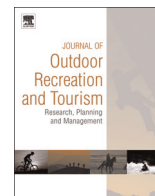




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Discussion paper

## The impact of ecosystems on human health and well-being: A critical review

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## ABSTRACT

Human health is a key factor for population well-being, and depends on the conditions and functioning of the ecosystem and its ability to provide adequate and healthy flows of ecosystem services, as stated by the well-known approach of the Millennium Ecosystem Assessment (MEA). The aim of this paper is to provide an overview of the literature focusing on the links between ecosystem services and human well-being, starting from a reinterpretation of the MEA framework. In this process, we highlight the need to consider the mechanism of exposure through passive, consumptive and active behaviour, as well as contextual factors such as socio-economic, demographic and climatic factors. In this context, tourism, recreation and leisure are linked to active engagement.

The literature at present uses different measures of health and well-being, which suggests the need to develop harmonized approaches and new methods to assess the influence of study design on measured outcomes. In conclusion, the analysed studies show moderate evidence towards a positive impact of green environment, though positive and significant effects are not found in all cases examined.

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## 1. Introduction

Ecosystem services contribute to human well-being in many different ways. As stated in the Millennium Ecosystem Assessment (MEA, 2005), five main elements have been identified: security, basic material, health, good social relations and freedom of choice and action. Security refers, according to the assessment, to both safety for individuals and their properties, and the more abstract sense of access to minimum resources and avoidance of disasters caused by humans. Basic materials for good life include shelter, food, water and energy necessary for subsistence, as well as income, assets and access to goods. Health is one of these five components but is also central in this study. The Millennium Ecosystem Assessment, as well other entities such as the WHO (1946),<sup>1</sup> takes an extensive approach to health, identifying it not only as the lack of illness, but that it also relates to a feeling of strength, being nourished and having access to adequate air and water (World Health Organization, 1986). In the cluster dedicated

to good social relations, aspects such as social integration and respectful environments are considered. All these groups provide the basis for a fifth constituent of human well-being, freedom of choice and action. This concept is determined by the ability of the person to achieve a degree of control of the happenings surrounding them.

Human health is one important factor for determining population well-being, and depends on the conditions and functioning of the ecosystem and its ability to provide adequate and healthy flows of ecosystem services (e.g. water, food, air quality). The MEA framework lists four groups of ecosystem services: provisioning, regulating, cultural, and supporting services. Supporting ecosystem services constitute the basis of the functioning of ecosystem services themselves, including their nutritional cycles and the formation process of the soil. Ecosystems provide also direct provisioning, with items such as food, water or medical plants. Regulating services affect also directly human well-being through the regulation of climate and flood control. Finally, cultural services affect human health because they offer opportunities for recreational activities and rural tourism, aesthetic and spiritual values, thus contributing to both physical and emotional aspects of health. Recreation promotes active lifestyles which improve health because of decreased risks of certain diseases (such as cardiovascular) and the negative effects of ageing and obesity. Cultural

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<sup>1</sup> Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19–22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

services are also related with improved mental health, improved community cohesion and sense of identity. Some of these services are also linked to the market through the tourism sector and can therefore contribute to the national economy.

All these services affect human well-being in different ways. A deteriorated environment has a negative impact on human health, as for example air pollution can aggravate pre-existent cardiovascular and respiratory diseases in the elderly especially, so that any improvement of air quality or reduction of the outdoor and indoor heat will have a beneficial effect on health. The simple contact with nature promotes many beneficial impacts on health, such as on cardiovascular and respiratory systems, reduced diabetes and obesity (through a more active lifestyle), and psychological well-being. Life expectancy is generally increased and mental health is improved due to the calming and restorative effects of nature. Open areas such as urban green areas provide also a good context for social interaction and therefore might improve the cohesion of neighbourhoods, which affects social relations.

This paper analyses the benefits that green and blue areas such as urban parks and green spaces and/or freshwater and coastal zone, can provide to human health and well-being. For this purpose a literature review has been conducted to analyse how the natural environment is influencing different aspects of well-being focusing on health and its determinants.

The paper is organized as follows. Section 2 contextualizes the study's approach through the MEA framework describing the interaction between ecosystem services and human well-being including human health. Section 3 presents the evidence on the linkages between health and well-being on one side and ecosystems on the other. Finally, Section 4 discusses next research gaps and main conclusions.

