



Economic valuation of the existence of the southwestern basin of the Dead Sea in Israel

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ABSTRACT

The Dead Sea is a unique natural and tourist site that attracts many tourists. In recent decades, the Dead Sea water level is suffering from a significant decrease, resulting in the dehydration of the southwestern basin. This study focuses on the economic benefits arising from the continued existence of the southwestern basin as an important and unique tourism center. The economic benefits were estimated by methods for estimating market benefits of tourism based on market-data, as well as by the Travel Cost Method and the Contingent Valuation Method. The results suggest that there are clear economic benefits to the preservation of the southwestern basin, and while the market benefits constitute the major part of the estimated benefits, the non-market benefits show that the Israeli public assigns the southwestern basin a significant economic value. The results may assist in making informed policy decisions regarding the continued existence of the southwestern basin.

1. Introduction

The Dead Sea is a unique natural site that attracts many visitors from Israel and abroad. Over the past decades, the Dead Sea level has dropped considerably for various reasons (Becker and Katz, 2006). As a result, the southwestern basin of the Dead Sea is drying up. Today, the southwestern basin continues to exist as a water body due to a feeding channel from the northern basin. In fact, this channel allows the existence of the hotels located on the shores of the southwestern basin which constitute a major tourist attraction in the region. In the ongoing public debate that has been taking place during recent years regarding the possible solutions for the issue of the Dead Sea level, it is clear to all that the implementation of the appropriate solution entails broad economic implications for all parties concerned. However, this discussion barely touches the economic value arising from the existence of the southwestern basin of the Dead Sea. These benefits include both market and non-market values.

Non-market benefits are the benefits to the general public arising from the existence of a natural resource, which cannot be measured by the market mechanism (Boyer and Polasky, 2004). The difficulty in carrying out an evaluation of non-market benefits (such as view, air quality, etc.), is due to the fact that they do not carry a price tag and are not traded in the open market (Huhtala, 2004). The Travel Cost Method (TCM) and the Contingent Valuation Method (CVM) are the most

commonly used methods for assessing the value of non-market benefits (Jala and Nandagiri, 2015). CVM is a survey method that is based on responses to hypothetical questions presented in the context of the good being valued, while TCM calculates the individuals expenditure for reaching the site. Many studies have carried out economic valuation of nature and landscape sites using CVM (e.g., Bateman et al., 1993; Loomis, 1987) and TCM (e.g., Acil, 2006; Douglas and Taylor, 1999; Fleming and Cook, 2007; Lansdell and Gangadharan, 2003). According to these studies, in many countries, individuals are willing to pay substantial sums to preserve nature and landscape sites surrounding them. The benefits found are not derived only from the direct benefit of the individual use, but also from other reasons, such as unique landscape features and the importance of the site from an environmental perspective.

CVM is a “stated preference” method, as it involves asking people directly how much they are willing to pay for a specific environmental service. Using the CVM, respondents are usually presented with detailed information regarding a hypothetical scenario in which the quality or quantity of an environmental good, service, or resource, would reduce or increase. Although there are those who criticize the CVM as a valuation method (e.g., Diamond and Hausman, 1994), as it does not quantify actual market behavior, other studies, which had attempted to validate figures from CVM studies, found a rather close match with other non-market valuation methods when evaluating use

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values, thus raising the credibility of CVM (Carson et al., 1996; Freeman, 2003). Furthermore, an expert panel (the NOAA panel) found that in spite of its limitations, CVM represents the only systematic method available for assessing non-use values (Federal Register, 1993). Regarding the TCM, the basic assumption is that the time and travel cost of individuals for visiting a site is a surrogate to their willingness to pay (WTP) to visit the site (Limaie et al., 2014).

In recent years, several CVM and TCM studies were also carried out in Israel, examining the economic value of nature and landscape sites (Becker et al., 2014; Abramson et al., 2010; Becker and Chores, 2007; Fleischer and Tsur, 2000; Odish and Fleischmann, 2004). These studies show that the Israeli public is willing to pay for the preservation of nature and landscape sites and that it attributes to such sites a considerable economic value (some of these studies included CVM among the Palestinian public and the Jordanian public). A study carried out in Israel by Becker and Katz (2006), used both CVM and TCM in order to estimate the non-market economic value for the conservation of the Dead Sea. Nevertheless, the study by Becker and Katz (2006) was carried out for the entire Dead Sea, while the current study relates only to the economic value of the southwestern basin, and examines both market and non-market values.

