

# **Sustainable tourism development and social carrying capacity: a case-study on the North-Western Adriatic Sea**

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## **Abstract**

This essay focuses on social carrying capacity (SCC) as an indicator of tourism sustainable development, and establishes a practical definition of SCC based on the majority rule. In order to understand the main difficulties encountered in measuring SCC from the point of view of beach visitors and residents, data about the well developed tourist resort of Marina di Ravenna (Italy) on the North-Western Adriatic coast were used. We also highlight that, when crowded situations are very frequent and these two aspects of the SCC are in conflict, coastal policy-making should result in a compromise between the need to preserve residents' life style and to increase the economic benefits of the beach recreational use.

*Keywords: sustainability, sustainable tourism development, social carrying capacity, majority rule, well developed tourist site, crowding, day-visitor.*

## **1 Introduction**

Sustainability is essentially a product of the human mind, and in deciding that it is good and a duty to protect environment the international community has given ethical judgements. Every process of development has to be sustainable in order to attain the integrity of the life-support system on the earth; so what has to be promoted is sustainable development, which means that human development has to be sustained by the environment and the ultimate carrying capacity of the earth. Biogeophysical foundations must be integrated with social aspects such as the economic, cultural and political aspects of natural resource management, and



therefore 'sustainability is a necessary and sufficient condition for a population to be at or below any carrying capacity' (Seidl and Tisdell [13]).

As regards the management of coastal resources for tourism and recreational activities, tourism sustainable development generally requires the management of all resources in order to fulfill economic, social and aesthetic needs, and to maintain ecological processes, biological diversity and life support systems (Council of Europe [5]). In other terms, sustainable tourism should be pursued by means of 'a rational distribution of tourism activity...without exceeding the saturation limits of each area...according to its vulnerability and characteristics' (Decleris [6], p.86).

In the Recommendation No. R(97) 9, the Council of Europe [4] specifies some criteria to be satisfied by a 'sustainable environment-friendly tourism' applied to coastal sites. After the premises that 'coastal areas are systems of great biological, geophysical, landscape, cultural and economic richness,..., which should be preserved for present and future generations', it is recognized that 'coastal tourism may be a major instrument of economic development for many regions and countries'. Nevertheless, 'it can also, if implemented in an intensive manner, cause considerable and sometimes irreversible damage to the natural and socio-cultural environment'; therefore a 'balanced tourism development' has to be promoted. Amongst the general principles established in the recommendation, we highlight that tourism should be limited 'to a level compatible with the ecological and social *carrying capacity* of the site'.

In this article, after a brief description of the concept of tourism carrying capacity as indicator of sustainable tourism, the focus is on social carrying capacity (SCC). We will highlight that the practical measurement of the SCC requires the specification of a voting rule. In order to understand the main difficulties that can be met in measuring SCC, we use data about the Italian tourist resort of Marina di Ravenna on the North-western Adriatic coast.

## 2 A practical definition of SCC

Carrying capacity as indicator of the use intensity of an area is not a simple concept. Decleris ([6], pp.85–9) highlights that 'in its narrow scientific sense, carrying capacity is the number of species or units of a species which can be maintained indefinitely by an ecosystem without degradation of that system. ...[Nevertheless in] its broader content the principle of carrying capacity says that the construction and management of man-made systems must not transcend their own carrying capacity or that of the ecosystems (land or water based, or marine) influenced by them'. This means that 'the application of carrying capacity to human species requires the recognition that carrying capacity is foremost socially determined, rather than biologically fixed due to the important influence of human consumption patterns, technologies, infrastructure, and impacts on the environment or food availability'; in other words the optimal number of visitors sustained is established according to the welfare function of the community involved (Seidl and Tisdell [13]). In spite of this complexity, measures of carrying capacity and methods for determining them have to be



established, mainly for those systems which tend 'to develop to excess', such as mass tourism systems.

In general, tourism carrying capacity can be considered as the maximum number of visitors (day-visitors and tourists) that can be contained in a tourist area (abundance carrying capacity). We highlight that in this article tourism is intended in the broad sense, i.e. as an economic sector whose demand is not only composed by tourists (people who stay at least one night) but also day-visitors (people who do not live on the site, but visit it and do not sleep there), because on many tourist sites, the high number of these influences public authority planning.

A tourist system is an integrated system constituted by at least three different sub-systems, i.e. the ecological, social and economic sub-systems; therefore tourism carrying capacity is the result of the carrying capacities of all those sub-systems (Seidl and Tisdell [13]). Nevertheless, the levels of these different carrying capacities may be in conflict; for example, mass tourism is desirable from the economic point of view because its consequence is an increase of the local aggregate income, but from the environmental and social point of view it can be damaging if dunes are destroyed and criminality increases. This means that, as regards the sustainable development of a tourist site, policy-makers have to mediate between the carrying capacities of the different sub-systems, also stimulating discussion about society values in order to change their planning and action if necessary.

