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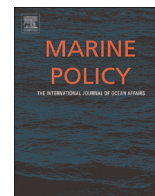
# Visitors' awareness of ICZM and WTP for beach preservation in four European Mediterranean regions

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## ARTICLE INFO

## ABSTRACT

This paper discusses the results of a multi-country survey about private stakeholders' contribution to coastal preservation. It was conducted in four coastal sites of Greece, Italy and France, in order to collect information about beach visitors' perception of Integrated Coastal Zone Management (ICZM) and their willingness to pay (WTP) for beach preservation, intended here as defence from erosion. In order to find Q2 out whether ICZM perception is a determinant of WTP, regression analysis is applied. Results show that in these sites respondents have a low level of information about the nature of ICZM, despite local authorities having implemented some ICZM strategies for preserving the coast. Nevertheless, those who are informed about ICZM have a higher probability of paying for beach preservation. This suggests to policymakers that promoting public awareness about ICZM may increase the probability of paying. Finally, some categories of visitors, such as women and young and middle-aged people, have a higher probability of paying than men and older people, thus suggesting a more sensitive attitude to beach preservation. Therefore, policy-makers should also pay attention to the categories of visitors less likely to pay.

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## 1. Introduction: background and aims of the study

Integrated Coastal Zone Management (ICZM) is a key paradigm for the sustainable development of coastal zones. It may be defined as 'a strategy for an integrated approach to planning and management, in which all policies, sectors and, to the highest possible extent, individual interests are properly taken into account, with proper consideration given to the full range of temporal and spatial scales, and involving all coastal stakeholders in a participative way' [17, p. 6]. In terms of the System of Environmental-Economic Accounting (SEEA), Central Framework, which is a 'multi-purpose conceptual framework that describes the interaction between the economy and the environment', ICZM has the

task of 'preserving and maintaining' the stock of coastal resources [12, p.88]. In order to pursue this task, ICZM acknowledges that a policy-maker should ask private stakeholders to contribute in monetary terms to coastal preservation not only for the satisfaction of their own needs but also for those of future generations [5].

ICZM is 'essentially a local activity implemented by public and private stakeholders on the ground'. Nevertheless, it has a 'transnational dimension' since 'looking at the interactions between ecosystems, regional production systems, as well as social structures and cultural patterns, typically requires taking into account larger geographical areas that cut across (national) boundaries while also linking land and sea development' [17, p. 223]. At the European level, ICZM is considered a very suitable tool for simultaneously pursuing sustainable coastal management and sustainable tourism [11]. The Recommendation 2002/413/EC asks European Union (EU) Member States to elaborate national strategies for coastal management according to ICZM principles. In particular, as regards the regional strategies for ICZM, the Mediterranean area plays a pivotal role. Therefore, this issue has been addressed in the framework of the Mediterranean Action Plan

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(MAP) which represents a cooperative effort between the EU and the countries with a Mediterranean shoreline for pursuing the objectives of the Barcelona Convention, the major legal framework for the protection of the Mediterranean environment (www.unepmap.org) (UNEP/MAP/PAP, 2002).

This research was funded by the EU research project Regional Framework Operation BEACHMED-e (Strategic management of beach protection measures for the sustainable development of Mediterranean coastal areas, http://www.beachmed.eu), sub-project ICZM-MED (Concerted actions, tools and criteria for the implementation of the Integrated Coastal Zone Management in the Mediterranean), 2006–2009. With the trans-national dimension of ICZM in mind, in cooperation with the Priority Action Program/Regional Activity Centre (PAP/RAC), one aim of this subproject was to collect information about how ICZM is perceived by beach visitors in five regions of three Mediterranean European countries – Macedonia and Thrace in Greece; the regions of Emilia-Romagna, Lazio, and Liguria in Italy; and the Languedoc-Roussillon region in France – and about how much they are willing to pay for beach preservation, intended here as beach defence from erosion.

