



## Exploring multi-dimensional recreational quality of beach socio-ecological systems in the Canary Islands (Spain)



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### HIGHLIGHTS

- This research analyzes recreational quality of beaches as socio-ecological system.
- Proposed index analyzes different dimensions of recreational quality of beaches.
- Quality is moderate-high in all dimensions (important differences among beach types).
- Experts and users converge in weighting recreational quality dimensions.

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### ABSTRACT

Beaches exposed to continuous arrivals of tourists, such as on the Canary Islands, are subject to demands for quality requirements that are more stringent than in other coastal areas with seasonal tourism. It is therefore especially necessary to evaluate the recreational quality of these beaches. This paper develops a system of indicators (accessibility, environmental quality, water quality, comfort, scenic quality, human activity and infrastructure, facilities and safety) which integrates the narratives of stakeholders, and reveals high recreational quality values at urban and semi-urban beaches, moderate to high values at semi-urban beaches, and low values for services at natural beaches. In order to increase the quality of (i) accessibility at urban and semi-urban beaches, (ii) comfort, scenic quality, facilities and safety services at semi-urban beaches and (iii) water quality, facilities and safety at natural beaches, local management practices need to be adapted in accordance with the different types of beaches.

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### 1. Introduction

There are many diverse functional features of a coastal domain, which are expected to meet the needs and expectations of a broad spectrum of users (Nonn, 1987). Tourism and recreation are

especially important among these services and functions (Barbier et al., 2011), which often involve human occupation of the first 100 km of the coastline (Martínez et al., 2007).

Tourism policy development is not usually based on inclusive processes that could integrate the narratives from the different local stakeholders, partly because of pressure from the private sector and priorities imposed by other influential stakeholders (Bramwell, 2011). With beach adaptation for human use, recreational quality is especially important in economies that rely largely on tourism, such as the Canary Islands (Bianchi, 2004). In this archipelago, the development of mass tourism has led to social and territorial changes. Mass tourism emerged in the 1960s and beach-related tourism became the mainstay of the islands' economic development. The population, which was previously engaged

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mainly in agriculture, saw a promising source of higher income in the tourism sector, resulting in mass migration from the inland parts of the islands to the coastal zones (Naylon, 1967). In the same period, lobbies in the tourism sector enjoyed significant influence over planning and land management measures, especially those applied to the beaches that attract tourists. The increase of tourism and local population at the coast has generated a different recreational use of the surrounding beaches, which has resulted in different beach service configurations based on the degree of human occupancy and socio-economic activities. The concept “recreation” refers to activities or situations of leisure, relaxation or entertainment by users, who freely participate in these activities based on their interests and preferences. This concept has been analyzed as an epistemological contribution to social science development (Henderson, Presley, & Bialeschki, 2004). In this respect, three different approaches to recreation concept can be distinguished (Hollander, 1976): (i) philosophical analysis of recreation that includes the guesswork and rationalism of society; (ii) social empiricism that describes and documents the behavior of society; and (iii) social analysis, which tries to explain causality and the behavior of individuals. Thus, in the analysis of beach recreational quality it is important that beaches are understood as socio-ecological systems (McLachlan, Defeo, Jaramillo, & Short, 2013.), consisting of four main interrelated elements: (i) the resource (the physical beach itself); (ii) users; (iii) managers; and (iv) services and public infrastructure (Anderies, Janssen, & Ostrom, 2004). Following this model, the recreational quality of beaches is linked, on the one hand, to services (kiosks, hammocks, home security, adaptation of services for the disabled and controlling the quality of bathing water) implemented by managing institutions and, on the other hand, to the relationship between users and the resource.

Concerns about the management of the recreational quality of beaches worldwide arose after the 1960s and 1970s, when beaches first began to be perceived as spaces for leisure and recreation. Since then, numerous scientific studies have addressed this issue (Ariza et al., 2010; Barbosa and Da Costa, 2008; Botero, Pereira, Tosic, & Manjarrez, 2014; Cervantes & Espejel, 2008; Leatherman, 1997; Morgan, 1999a; Nelson, Morgan, Williams, & Wood, 2000; Williams & Micallef, 2009). Usually, these studies focus on beaches located in urban areas where the interactions between humans and the environment generate the most intense conflict (Nonn, 1987). In contrast, studies on recreational quality of natural beaches are scarce, though no less interesting, because they cover an environment that is highly valued by visitors with particular profiles (Lozoya, Sardá, & Jiménez, 2014).

