

Social Value of Nature Amenities: WTP for the Use of Public Seasides

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Abstract. The value of seaside tourism, its economic dimension, are generated above all by the competitiveness of the coast, especially in sandy beaches, surrounded by valuable landscape contexts, and well connected in terms of services, accessibility, accessibility, and degree of "amenities".

Some parts of the coastal strips are less accessible, due to naturalistic reasons (Sites of community importance, marine parks, protected areas), geomorphological (risk-related problems) and infrastructural (barriers such as the railway line, or the high waterfront); others, on the other hand, enjoy good accessibility, are close to bathing services. In addition to accessibility and support services, the most relevant "physical" indicator is that relating to the ability to accommodate bathers, ensuring the sustainability of the effects on the environment, and social equity. This latter aspect represents a peculiarity of the Italian system of coastal management, as the edge of the coastline is public property, by Constitutional Law, and granted to entrepreneurs through the payment of a fee. The very low value of this Italian form of taxation, however, does not repay the use of natural resources, and often conflicts with European directives (in this case the Bolkenstein Directive) which obliges member states to make a selection among requests for granting the public beach, based on environmental and socio-economic criteria.

Keywords: Social value of nature amenities · WTP for the use of public seasides

1 Introduction

Management of coastal areas in the area of European Community states arena represents one of the more complex activity, for which most of the Member States tried and still try to develop and implement several common strategies, involving economy, research, development and environmental protection. There are many directives and programs that involve coastal areas. The sea is the places of most environmental and ecological services. The data collection of ecological indicators regarding european marine environments, is still on development.

© Springer Nature Switzerland AG 2019
S. Misra et al. (Eds.): ICCSA 2019, LNCS 11622, pp. 132–144, 2019.
https://doi.org/10.1007/978-3-030-24305-0_11

The progressive involvement of the private actor in management of the seaside usually shows a complex procedure, due to the need to shift, even partially from the public domain of marine areas to the private management. In Italy, in fact all the coastline is public, but the license of use of the beach can be accorded with private entrepreneurs. This national rule is on charge on the Italian Marine Regions, that are fifteen on twenty. Regions develop their action plan, that takes in account the peculiarities of each own environmental marine context. Therefore there is a quite complex framework that considers the State, the Region, the Municipalities, having each one of them their proper legislative framework.

The paper explain some relevant aspect of the approach that municipalities have to use in the region of Apulia, where the see represent in various way a main item in the public accounting.

In order to develop regional directives to regulate the licence use at the local level, and by according a set of criteria, the Apulia Regional Government provides the Regional Coastal Plan (RCP) with guidelines for all marine municipalities aiming to produce a "City Coastal Plan" (CCP).

RCP, in the elaborate "Implementation technical standards and general guidelines for the preparation of City Coastal Plan", defines in detail the contents of the CCPs, with reference to the relationships between specific territorial objects, artefacts and works, public uses of the sea and of the coast.

The regional guidelines are

The set of rules of the RCP, establishes the aims of the Municipal Coastal Plan defining it as an "instrument of planning, management, control and monitoring of the coastal municipal territory in terms of landscape protection, environmental protection, guarantee of the right of citizens to access and free use of the natural public heritage, as well as the discipline for its environmentally compatible use. It covers the related public interests:

- the development of the tourism sector, due to its socio-economic implications;
- enjoyment of the asset by the community;
- the protection of the natural environment and the recovery of stretches of coastline that

they are in a state of degradation, or morphological instability".

In the interpretation given in the RCP, the main objective of the CCP is to pursue economic and social development of coastal areas through the affirmation of the quality and sustainability of the same, outlining defense and government strategies, in the observation that the state current of the coastline is generally affected by a unordered evolution, the effect more than a summation of interventions without any reciprocal connection that of the product of a system logic based on a correct relationship between built environment and natural environment.

The PCC must build a knowledge – base that, according with the national law, is reversed in the National Geographic Information System of Public Domain, to constitute a new, updated system for managing public terrestrial properties.

The last, but not least scope of the CCP is the assessment of the payment due by entrepreneurs for the license of using the coastal line.

The Italian Government establishes a national rate system for marine uses licence that is periodically the rate for square meter, according to a set of categories of marine

use. Therefore, since many years the only new decision, is regarding the payment of use licence.

