



Interactions between climate change and the tourism sector: Multiple-criteria decision analysis to assess mitigation and adaptation options in tourism areas



Alexandra V. Michailidou^{*}, Christos Vlachokostas, Nicolas Moussiopoulos

Laboratory of Heat Transfer and Environmental Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece

HIGHLIGHTS

- Decision making scheme in tourism management considering climate change impacts.
- Multi-criteria analysis to assess mitigation and adaptation measures in Greece.
- Environmental benefit, applicability, cost, social acceptance criteria considered.
- Active involvement of experts and local authorities in decision-making.
- Rational energy use, efficient energy & water management to be primarily considered.

ARTICLE INFO

Article history:

Received 3 May 2015
Received in revised form
21 January 2016
Accepted 23 January 2016
Available online xxx

Keywords:

Mitigation
Adaptation
Climate change
Multi-criteria analysis
ELECTRE III
Sustainable tourism

ABSTRACT

Tourism is one of the most climate-sensitive economic sectors, but also a contributor to climate change. With the effects of climate change becoming an increasing concern, the tourism sector must urgently and realistically respond by mitigating its emissions and adapting tourism businesses and destinations to the changing climate conditions. This work presents a generic methodological framework to plan, manage and implement climate change mitigation and adaptation measures in the tourism context. The methodological scheme is based on Multi-Criteria Decision Analysis for prioritizing available options applicable to a defined tourism area. The proposed framework is implemented for Greece, one of the world's most popular tourism destinations, and optimally ranks 18 mitigation and 16 adaptation measures under 4 criteria i.e. environmental benefit, applicability, cost and social acceptance. The analysis indicates that rational energy use, improvement of energy efficiency and water management/saving measures should be primarily put forward for the Greek case.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Undoubtedly, tourism is a key driving force for socio-economic progress. It accounts for 5% of direct global Gross Domestic Product (GDP) offering 235 million jobs worldwide. In 2014, international tourist arrivals reached 1138 million and the corresponding turnover approximated US\$1200 billion (UNWTO, 2015). However, tourism contributes to the climate change phenomenon since it is responsible for about 5% of global CO₂ emissions, emanating mainly from transport, accommodation and related activities. The

accommodation sector uses vast quantities of energy, water, raw materials and products. The average energy use per guest night for all different accommodation categories internationally approximates 100 MJ (Gössling, 2002), whereas average direct water consumption reaches 350 l per guest night (Gössling, 2015). The accommodation sector generates large volumes of waste i.e. a typical tourist in Europe generates at least 1 kg of solid waste per day (Davies & Cahill, 2000).

On the other hand, tourism is a particularly climate-sensitive economic sector, considering that climate change affects a number of key factors pertinent to the tourism industry. Climate plays an important role in destination choice and the timing of travel (e.g. Scott & Lemieux, 2009; Kozak, Uysal, & Birkan, 2008; Hamilton & Tol, 2007; Hamilton & Lau, 2005). In addition, it allows for an activity to be undertaken or inhibits participation, for instance ski

^{*} Corresponding author. Laboratory of Heat Transfer and Environmental Engineering, Aristotle University of Thessaloniki, Box 483, 54124 Thessaloniki, Greece.
E-mail address: amichail@aix.meng.auth.gr (A.V. Michailidou).

tourism depends on snow conditions, (e.g. [Shih, Nicholls, & Holecek, 2009](#); [Scott, Jones, & Konopek, 2008](#); [Scott & Jones, 2007](#)). Several studies have examined the influence of climate change on tourists' demands and flows based on future scenarios suggested by the Intergovernmental Panel on Climate Change ([Amelung, Nicholls, & Viner, 2007](#); [Scott, Jones, & Konopek, 2007](#); [Hamilton, Maddison, & Tol, 2005](#); [Lise & Tol, 2002](#)). The scientific community has considered the impacts of climate change on tourism on: (i) global scale ([Amelung et al., 2007](#); [Hamilton et al., 2005](#)), (ii) country scale ([Hamilton & Tol, 2007](#)) and (iii) destination scale, such as on coastal areas ([Moreno & Amelung, 2009](#); [Moreno & Becken, 2009](#); [Phillips & Jones, 2006](#)), islands ([Becken, 2005](#)), ski areas ([Dawson & Scott, 2007](#); [OECD, 2007](#); [Scott, McBoyle, Minogue, & Mills, 2006](#)), and parks ([Scott et al., 2007](#); [Jones & Scott, 2006a, b](#)). The main conclusion of these studies is that climate change will determine the choice of destination, the season and the length of the stay.

Furthermore, extreme weather events, sea level rise, snow decrease, wildfires, infectious diseases are some of the climate change impacts that could affect not only tourists' comfort and activities but also their safety. Heatwaves ([UNWTO-UNEP-WMO, 2008](#)), fires and droughts ([Scott & Lemieux, 2009](#)), hurricanes ([Becken & Hay, 2007](#)), transportation accidents, delays and cancellations ([Koetse & Rietveld, 2009](#)) have been reported, resulting in injuries and life losses, which induce insecurity to tourists and therefore cancellations of next season's bookings on affected areas. For instance, the 2003 heatwave in France was responsible for 15,000 deaths and major shifts in traditional tourist flows for this year away from the traditional resorts in the Mediterranean and towards Northern or Western beach locations ([UNWTO-UNEP-WMO, 2008](#)). On the contrary, regions in which climate change leads to moderate temperatures and do not incur extreme weather conditions, and which are normally not the traditional tourist destinations, will experience a double positive effect, considering that there will be an influx of tourists from currently the most popular destinations and the locals will no longer travel to foreign holiday destinations ([Hamilton et al., 2005](#)).