Beach visitors are private stakeholders, whose contribution may be essential in order to identify sound practices for pursuing sustainable coastal development [9]. In particular, their participation in ICZM may reduce local conflicts and make decision-making about coastal management more appropriate in order to provide sustainable beach services. Surveying visitors' preferences and opinions provides important information for policy-makers involved in coastal management. Therefore, in pilot sites of the regions chosen within the ICZM-MED sub-project, a survey by questionnaire was carried out in 2007, in order to obtain information about beach visitors' ICZM perception and preferences, and their willingness to pay (WTP) for beach preservation by applying the contingent valuation method (CVM).

Descriptive statistics about the data obtained through this EU research have mainly been published in [21]. All the results (descriptive statistics and regression analysis) about the Emilia-Romagna region have been published in [24]. This paper completes the analysis of the data of the other BEACHMED-e regions (Macedonia and Thrace, Lazio, Liguria and the Languedoc-Roussillon) by applying regression analysis. Though the survey was carried out in 2007, this analysis maintains its validity because beach services, and the characteristics of beaches and of their visitors, have not undergone substantial change in the sites considered. After 2009 the number of beach visitors fell only in Macedonia and Thrace (due to the Greek economic crisis), but today their number is about that of 2007.

Therefore, after a brief description of the previous literature and of the main characteristics of the study areas, the CVM survey design is presented. The summary of descriptive statistics is presented about the variables used for regression analysis. The theoretical regression model used is described and justified, and the results of its estimate are analyzed. They show that policy-makers should promote information campaigns about ICZM in order to increase visitors' probability of paying, and should pay attention to the categories of visitors less likely to pay.

## 2. Previous literature

### 2.1. Willingness to pay for beach preservation from erosion

From the economic point of view, coastal areas are public goods, which everyone enjoys in common, and the preservation of coastal areas is an essential task of public authorities. Public investments in these areas may provide significant economic benefits or values, but public funds are limited. Since ICZM acknowledges that stakeholders should be asked by policy-makers to contribute in monetary terms to the implementation of coastal preservation, the estimate of the mean of their contribution – which depends on the value of preservation benefits – is needed.

The total economic value (TEV) ascribed to a beach is measurable in monetary terms since it depends on human preferences [37].[1] It is the sum of different economic values, such as present use value, option value, bequest value and existence value. Present use value is the monetary amount ascribed to the use of a beach by whoever makes the valuation, and is direct and indirect; in particular, beach recreational use is a direct use, while beach flood control is an indirect use. Option value is recognized when a stakeholder wants to have the option to use the beach in the future. Bequest value measures the importance of preserving the beach for future generations, while existence value represents the subjective intrinsic value recognized to it, and its loss may be considered a loss of welfare only because it no longer exists. Not all these values are established by the market, and thus they require the use of non-market valuation techniques.

Benefit transfer (BT) and CVM are economic methods suitable for estimating beach benefits from a conservation project when they are not established by a market. The evaluation of these non-marketable benefits is justified by the belief that, unless they are expressed in monetary units, they will be assigned a zero value. The practical difficulty in estimating these benefits lies in obtaining their rational and consistent expressions from people – interested in beach preservation (relevant population) – by means of a survey by questionnaire. However, a valuation survey is time-consuming and very expensive, therefore the procedure of the BT is also recommended.[2]

#### 2.1.1. The benefit transfer procedure

The BT procedure establishes whether and how the value of coastal benefits known from existing studies (study sites) can be used to infer the coastal value of a new site (policy site). It can be applied in different ways, such as the transfer of mean values and the estimate of a BT function. Nevertheless, for a BT application some basic criteria should be respected: (i) site characteristics should be the same; and (ii) population characteristics should be similar for both policy and study sites [10]. At the time of survey values for transfer from coastal sites in the Northern Mediterranean Sea were not found, therefore it was impossible to infer the value of preservation benefits of the study sites considered here.