The way of give the use licence highlight show the measure of collaboration between Public Authority and Private entrepreneurs currently represents the unawareness of the municipalities to enjoy of an effective procedure for the convergence of collective interest with the use of public properties.

On one hand the public give the use of coastline also for a major inability to manage all the seaside. On the other hand, the public locates a set of constrains of use for the more environmentally sensible part of the coastline, especially as regards the coastal erosion, the hydrogeological balance and the geomorphological equilibrium and finally the respect of natural areas. The consequence is that the willingness to pay (WTP) is absolutely not the measure for establish a correct fee for a public licence of use of the coastline.

Furthermore, a better the cooperation between the public administration and private investors favors indirectly the sharing of appropriate organizational skills in the transformation and management of the public property assets.

The last, but not least main oddity of the tax-system is that the value is referring at only two level of tourist attractivity of the coast: the yearly fee is 1,38 euros per square meters for all the existing beaches in Italy, classified as normal-touristic attractive, and 2,76 euros per square meters for those beaches classified as "high-touristic attractive". As a consequence, municipalities by the redaction of CCP have to select the coastline sectors, and to classify their belonging to the "normal attractivity" or the "high attractivity".

The paper explains what is the general reasoning that can produce a correct assessment of the beach [1], and depicts a future scenario in case of improvement of the evaluation system of public looking at the methods. The paper is subdivided in several paragraph: in the first is described the context that suggested to the author to experiment the method. In the second the method is explained as regards the scientific framework and the use of the method. Finally, the application the method to the case of study is described in detail.

2 Facts and Data

The case of study regards the application of the City Coastal Plan in a small coastal Municipality of Apulia, the City of RodiGarganico. The territory is extend for about 9.9 km along the north-Gargano coast and appears as a stripe on the map. On 01/01/2018 the Municipality had 6355 residents, of which 1860 women, and 138 foreigners. The territory is characterized by some geographical features, representing at the same time a constraint and a stimulus to its economic development.

The municipal territory consists, in fact, of a portion of the northern coast of "Gargano peninsula", connected to a hinterland of limited depth towards the interior, which extends in parallel to the coast itself. Its perimeter seen on the map is reminiscent of an inverted trapezoid, whose northern side represents the coastline, and those to the south continue inland.

The center of Rodi garganico is located at 46 m on the level of the sea, and divides in the middle the municipal territory into two parts, with different morphological characteristics: the Eastside Coast, more impervious and characterized by historical crops, and that of the Westside Coast, more flat and marked by olive-trees and arable crops (Fig. 1).

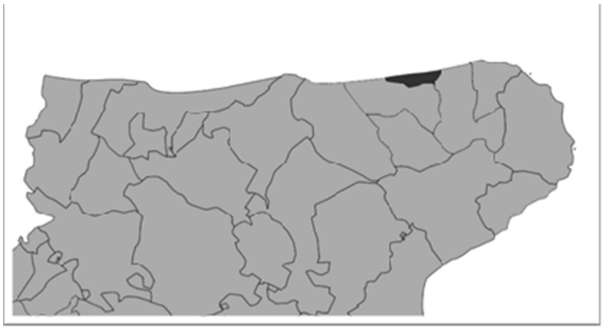

Fig. 1. The position of Rodi Garganico (the darker area in the map) in the North of Apulia

The coastal dynamics of Rodi is affected by the marine meteorological changes and the alternation between phases of advancement of the coast, due to deposition of sand, and the retreat due to marine erosion. In the following figures you can see the variations in depth of beaches and beaches, due to the dynamics mentioned above. In particular, the most significant dynamics are those relating to the east coast, whose dynamics is strongly conditioned by the dynamics related to the port basin, and to the operations of management of the same. It is worth emphasizing that the coastal dynamics has been in constant evolution, and in recent times has "followed the destiny" of the operations carried out in the port basin (dredging, on the seabed, nourishment etc.) alternating phases of retreat and progress. In recent years the retreat has stopped, when the coast has thinned to the point of becoming a sea-side extrusion modelled on the slope on which the state road "SS Garganica" passes. The presence of road works and the seafront at least apparently does not allow further setbacks, but the evolution of the coast is complex (Figs. 2 and 3).



