decades as a significant evolving dispute regarding the protected areas, the climate change subject was developed by various authors that highlighted the vulnerability of protected areas to climate change and the need the take significant measures to meet the conservation challenges (Scott, Lemieux, 2005, p. 701).

However, protected areas are facing, along climate change, external threats such as increasing urbanization, accelerated resource extraction, fragmentation of greater park ecosystems, and as well internal threats, among other recreation and tourism impacts.

Still, climate, as a determining factor in creating and controlling the distribution of ecosystems and species, is anticipated to be the major threat to protected areas globally, nonetheless much of the impact is only now being detected (Austin and all, 2008).

The natural environment is very important in shaping the attractiveness of an area for tourism, and this is essentially for nature-based tourism, which is one of the fastest growing markets segments worldwide. Thus, more than influencing tourism season length, most important are the changes on the natural environments on which tourism depends. Therefore, if climate change harmfully affects the natural setting of these areas (the loss of special flora or fauna, fire and disease impacted landscapes) the quality of the tourism product would be diminished with implications for visitation and local economies (Scott, 2003).

As Eagles (1998) highlighted, nature-based tourism is the travel and tourism activity reliant on the positive destination attributes of the natural environment, dependent upon two essential components: 1) proper levels of environment quality and 2) appropriate levels of consumer service.

As told before, global climate change (Eagles, 2004, p. 25) will be one the most important environmental issues affecting protected areas and tourism in the 21st century, as the previsions of the Intergovernmental Panel on Climate Change (IPCC) are not so comforting, implying: higher maximum temperatures and more hot days over nearly all land areas, as well as higher minimum temperatures, with fewer cold days and frost days over nearly all land areas. Moreover, diurnal temperature range will reduce over most land areas, more intense precipitation events will occur, ocean levels will increase, and also the in tropical cyclone peak wind and precipitation intensities. Also, changes according to latitude will reveal the movement from the equator towards the poles, and specifically, higher temperatures in higher latitudes, with arctic ecosystems affected strongly.

Due to this trend, global climate change possibly will reduce the ability of some protected areas to accept tourism through intense heat, drought, and rising ocean level, but, nevertheless, it may well increase the capability of protected areas in the temperate

latitudes to receive tourists, with longer operating seasons occur due to warmer spring and fall periods.

Tourism industry provides considerable benefits to protected areas and the communities nearby to or within them, not only regarding the cultural and natural heritage and the great knowledge of the interplay between humans and their environment, but also providing solutions in order to face climate change.

Protected areas all around the world represent an important tourist attraction, with millions of visitors, their behavior being intensely linked to climate, which may disturb the upcoming forecasts of tourism, in terms of competitiveness. Therefore, the impact will address four distinct directions (Lemieux, Eagles, 2013, p. 174):

1. Direct climatic change (length and quality of tourism seasons, operating costs, increased infrastructure damage and business interruption);
2. Indirect climate-induced environmental changes (water availability, biodiversity loss, reduced landscape aesthetic, increased natural hazards, coastal erosion and floods etc.;
3. Indirect climate-induced social-economic changes (social conflicts, political instability, economic decline etc.);
4. Climate change mitigation policy (increased costs for transportation, less access to some destinations).

In other words, the influence of climate change in protected areas occurs on physical resources, such as water level, snow cover, wildlife species that provide the base for specific tourism activities such as boating, rafting, skiing, birdwatching, which translates into level of visitor satisfaction.

Tourism in and around protected areas must sustain undoubtedly conservation: building support and raising awareness of the many important values of protected areas including ecological, cultural, sacred, spiritual, aesthetic, recreational and economic values. Tourism based on protected areas must generate itself the income for conservation work for the protection of biodiversity, ecosystem integrity and cultural heritage (Bushell, McCool, 2007). Tourism related to protected areas and conservation also provides opportunities for local communities to develop themselves economically, and through this developing process, more funding becomes available to support conservation of protected areas, interpretation, education and outreach to both tourists and local residents that will contribute to the fight against climate change.

Research methodology

Regarding the method of gathering information, structured communication was chosen which resulted in a questionnaire with 14 questions, and recording responses was achieved by the interviewer technique, the questionnaire duration being of approximately 15 minutes. The fact that the selection of subjects was randomly respecting the probability principles must be added. However, collecting information design took into account the researched community who was researchers. The research was conducted in 2013, during a tourism conference organized in Romania, researched community being

made up of 101 people. The classic model was elected with a 95% probability coefficient corresponding to z = 1.96 and the accepted error limit of 5%. With no previous research, the maximum dispersion has been introduced in calculating which is f (1-f) = 0.5 * 0.5 = 0.25, thus resulting sample size of 90 questionnaires. SPSS software was used for data processing. Out of 101 people surveyed were obtained 74 valid responses. Under these conditions, the results can be extrapolated unreservedly to the whole community.

The results of the processing and interpretation of information

For the questions regarding the level of importance of different changes in the structure of the major components of tourism in protected area under the direct climate change impact the Likert scale was used with five gradations: very low, low, medium, high and very high. As a statistical tool for data processing SPSS software was used.

For all changes in the structure of the major components of tourism in protected area the respondents answer is that the level of importance is low to medium (the highest average responses meets for length and quality of tourism seasons and the lowest average for business interruption), the answers are quite homogeneous, standard deviations ranging between 0.815 and 1.543 (table 1). Regarding the order responses on the level of importance of different changes in the structure of the major components of tourism in protected area under the direct climate change impact on the first place is length and quality of tourism seasons (average 4.1377), followed by increased infrastructure damage (average 3.0258), operating costs (average 2.7087), business interruption (average 2.667574). For length and quality of tourism seasons the most common response is high level (the mode is 4000) with frequencies 33% of the valid responses, while for operating costs and increased infrastructure damage the most frequent answer is medium achievement level (the mode 2000 and 3000), with frequencies of 25% and 31%. In terms of the business interruption the most common response was low importance level (the mode is 1000) with a frequency of 27% of valid responses.