It should be underlined that the nature and intensity of climate change impacts differ among tourism destinations around the world. Possible differentiations in tourists' flows and demand patterns throughout the world would bring income redistribution, employment and community development or stagnation, and significantly influence the profitability and viability of tourism businesses ([UNWTO-UNEP-WMO, 2008](#)). However, it is important to emphasize that the economic consequences are not the same for all regions or destinations ([Shaw & Loomis, 2008](#)). For example, there are regions and countries that are more vulnerable than others, but present higher adaptive capacity. In any case, both strategic mitigation and adaptation management have to be efficiently planned, and realistically implemented to an area under consideration. The tourism sector must urgently respond to climate change by mitigating its greenhouse gas (GHG) emissions and by adapting to the changing climate conditions. This is also emphatically expounded in the Davos Declaration (2007). Towards this aim tourism businesses and stakeholders' engagement becomes crucial.

Nevertheless, research on the engagement of tourism businesses and stakeholders in climate change mitigation and adaptation management is scarce. Several studies have examined the willingness of tourism stakeholders to act towards mitigation and adaptation by conducting surveys on local communities (e.g. [Matasci, Kruce, Barawid, & Thalmann, 2014](#); [Amundsen, Berglund, & Westskoget, 2010](#)). According to [Matasci et al. \(2014\)](#), stakeholders noted the need for more information and communication about possible adaptation measures in order to overcome the barriers of their implementation. Others have examined climate

change perceptions and reactions of tourism stakeholders in both winter and summer context (e.g., [Hopkins, 2014](#); [Morrison & Pickering, 2013](#); [Jenkins & Nicholls, 2010](#); [Bicknell & McManus, 2006](#)). These studies reveal that businesses which have not yet witnessed any changes were less concerned or willing to change their behavior. Tourism businesses, which are adapting to climate change, have mainly engaged in measures related only to their short-term economic sustainability.

Considering all the above, this paper presents a generic management framework in order to plan and implement a climate change mitigation and adaptation strategy in a defined tourism area. This is deemed pivotal in order to support decision-makers, so that tourism destinations become responsive to climate change. The methodological scheme is based on the theoretical background of Multi-Criteria Decision Analysis (MCDA) and considers 18 mitigation and 16 adaptation options. The proposed framework centers on the example of Greece, one of the world's most popular tourism destinations. Said approach is implemented for the first time in Greece, at least to the authors' knowledge. The importance of this work is evidenced by the fact that there is no common national tourism managerial framework to address interactions between climate change and tourism activity in the country, and thus, address the issue of sustainable tourism in a systematic and centrally planned way, particularly in this era of Greek economic recession.

The framework allows decision-makers to benchmark and choose interventions/measures/alternatives by taking into consideration local specific characteristics. The most applicable bundle of alternatives rests in achieving stakeholders' consensus, while taking into account multiple conflicting views and criteria. Thus, MCDA is essential considering that the development of such a strategy is a complex and multi-disciplinary process involving a wide range of scientists and stakeholders (e.g. governments and local authorities, tourism enterprises, investors, insurance companies) with varying expertise and interests. However, literature review reveals (Section 2) that the adoption of MCDA in the context of tourism management in order to plan mitigation and adaptation options has yet to be applied, at least to the authors' knowledge.

2. Multi-criteria decision analysis in the context of tourism management

MCDA techniques can be used to identify a single most preferred option, to rank options, to short-list a limited number of options for subsequent detailed appraisal, or simply to distinguish acceptable from unacceptable possibilities. Their properties make them appealing and practically useful. [Belton and Stewart \(2002\)](#) portrayed some of these properties: (i) take explicit account of multiple, conflicting criteria, (ii) help to structure the management problem, (iii) provide a model that can serve as a focus for discussion, and (iv) offer a process that leads to rational, justifiable and explainable decisions. They can deal with mixed sets of quantitative and qualitative data, including expert opinions. In the environmental context, applications of multi-criteria methods have gained wide acceptance in recent years since they have been employed for a wide range of environmental planning and management problems (e.g. [Achillas, Vlachokostas, Moussiopoulos, & Banias, 2010](#); [Garmendia & Gamboa, 2012](#); [Vlachokostas, Achillas, Moussiopoulos, & Banias, 2011](#)).

MCDA methods have already been used in the tourism management context. [Proctor and Drechsler \(2006\)](#) developed a multi-criteria evaluation process for the selection of suitable tourism management practices in Victoria, Australia. MCDA was adopted by [Zhang et al. \(2013\)](#) to manage protected area zones with respect to different levels of human activity. MCDA techniques have seldom

Download English Version:

<https://daneshyari.com/en/article/7421445>

Download Persian Version:

<https://daneshyari.com/article/7421445>

[Daneshyari.com](https://daneshyari.com)