Fig. 2. The ten kms of coast, "cut" in the middle on the promontory where the City of Rodi Garganico and the touristic harbor are laying



Fig. 3. The evolution of the coast near the harbor from 1997 to 2016

Some studies on the suitability of bathing shows that in the whole of 9,260 meters of coastline, 8140 can be usable, and 110 meters unusable. Generally speaking, it should also be considered that many recreational tourist activities take place on the beach or near the beach, outside the area that is conceived to the private entrepreneurs. The development on the coast is related to local condition, more than the general one. But the national law remarks that Municipalities can consider as yearly use fee 2,643€/m^2 for High Value Coasts (HVC) and 1,322 €/m^2 for Normal Value Coast (HVC).

Due to a problem of lacking funds, the municipality was waiting excessively to redact the Coastal Plan, until when the Apulian Region, according to the law, assigned to a special Public Servant, expert in the matter, the duty to develop a Coastal Plan for the City of Rodi Garganico, and the expert involved a research team of the Polytechnic University of Bari.

During the redaction of the CCP, the team considered interesting to develop a test for identifying the differences between some segment of the coast, according to given criteria, in order to better understand the advantages/disadvantages of simplify due to the National classification of usable seaside. The choice was to subdivide the three coastal section (Westside, City Harbor and Eastside) in sub sections, an to use a spatial multicriteria assessment.

3 Methodological Approach

Multi-criteria assessment represents a methodological approach in problem solving regarding the identification of the best choice among alternatives according to several task/criteria, that in some cases has a practical utility in assessing the sustainability of plans and projects [2–5]. Traditionally, the evaluation of plans and projects preludes to the comparison between different solutions, according a general economic judgment of convenience, in order to understand which solution produces greater complex social use value. The estimation of complex social values is usually multidimensional, and therefore is framed in methodologies that take into account different points of view, which can refer to objectives of equity, environmental protection and increase in economic well-being.

In the field of evaluation of plans and projects, the solutions frequently represent alternative hypotheses (e.g. solutions for reusing a building, solutions among the others for using an area, different location solutions for an activity, etc.) and the criteria are generally of convenience, feasibility, environmental impact [6, 7].

In our case the answer should solve a localization problems: problems related to different localization hypotheses of a given secondary urbanization work, in the face of more possible alternatives provided as, in our case the intended allowed use by planning instrument, which identifies several areas within which it is possible to choose. In other words we can speak of “problems of intended use”: problems relating to identify some areas proportionate according to the plan, for which different locations are possible within a municipal area [8, 9].

The first theoretical step of multiple criteria evaluation is to build a logical model that expresses a “generalized concept” of preference.

By "preference" we mean a relationship between two or more alternative solutions of a problem capable of expressing an *order of priority* among them. This relationship expresses a *criterion of choice*.

This modeling is based on the existence of a binary relationship between a group *non-ordered pairs of solutions* (like ai, aj) of a set {A} that allow to *compare* each other the alternatives of possible alternative solutions, that will be selected according to the development of a ranking.

In the classical formulation the model is presented as follows: Given the solutions a_1, a_2 belonging to the set of alternatives {A} we have:

(1) a_1 P a_2 (preference) it is possible to compare a_1 and a_2, and it is possible to state that a_1 is preferable to a_2 in an absolute manner, because a_1 is preferable to a_2, and the opposite do not make sense;
(2) a_1 I a_2 AND a_2 I a_1(indifference) it is possible to compare a1 and a2, but it is not possible to state that a_1 is preferable to a_2, or that a_2 is preferable to a_1
(3) a_1 I a_2 (incomparability) it is not possible to compare a_1 and a_2

The comparison between two solutions a_1, a_2 will be carried out consequently comparing the values of $u(a_1)$ and $u(a_2)$, where "u" is the utility function with respect to a criterion.

Multicriteria methods are based on different way of comparing before each couple of alternative according each criterion, and after making an aggregation in a single preference ranking, that represents the combination of the others.

In our case we have 8 alternatives and 5 criteria. If the criteria of our set do not have the same importance it is necessary to develop a further step, that is the "*weighting*".