Table 1: The level of importance of different changes in the structure of the major components of tourism in protected area under the direct climate change impact (operating costs, length and quality of tourism seasons, increased infrastructure damage and business interruption)

Variables	Answers Question 4						
	Valid N	Average	Median	Mode	Frequency	Std. Dev.	Standard error
4.1	74	2.7087	3.000000	3.000000	31	1.01377	0.140382
4.2	74	4.1377	4.000000	4.000000	33	0.81593	0.093451
4.3	74	3.0258	3.000000	2.000000	25	1.10238	0.173418
4.4	74	2.6675	2.500000	1.000000	27	1.54388	0.144887

Source: elaborated by author

From the perspective of indicate the importance level of changes in natural characteristics of environments which could influence negative tourism by reducing the perceived attractiveness of a protected area, under indirect climate change impact, researcher rank them as follows (table 2): the firsts are biodiversity loss (average

3.6477), followed by increased natural hazards (average 2.8854), coastal erosion (average 2.7087), water availability (average 1.9122), floods (average 1.6048). Respondents gave a high degree of involvement (4.000) for biodiversity loss, a medium degree of involvement (3000) for increased natural hazards, coastal erosion (the median is greater than average). In terms of homogeneity of responses, the first are visits increased natural hazards (Std. Dev 1.60697), which means that in general the respondents rated mostly with 3.000 (medium).

Table 2: The importance level of changes in natural characteristics of environments which could influence negative tourism by reducing the perceived attractiveness of a protected area, under indirect climate change impact (water availability, reduced landscape aesthetic, biodiversity loss, increased natural hazards, coastal erosion and floods)

Variables	Answers Question 7						
	Valid N	Average	Median	Mode	Frequency	Std. Dev.	Standard error
7.1	74	1.9122	2.000000	1.000000	32	0.99083	0.10788
7.2	74	1.6048	1.000000	1.000000	44	0.84388	0.08975
7.3	74	3.6477	4.000000	4.000000	25	1.09578	0.11887
7.4	74	2.8854	3.000000	3.000000	27	1.60697	0.17922
7.5	74	2.7087	3.000000	3.000000	30	0.93456	0.10645
7.6	74	1.7456	1.000000	1.000000	43	1.07567	0.11963

Source: elaborated by author

At the opposite pole is reduced landscape aesthetic (Std. Dev. 0.83053), which means that the majority of respondents rated mostly with 1.000 (very low). It is also observed for all the changes in natural characteristics of environments which could influence negative tourism by reducing the perceived attractiveness of a protected area, under indirect climate change impact a high degree of statistical significance of the media, since the ratio between the mean and the standard error is less than 2.000 (the result is significant at 95% level). Moreover, there is a high frequency of responses providing a very low importance level of changes in natural characteristics of environments which could influence negative tourism by reducing the perceived attractiveness of a protected area, under indirect climate change impact (the mode is 3.000), with the exception of biodiversity loss (how is 4.000).

In terms of the importance level of modifications, induced by indirect climate change impact, in socio-economic environment of local communities in protected areas which could affect tourism researcher rank them as follows (table 3): the firsts are economic decline (average 3.7578), followed by social conflicts (average 2.8282), political instability (average 2.0897). Respondents gave a high degree (4.000) for economic decline, a medium attractiveness degree (3.000) for social conflicts (median is greater than the average). In terms of homogeneity of responses, the firsts are political instability (Std. Dev 1.11984), which means that in general respondents rated mostly with 1 (very low) and at the opposite pole economic decline (Std. Dev. 1.04334), which means that in general respondents rated their involvement in this activity mostly with 4.000 (average). It is noted, for all modifications, induced by indirect climate change impact, in socio-economic environment of local communities in protected areas which could affect tourism

a high degree of statistical significance of averages, as the ratio of the average and standard error is less than 2.000 (the result is significant at the 95% level). It is also observed a high frequency of responses which gives a very low level of importance of the political instability (the mode is 2.000) and those given an average level of importance (the mode is 3.000) for social conflicts, apart from economic decline (the mode is 4.000).

Table 3: The importance level of modifications, induced by indirect climate change impact, in socio-economic environment of local communities in protected areas which could affect tourism (social conflicts, economic decline, political instability)

Variables	Answers Question 8						
	Valid N	Average	Median	Mode	Frequency	Std. Dev.	Standard error
8.1	74	2.8282	3.000000	3.000000	42	1.04376	0.10034
8.2	74	3.7578	4.000000	4.000000	37	1.04334	0.08856
8.3	74	2.0897	2.000000	2.000000	43	1.11984	0,10689

Source: elaborated by author

Conclusions

According to the research, length and quality of tourism seasons is the most important change in the structure of the major components of tourism in protected area under the direct climate change impact. Biodiversity loss is the most important change in natural characteristics of environments which could influence negative tourism by reducing the perceived attractiveness of a protected area, under indirect climate change impact. Also, economic decline represents the most important modification, induced by indirect climate change impact, in socio-economic environment of local communities in protected areas which could affect tourism. Based on these research findings, increased costs for transportation and less access to some destinations could represent proposals in elaborating a climate change mitigation strategy.

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