#### 2.1.2. The contingent valuation method

CVM was considered suitable for this multi-country research. The focus was on ICZM perception and WTP for a beach quality change (preservation from erosion). More specifically, no specific common project was evaluated in the survey, because the attributes of a defence project depend on the site characteristics, which change site by site, but it was considered that each quality change should be obtained implementing a project conceived according to ICZM dictates.[3]

CVM philosophy claims that individuals have well-defined

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[1] A primary value (PV) is also recognized to a beach. PV means that an intrinsic objective value independent of the individual's preferences is recognized to the coastal system considered as a whole since the functioning of a beach ecosystem is more than the sum of its individual components. PV is recognized by intuition, and since it cannot be measured in economic terms, it cannot be added to TEV. PV and TEV make up the total value (TV) ascribed to a beach [37].

[2] The BT procedure is predominantly suggested about the recreational use of US and UK beaches [3] (Penning-Rowsell et al., 1992).

[3] The choice experiment procedure [7] was considered unsuitable since, by focusing on the attributes involved in a choice, it asks respondents to choose between alternative projects in terms of their attributes and computes the WTP of a change in the attributes.

preferences for beach preservation. Therefore, their demands for preservation benefits can be measured by the amount of other goods they are willing to give up for them and still be as well as before [28]. By means of a survey by questionnaire, CVM creates a hypothetical market, which permits respondents to state their WTP for beach economic benefits that are not established by a market. Since it is a well known method, the CVM literature is very extensive and the reader is referred to the existing literature. In particular, Arrow et al. [2] establish guidelines for its correct application.

As regards beach benefits, the valuation question is generally phrased as WTP.[4] The response format of the evaluation question, yielding the most accurate estimates, is still an open issue. Considerable attention has been paid to the dichotomous choice (DC) format and the open-ended format (OE) (McFadden and Leonard, 1993). The DC requires respondents to declare whether their WTP for a conservation benefit is greater or lower than a specific bid established a priori. A single DC presents only one bid, and asks for a yes or no response. A double DC also offers a second bid (higher if the reply to the first bid is yes, and lower if it is no). The OE format instead requires respondents to give an exact indication of their maximum WTP for the benefit under valuation. Each of these CVM valuation formats has well-known advantages and disadvantages. In this research the OE format is chosen, and this choice is justified by the fact that the DC format yields a less accurate estimate of the actual WTP than the OE format, since it does not provide information about the maximum WTP but only about the upper and lower limits of the expected WTP. The OE format can instead lead to extreme responses. Nevertheless, experience shows that the DC format, in general, gives a higher estimate of the mean WTP than the OE format. In particular, Garrod et al. (1994) highlight that in their CVM experiment the mean WTP obtained through a DC question is about 3.8 times that obtained by an OE question. In addition, in a DC question respondents may be affected by the amount offered, while in a double DC respondents may strategically adjust their response to the second question [16].

### 2.1.3. Previous case-studies

As regards non-Mediterranean coastal sites, in the US, Silberman and Klock [33] apply CVM in order to estimate the conservation (against erosion) value of a New Jersey beach. Beach visitors are interviewed, and $16 is the mean WTP (one-time value).[5] Silberman et al. [34] also focus on WTP for beach conservation in New Jersey. In an on-site survey about beach visitors, the mean WTP (one-time value) of those who in the future would visit that beach area is about $15, and about $9 for those who would not visit it; while a telephone survey of residents gives the mean as about $19 and $9.5 respectively. In the UK, Goodman et al. [15] investigate benefits from a British coastal conservation programme, funded by the UK Ministry of Agriculture, Fisheries & Food (MAFF). The mean WTP for the conservation of the entire British coast is £48 per year. In the Philippines, [36] estimates the annual WTP for a marine conservation programme in the Tubbataha Reefs National Marine Park (Philippines). People in three cities are interviewed, and the mean WTP per year ranges from $2.89 to $13.79.