In well developed tourist sites the natural environment has generally been heavily sacrificed to economic growth, and the attention is about the dimension and kind of social interaction between visitors and local population, and also amongst visitors themselves. On these sites the satisfaction of visitors' needs generally goes well beyond the mere minimum subsistence level, and their life style (use level of facilities, visitors' recreational activities and so on) must also be considered for defining and measuring carrying capacity. In literature the SCC of a tourist area is defined from two different point of views: a) from the point of view of visitors, SCC is the maximum level of crowding that coastal visitors are willing to accept from the other visitors without reducing the quality of the recreational experience; while b) from the point of view of residents, SCC is the maximum number of visitors tolerated by the host population (O'Reilly [11]). De Ruyck et al. [7] highlight that as regards visitors, the existence of facilities and economic innovation such as the organization of crowd-attracting activities can considerably increase SCC, which also changes according to the characteristics of visitors (sex, education, attitude, etc.). Therefore, SCC is a dynamic indicator whose measure is influenced by many factors which are specific to the site situation considered.

From a working point of view, nevertheless, the a) and b) definitions of SCC involve a practical difficulty. What is meant in operational terms by 'tolerated by the host population', and 'that coastal visitors are willing to accept from the other visitors'? Do these sentences mean that all the host population (unanimity) tolerate and all the coastal visitors are willing to accept, or that only the majority of them, or some other part of them? This specification is important because



social deliberations can be taken according to different rules of voting. Since the majority rule is generally used for social choices, as practical definitions of SCC we consider: a') the maximum number of people at the time when the majority of visitors feel comfortable with the number of other visitors on the beach; and b') the maximum number of visitors tolerated by the majority of residents. The reference to the voting rule stresses the normative nature of SCC. In politics the majority rule is applied to results obtained with the universal suffrage; as regards SCC the universal suffrage would be very expensive, therefore this rule should be applied to the results of a survey based on a random sample.

These two aspects of the SCC may be in conflict, since the maximum number of visitors tolerated by the visitors themselves may be different from the maximum number tolerated by residents. In case of conflict, coastal policy making should be the result of a compromise between the need to preserve residents' life style and to increase the economic benefits of the beach recreational use.

### 3 Methods for measuring the SCC

Traditional indicators such as arrivals and night-stays, and the structure of tourist supply are inadequate indicators of the tourist carrying capacity, because they do not consider the consequences of tourism on the socio-cultural environment. Other indicators are needed (e.g. Seidl and Tisdell [13]).

A) From the point of view of beach visitors, overcrowding can reduce the enjoyment of the recreational experience and they could go to an alternative site or return home. As an indicator of overcrowding, the WTO recommends using the number of visitors per  $m^2$  of beach (Consulting & Audit Canada [3]). Therefore, in order to compute the maximum number of visitors tolerated by the visitors themselves per 100  $m^2$  of beach (density SCC), De Ruyck *et al.* [7] suggest: i) carrying out a survey by questionnaire (visitor questionnaire) on the most crowded days of the year in order to obtain information about visitors' perception of crowding on the beach at the survey time; the questionnaire should consist of questions to measure how uncomfortable visitors feel about the number of beach visitors at the moment of the interview, and the visitor's reaction to crowding; ii) obtaining the number of visitors on the beach in the most crowded days of the year by counting the number of people in photographs taken on the same days (see also O'Reilly [11]). The beach density SCC is computed by dividing the abundance SCC (maximum number of visitors tolerated) by the beach surface ( $m^2$ ), and multiplying by 100.

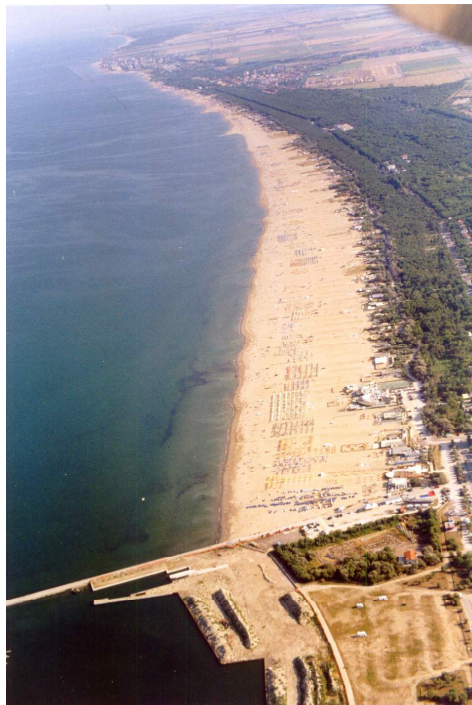
B) From the point of view of residents, in the high season they may suffer the crowding due to the success of beach recreational activities. Traffic, noise and pollution by day and by night can be the main causes of residents' discomfort (in particular during the weekends), and can oblige them to modify their lifestyle in some measure. Qualitative indices of saturation or irritation were established by Cohen [2], Doxey [8] and Butler [1]. In addition, a number of quantitative indicators of social pressure and social carrying capacity exists in literature. Considering tourists and day-visitors, de Albuquerque and McElroy [10]