The aim of this paper is to estimate both market and non-market benefits resulting from the continued existence of the southwestern basin as a unique and important center for local and international tourism, in comparison to a scenario in which the water body would naturally dry up and cease to exist. In this context, we may note non-market benefits as benefits of tourists and visitors to the site, as well as benefits to the population who does not visit the site, but is aware of its existence, and is interested in maintaining its properties. It should be noted that the estimated benefits to the economy relate only to the tourism and environmental aspects, and do not take into account the benefits that the country derives from activities of the Dead Sea industry.

2. Methodology

The assessment of the economic benefits of the southwestern basin in this study refers to a variety of benefits to the economy arising from its existence. The assessment of the economic benefits includes both monetary benefits based on market research and data that reflect the market value of tourism products (such as hotel revenues), as well as the benefits to the welfare of the Israeli public. These benefits are estimated by using both market evaluation methods based on market data (such as data on domestic tourism), and by using TCM and CVM for non-market benefits for products which have no market value. Following is a description of the methodology carried out for estimating the benefits.

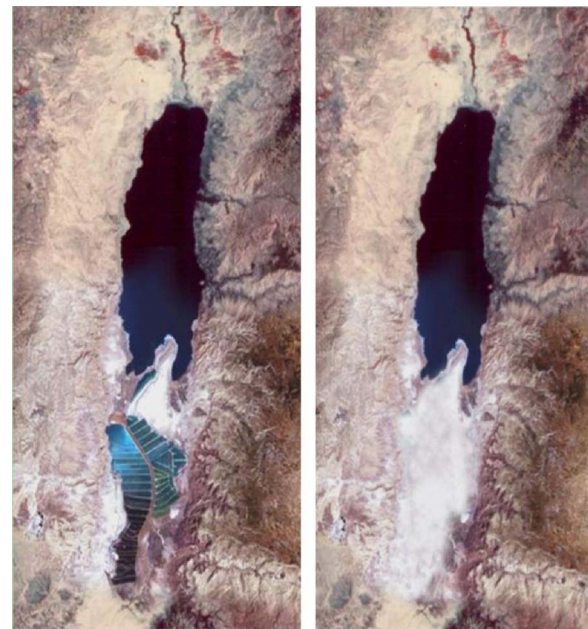
2.1. Defining interest groups

The interest groups represent the population groups that may benefit from the existence of the southwestern basin of the Dead Sea. Accordingly, the following interest groups were defined: (1) Tourists staying at the Dead Sea's hotel compounds. (2) Tourists visiting the south region of the Dead Sea (which do not stay in the Dead Sea's hotels). (3) Israeli interest groups that do not visit the Dead Sea, but have an interest in its future and preservation values.

2.2. Defining scenarios

The methodology for assessing the economic benefits from the existence of the southwestern basin of the Dead Sea is based on a comparison between two scenarios:

Business as usual (BAU) scenario: A scenario that reflects the current condition of the Dead Sea. The main characteristic of the present state is approximately a one meter drop per year in the northern basin level,



BAU scenario

Alternative scenario

Fig. 1. The BAU scenario and the alternative scenario.

and maintaining a constant water level of the southwestern basin through a feeder channel.

Alternative scenario: This scenario reflects the reduction in the area of the Dead Sea's water body, which will lead to the closure of the Dead Sea's hotels. In this scenario only the northern basin would remain as a water body.

The differences between these two scenarios were visually presented, as shown in Fig. 1 to the various interest groups for their impression and to ensure full understanding of the scenarios. Estimating the economic benefits by the various evaluation methods was held in relation to these scenarios.

2.3. Estimation of market benefits

In the framework of this study, we quantified market benefits originating from the tourism and hotel industry, which apart from the Dead Sea industry, is the main activity branch benefiting from the existence of the southwestern basin. Estimating the benefits was based on data collection and surveys (see Section 2.5) to assess the extent of the activities taking place in the region, which are directly related to the southwestern basin and the effect of an event of dehydration of the Dead Sea. These include benefits from internal tourism as well as from foreign tourism. In this context, we evaluated: (1) The loss of economic benefit due to a reduced number of tourists visiting the southwestern basin hotels, and from the transition to cheaper hotels on average in other regions in Israel. (2) Tourists (Israeli and foreign) who will stop vacationing in Israel.

To estimate the revenue stream in this theoretical scenario, an economic model was built to allow us, under reasonable assumptions, to obtain an estimate of this sum. In general, the concept underlying the modeling is that in the event of the drying of the southwestern basin, a transition will occur in part of the region's tourism to other areas, in Israel and worldwide. Thus, the economic quantification requires us to answer two main questions: (1) How will the "tourism pie" be divided between the various tourism areas in Israel? (2) What would the revenue gap be due to the shift to other sites?

To calculate the revenue loss from the southwestern basin hotels, the economic model consists of three successive steps:

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