Studies about recreational quality of beaches are often based on perceptual surveys (Morgan, 1999b; Tudor & Williams, 2006, pp. 153–164; Roca & Villares, 2008; Vaz, Williams, Silva, & Phillips, 2009; Lozoya et al., 2014) and decisions made by stakeholders (Villares et al., 2006). The inclusion of these narratives is especially important for the analysis of beaches as socio-ecological systems that are complex and dynamic. These narratives allow a greater awareness (points of view, previous experiences or perceptions) of the causes and relationships of the processes that make up the beaches. Thus, a study of the narratives of users and experts is essential for an analysis of the management of beaches as socio-ecological systems (Anderies et al., 2004).

In coastal areas, there are continuous arrivals of tourists throughout the year due to attractive climate and opportunities for leisure and recreational activity. This situation, in island environments such as the Canary Islands, generates significant misalignments (social-economical conflicts) and territorial transformation because of limitations of space and coastal resources. The Canary Islands are a particularly good example, given the lack of fit between the needs of users, policy decisions,

provision of services and natural functioning of the beaches. In such environments, managing institutions should be aware of the peculiarities of the socio-ecological and economic processes (Folke, Pritchard, Berkes, Colding, & Svedin, 2007; Mayumi & Giampietro, 2006; Ostrom et al., 2007). Thus, governance is presented as a solution for the gradual reduction of uncertainty in the effectiveness of the measures taken (Garnåsjordet, Aslaksen, Giampietro, Funtowicz, & Ericson, 2012). In the Canaries, despite the recreational importance of the beaches, there is no holistic approach to their management, and no studies have assessed the dimensions involved in the recreational quality of the beaches that have varying degrees of artificiality and human occupation (i.e. urban, semi-urban and natural beaches).

The aim of this study is to develop a system of indicators to estimate the recreational quality of beaches. As beaches are highly complex systems, we depart from the paradigm of Post-normal science (existence of irreducible uncertainty through scientific research, high stakes, and the need to make decisions urgently) (Funtowicz & Ravetz, 1993) for their analysis. System development indicators have relied on the expertise of academics, as well as on the various stakeholders, and the perceptions of users. This research aims to generate a set of useful indicators to aid collective deliberation in the process of governance of the beaches in the Canaries, so that their management as an economic resource can be optimized, and understanding of existing territorial conflicts is enhanced. The general approach can be especially useful for analysis of beaches as tourist resources in coastal areas of arid regions.

## 2. Canary island beaches

Given the heterogeneity of the beaches of the Canary Islands, they have been classified according to their functional characteristics. The available classifications have been reviewed (Ariza et al., 2010; Roca & Villares, 2008; Vaz et al., 2009; Williams & Micallef, 2009) and adapted to the peculiarities of the Canarian beaches (Table 1).

### 2.1. General approach

A set of indicators, associated variables and valuation ranges were established through a literature review (Ariza et al., 2010; Barbosa and Da Costa, 2008; Botero et al., 2014; Cervantes & Espejel, 2008; ; Leatherman, 1997; Morgan, 1999a), consultation with experts in physical geography, and a review of the opinions given by beach users. The Beach Quality Index (BQI) developed by Ariza et al. (2010) was used as the initial basis for structuring the indices. The research was conducted assuming the need to analyze the different dimensions of the system separately, integrating the normative (related to values) and descriptive (related to knowledge) aspects consistently. Each dimension of beach recreation is considered as a partial index. The set of partial indices form the recreational quality indicator system. Thus, the methodology integrates both quantitative and qualitative techniques.

The data for calculating the partial indices were obtained from geographic information systems (GIS), query databases of public institutions, consultation with local managers, and field work.

### 2.2. Expert survey

During 2013 (April–May), experts were consulted (Appendix A) in order to create three lists of variables (urban, semi-urban, and natural beaches). Thirty-three experts with different backgrounds were selected according to their knowledge of ecological, physical and social processes at different beaches of the Canary Islands. The surveys helped to prioritize the variables associated with each

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