compute a host-guest ratio given by the average daily visitor density per 1,000 residents. This ratio can also be computed per 100 residents. Saveriades [12], instead, computes a tourist-host contact ratio by dividing the number of residents by that of tourists, and multiplying by 100. The optimum tourist-host contact ratio is the maximum number of tourists tolerated by that population, and indicates the threshold beyond which undesirable social tensions between residents and visitors would occur. This optimum ratio is computed by considering the information obtained from a survey by questionnaire designed to ask residents if they prefer a number of visitors greater or lower than, or equal to, that present on the site without feeling irritation.

#### 4 Marina di Ravenna SCC

Marina di Ravenna is a well developed tourist resort near Ravenna (Italy) on the Northern Adriatic coast. The beach of light fine sand, shown in photograph 1, is 4 Km long and on average 200 Mt wide; the developed part of the beach consists of 42 sunbathing buildings, while only a small part is completely free (undeveloped beach). In the past the dunes were almost completely destroyed, but a wide pinewood still exists behind the beach.



Photograph 1: The Marina di Ravenna beach.



In this resort some sunbathing building managers have innovated their services for beach visitors by reorganizing the sunbathing area, and expanded the traditional services (such as bar, showers, and the renting of cabins, seating and sun umbrellas) with restaurant services, new sport activities, parties, cultural and music meetings (called 'happy hours'), also by night. This economic innovation, made possible by the width of the beach, has been attracting numerous visitors, mainly day-visitors aged 20-40, and has been revealed to be a profitable business. Consequently, crowding phenomena have been occurring mainly during week ends in the spring/summer season.

#### 4.1 SCC about visitors

The data available about the Marina di Ravenna resort permit an estimate to be made of the SCC from the point of view of visitors. At this site a survey by questionnaire was carried out by Vitali [14] in order to collect information about visitors' reactions to crowding. The De Ruick et al. method was adapted for the Marina di Ravenna situation, and some modifications were made to it: i) as regards the questionnaire new questions were added about beach visitors' preferences regarding the new recreational activities, and to find out the proportion of day-visitors on the beach with respect to that of tourists; ii) in addition, the procedure of counting visitors on the beach and dividing the beach in zones in order to do interviews was simplified. In Italy people generally stay several hours on the beach; in particular, a study about the beach use in a resort very near Marina di Ravenna shows that visitors stay on the beach on average about 5 hours (Marzetti and Zanuttigh [9]). On the Marina di Ravenna beach, the most crowded hours of the day were from 2 to 7 p.m.. Visitors were interviewed in the afternoon and counted only once during those hours because their number was fairly stable.

A representative beach area of about 44,000 m<sup>2</sup> was chosen for carrying out an experimental survey of 62 face-to-face interviews (random sample). In this area there are four sunbathing buildings, three of which best represent beach recreational innovation in Marina di Ravenna. The interviews were done on the last two Sundays of May 2002. On those two days the beach was just as crowded as it is on the most crowded days of midsummer. Almost all respondents (93.5%) visit the beach mainly at weekends. Visitors do not use public transport; the majority of interviewees reach Marina di Ravenna beach by car (66%), 21% by motor bicycle, 11% by bicycle and 2% by foot. 6.5% of the interviewed visitors complain about traffic congestion and parking difficulty.

We summarize the findings about sensitivity to crowding in tables 1 and 2. Table 1 shows that on both Sundays the great majority of respondents felt comfortable with the number of visitors on the beach at the time of the interview. In addition, table 2 shows that on both days the majority of respondents who feel comfortable at present declared that s/he would also feel comfortable with more people on the beach (53.33% and 54.84% respectively); in particular, over 40% of respondents would feel comfortable with double the number of people on the beach.