## 2. Natural environment and human well-being: the MEA approach

At least in Europe the issue of how environment relates with human well-being has been addressed in much of the recent literature (e.g. Hartig, 2008; Bell Simpson, Tyrväinen, Sievänen, & Pröbstl, 2009; Pröbstl, Wirth, Elands, & Bell, 2010). The wide range of differentiated approaches taken in the literature in this area

highlights the need to integrate this question into the broader approaches taken, such as the Millennium Ecosystem Assessment (MEA) (e.g. Chan, Satterfield, & Goldstein, 2012). The aim of this section is to analyse the link between ecosystems and human well-being as described in the MEA assessment.

The well-known MEA approach proposed a framework linking ecosystem services with human well-being in terms of health and good social relations. As stated in the MEA, health can be defined as “the ability of an individual to feel well and strong, or in other words to be adequately nourished and free from disease, to have access to adequate and clean drinking water and clean air, and to have the ability to have energy to keep warm and cool” (MEA, 2005). The assessment also identifies the relation between health and well-being as bidirectional. Good social relations include factors such as social integration, altruism, sense of identity, education and learning processes. Fig. 1 shows the relationship between ecosystem services and different aspects of human well-being including health. However to understand the benefits from ecosystem services on health we believe that the mechanism of exposure is important. Therefore for the discussion below we will use the concepts of “passive”, “consumptive” and “active” exposure. Examples for the three forms of exposure are as follows:

- “Passive” exposure relates to benefits associated with the amenity provided by green and blue space in terms of views.
- “Consumptive” exposure relates to the consumption of elements of the environment, be it water or food for provisioning services or fresh air in terms of regulating services.
- “Active” exposure relates to immersive engagement with the natural environment in some form, be it through recreation, leisure or tourism.

We realize tourism, recreation and leisure are considered by some to be cultural ecosystem services – but active engagement is still needed to capture these benefits. Previous studies have attempted to identify the impacts on Quality of Life of tourism (Dolnicar, Yanamadram, & Cliff, 2012) by focussing on the exposure – well-being linkage, and identifying clusters of tourists who may particularly benefit from engaging in provided activities. However, the linkage back to ecosystem services has not fully been considered to date to our knowledge.

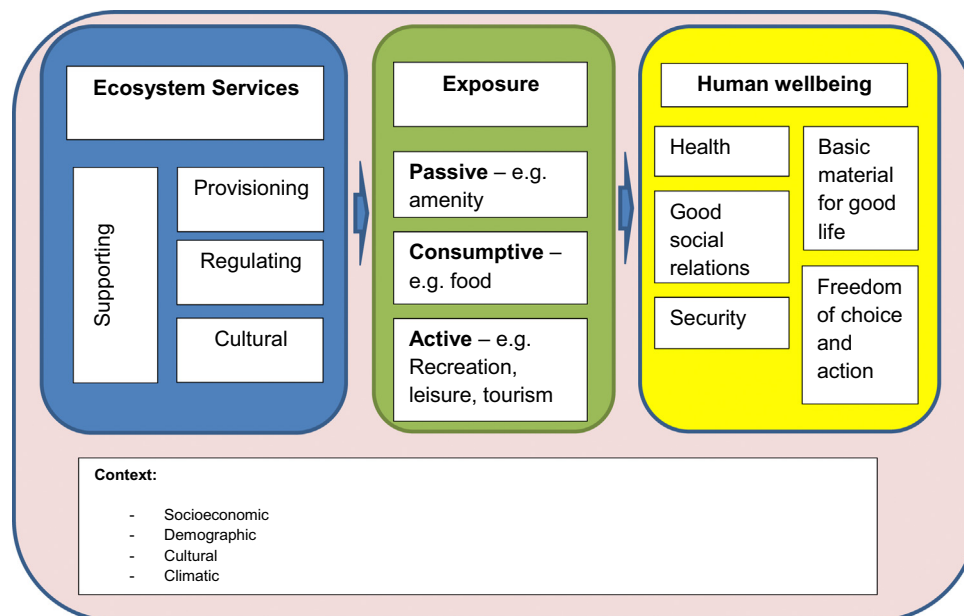


Fig. 1. Conceptual framework of linkages between ecosystem services and health and well-being. Source: adapted from MEA framework (2005).

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