The method adopted in this case is not the operation of weighting, but the operation of *discriminating*. The discrimination among alternative can be applied in different ways. In this case the evaluation was based on a scale varying from 1 to 5 corresponding to the simplest scale of judgments ("low", "medium-low", "medium", "medium-high" and "high"), associated with a utility function which measures the advantage obtained in relation to the assigned score. The scale of judgments of the criteria foresees therefore five levels of preferability, for five evaluation criteria. If an alternative prevails over all others for all criteria its non-standardized score would be 5, (the sum of five "win" comparison) and the concordance index would be 1.

The utility function has a variable trend from one criterion to another, so in some criteria the score difference is more discriminatory, in others less discriminatory, depending on the trends (concave = less discriminatory, convex = more discriminatory, linear = uniformly discriminatory and "s" = less discriminatory to extreme values). The relevance of the choices with respect to the criteria was also defined through the allocation of weights. The following figures show the tables with the trends of the advantage of the choice (value of the utility) as the scores vary.

Given that the extreme values always remain constant (score0 = utility0; score1 = utility1) regardless of the functions, these are the trends of the laws of variation of utility functions:

- "S" shaped: emphasizes the minimum and maximum values of utility function:fx increases more than the score x if x is higher than the intermediate value of the

interval and fy decreases more than the score y is lower than the intermediate value of the interval

- linear shaped: respects the perfect proportionality between scores x and y and value of the utility function fx and fy
- demi-concave shaped: brings the value of the utility function fx of the score x upper than x
- demi-convex shaped: brings the value fx and fy of the utility function of a given scores x and y downer than x and y (Fig. 4)

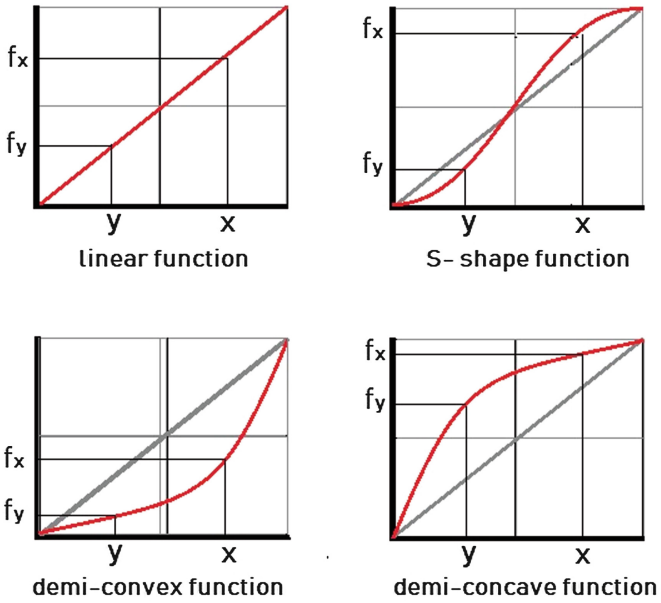

Fig. 4. The discrimination of value in different shaped functions

As already wrote, the choice to weight the importance of criteria by the use of various discriminating rule seems more effective than the traditional one, relating score and functions discriminant character, both in positive and in negative trends.

The considered five criteria are described as follows:

- "Beach depth": the physical depth of the beach (regardless of the depth of the use licensed beach, it is more important a wider and deeper beach than a less wide and shallow one)
- "Services": the greater or lesser presence of services for bathers
- "Accessibility": the greater or lesser presence of access services, vehicular and pedestrian traffic, public transport service stops
- "Parking": the presence of organized parking lots or parking lots along the roads
- "Landscape": the presence of major elements of environmental and/or landscape attractiveness (both natural and architectural and urban)

The alternatives correspond with the subdivision of coastal line in Fig. 5. The coast sectors shift from West to East, identified as follows.