Table 1: Percentage of respondents who feel comfortable with the number of people on the beach.

|                         |          |          |
|-------------------------|----------|----------|
| Day of interview        | 18/05/03 | 25/05/03 |
| Feel comfortable        | 70.00    | 77.42    |
| Do not feel comfortable | 30.00    | 22.58    |

Table 2: Number of visitors according to which respondents feel comfortable: % of respondents.

|                       |          |          |
|-----------------------|----------|----------|
| Day of interview      | 18/05/03 | 25/05/03 |
| Less: half the people | 30.00    | 22.58    |
| Same                  | 16.67    | 22.58    |
| More: double          | 43.33    | 41.94    |
| More: four times      | 10.00    | 12.90    |

Finally, as regards respondent’s behaviour in a hypothetical situation of overcrowding, on both days the majority of respondents declared that they would remain in the same beach area, while only a few would go to another beach or return home. On both Sundays, there were about 2,200 visitors on the beach area considered, with the mean beach density about 5 visitors per 100 m2. In that situation the carrying capacity was not surpassed because in that beach area the great majority of respondents did not feel uncomfortable.



Photograph 2: A ‘happy hour’ near the bar, and the sunbathing area near the beach.

According to this data, we estimate that, since the majority of respondents would feel comfortable with at least double the number of visitors on the beach, the density SCC of the beach area is about 10 visitors per 100 m2. People on the beach show a strong aggregation need because they stay in large groups, mainly

near the bar and restaurant buildings (in the beach area furthest from the sea) and the sunbathing areas (nearest the sea); in these beach sub-areas the density is higher than the overall beach density. This need of aggregation, as well as the existence of wide empty sub-areas as shown in photograph 2 seems to be why the majority of respondents would feel comfortable even with twice as many visitors on the beach.

These data, therefore, show that the Marina di Ravenna beach is mainly visited by people who enjoy being in groups. In particular, what these people value is not only the possibility of doing new recreational activities but also that these activities attract numerous people.

## 4.2 The Marina di Ravenna visitor-host ratio

In Marina di Ravenna, day-visitors are so numerous that they cannot be omitted from the estimate of a SCC index. We computed a visitor-host ratio by dividing the daily number of visitors (tourists and day-visitors) by the number of residents, and multiplying by 100. Official data are available only about residents and tourists (Vitali [14]). The number of tourists on a crowded day of the high season can be obtained by considering that in these days tourist accommodation is fully booked; so the number of tourist beds is considered the measure of the number of tourists present at the site on the most crowded days.

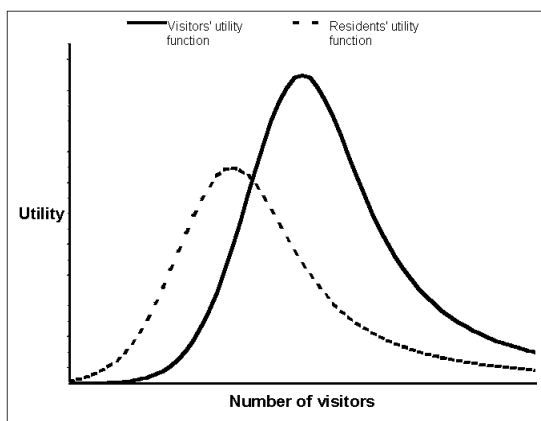


Figure 1: Residents' and visitors' utility curves.

As regards 2002, we estimate the number of day-visitors considering that on those two days of May day-visitors were on average 72.6% and tourists 27.4% (Vitali [14]). In that year and on those crowded days, given 5,612 tourist beds (presumed to be all fully booked), beach visitors would have been 20,482. If we also take into account 4,076 residents, the visitor-host ratio would have been about 502%. So, in Marina di Ravenna there would have been 5 visitors for one resident. We do not know if this number is the resident SCC, because a specific resident survey was not carried out. On the other hand, public petitions

(Vitali [14]) suggest that a certain number of residents feel discomfort as regards the number of visitors. Therefore we assume (fig. 1, in arbitrary units) that the maximum of the utility curve for residents is to the left of the maximum for visitors. The intersection of the two curves represents a Pareto equilibrium (an increase of utility for one player reduces the utility for the other player in a co-operative game). The number of visitors corresponding to this equilibrium could be a reasonable compromise for a policy-maker; it is located between 5 and 10 visitors per resident.

## 5 Conclusions

The attempt to estimate SCC highlights the need to specify a voting rule as criterion for establishing the maximum number of visitors tolerated by the visitors themselves and also by residents. This led us to define SCC with reference to the majority rule. As regards the SCC from the point of view of visitors, the data available about the Marina di Ravenna resort confirm that the number of visitors tolerated on the beach depends on the objectives of tourism management and visitors' value judgements. As regards the SCC from the point of view of residents, the computation of the visitor-host ratio is made more difficult by having to estimate the number of day-visitors due to the lack of official data. This difficulty can be overcome by using the information obtained from a visitor questionnaire.

## Acknowledgements

We thank the Municipality of Ravenna and Giovanni Gabbianelli for photograph 1, and Emanuela Vitali for photograph 2.

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