Fig. 5. The subdivision of the coastline in eight contexts

(a) "Ponente_1": The identified band runs from the border of municipality, hosting a tourist settlement to the end of the built area. the characteristics that can determine the tourist value are the following: very large beach, close services on the beach and in the built-up area, good accessibility, around low quality, medium-high parking/parking availability
(b) "Ponente_2": after the end of the built-up area there is a low quality area, a small beach Sand good beach quality services, average accessibility, average parking/parking availability
(c) "Punta Cucchiara": Low quality beach, services that can be reached with difficulty, difficult accessibility, around low quality, low availability of parking
(d) "Ripa": Beach located downstream of the promontory with the city; medium-sized, low quality, services that can be reached with some difficulty, limited accessibility, landscape context and around average quality, low parking availability
(e) "City – Port": includes the cliff, a small beach and the port area: services that can be reached on average, accessibility strongly limited by the current regulations for geomorphological risk; landscape context and around of high quality, medium-low availability of parking.
(f) "Levante_1": it is the area of beach subject to progress due to the effects generated by the presence of the port area, due to the supply of sand due to the presence of the port. whose depth decreases moving away from the harbor basin
(g) "Levante_2": the second part of the beach, facing east, is less affected by the effects of the harbor area, with dynamics that seem to alternate erosion and progress, although this band does not seem like the further east, where there are problems with erosion.
(h) "Molino - PietreNere": the area includes the terminal part of the eastern coast of RodiGarganico. It is characterized by a minimum depth of beach, high-quality services but accessible with difficulty, parking difficulties, a landscape remarkable around.

At the end the method is a synthesis between the Concordance analysis, and a fuzzy weighted combination[10].

The test has been carried out with a variation of parameter, with different degree of discrimination. Once the alternative are set and the score have been attributed, the multicriteria approach could be applied. The utility functions have been shaped (see Fig. 6). The next figure shows the most discriminating and the less one pairwise comparison (Fig. 7).

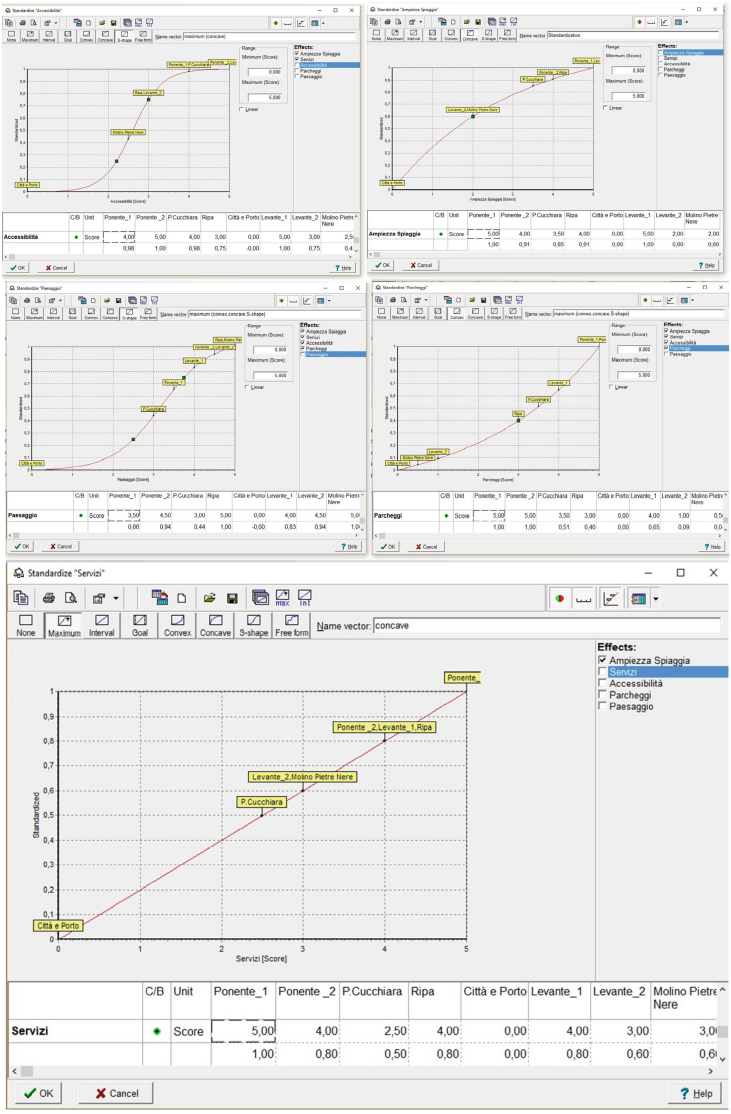

Fig. 6. The graphs show five utility functions corresponding to the criteria, and in evidence the only one that is linear.

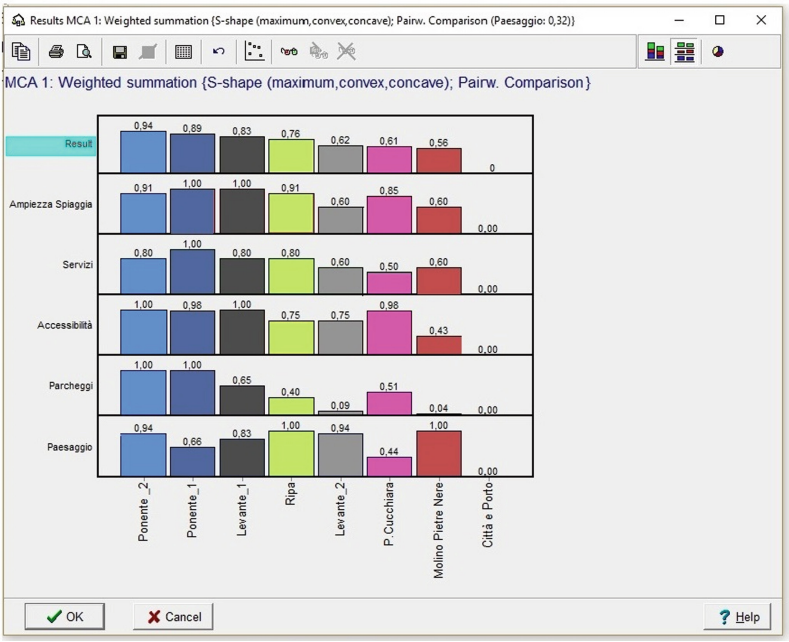

Fig. 7. The value of the five utility functions assumed for each one of the eight parts of the coastline

4 Consideration on the Method

The shaped utility function affected the result, as a proof that it could be as alternative method in substitution of a weight system. The result offer to us some reflections that should represent an answer to the question that are at the base of the research.

The first is that looking at the result, represented by the dominance indexes that are visible at the histogram at the top in Fig. 6, it is quite difficult to assign a "High value" fee. If we exclude the Port Area (that was performing "zero", as incomparable as regards a unexisting beach inside the harbor) the worst result, at the seventh place is "Molino-PietreNere"(0,56, on the left side of the histogram), while the Highest is "Ponente 2" (0,94, on the left side).

The interval between the lowest performance attributed (0,94 vs 0,56) accounts 0,38. In between there are other 5 coastal segments, that in average differ for a score of 0,06. This means that is quite impossible to attribute a fear distinction, grouping in two cluster (high and normal value of the coast), if we think that the difference among the fees in term, of ratio is the highest is two times greater than the lowest one (2,643 €/m^2 against 1,322 €/m^2). So is very difficult to discriminate.

The second aspect is related with the legislation. Until the end of December, 2018, in the Italian context the term to star the application of the Bolkenstein directive was the first of January, 2020. In the Economic National Plan for the year 2019 the Italian Government refuse to apply immediately the Bolkenstein Directive, and delayed the

application until the end of 2034 (more or less fifteen years). This means that our assessment, is destinated to be an experiment for a long timet even if the test shows that is better and more fear to apply a multiscale method to attribute the fee for the use license of the beach in the Public Domain, due to the difficulty to establish a break even point to pass from the normal fee to the high fee.

5 Concluding Remarks

In this paper the focus is related with the correct assessment of the social use value of some part of public environmental heritage[10, 11], and in a special way, the marine seaside. The occasion to think about the question has been given to us just in the case of the application of a regional law of Apulia, that oblige the municipalities to redact a City Coastal Plan (CCP), and to assign a level of taxation of private entrepreneurial use of the public beach, just considering only to two different level: "Normal" and "High". The research started from the hypothesis of change the current regime.

Such values create some non-sense in the perspective to connect the willingness to pay with the public benefit (by tax) of conceding the use of some public property, to have a equilibrate compensation of the use-value of public domain. But we should not forget that, the application of the obligation to assign by bid the use licence, in Italy is shifted further in the future: the application of the obligation of Bolkenstein Directive will be used in Italy in a far future. In a not so unlikely future scenario, when EU could [12] decide an infringement procedure for applying a penalty, maybe the assessment method that is explained in this paper, could be reconsidered not only in theory.

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