As regards Mediterranean coastal sites, [22] estimate the WTP for preserving a beach from erosion in Crikvenica (Croatia); the

mean WTP per visit is €2.16 for respondents who visit a beach whose access is not free of charge, while it is €1.62 for those who visit a beach free of charge. In Turkey, Birdir et al. [6] evaluate the quality conservation of three beaches (Kizkalesi, Yemiskumu and Susanoglu), and the mean WTPs per visit are €2.33, €2.22 and €1.77 respectively.

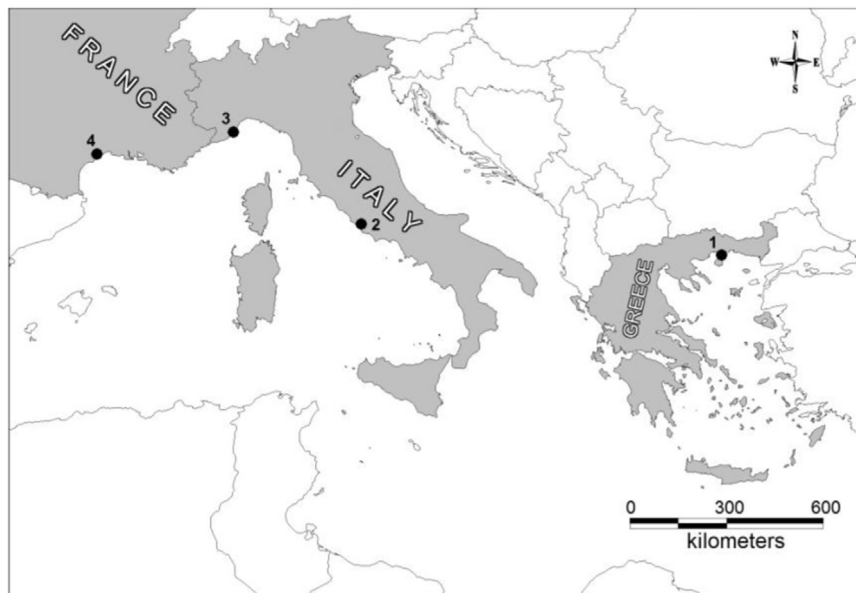As regards the Italian case-study of Riccione and Misano Adriatico (BEACHMED-e research), Marzetti and Disegna [26] specifically analyze respondents' knowledge of ICZM and consider it a determinant of the WTP for beach preservation. Through a survey by questionnaire they estimated how much beach visitors would be willing to pay for a five-year defence project. The survey was carried out in 2007. WTP (open-ended question) is asked for guaranteeing beach benefits, such as indirect use, option value, bequest value and existence value. Results show that respondents are fairly well informed about the coast and its management. About 17% of them are fully aware of what ICZM is, while the majority have a partial knowledge of ICZM. The WTP determinants are obtained through a two-stage model – 1st stage, probit model; 2nd stage, ordinary least square model (OLS). The probit model shows that being informed about ICZM is a determinant of the probability of paying for beach preservation from erosion, while the OLS model shows that being older reduces the WTP. The mean WTP every five years is €1.07 (zero values included) and €2.86 (zero values excluded).

### 2.2. Integrated Coastal Zone Management perception

As regards ICZM, the World Bank [40] published guidelines for the implementation of ICZM programmes, stressing the importance of public education in addressing human activities in order to achieve an ICZM, and the UNEP/MAP/PAP [39] published the *ICZM Process*; while in 2011 the EU ratified the *Protocol of ICZM in the Mediterranean* [38]. Nevertheless, few applied studies of ICZM perception by stakeholders are available, and they mainly deal with the institutional aspect of ICZM. In particular, in Mediterranean countries, this institutional issue is dealt with by Nasr et al. [29] in Egypt, [1] in Turkey, and [32] in Malta, France, Slovenia and Spain. In addition, Koutrakis et al. [20] deal with public stakeholders' perception of ICZM in five regions of Greece, Italy and France, and highlight that in all regions these stakeholders perceive a lack of collaboration and poor information exchange among the institutions responsible for coastal management, thus the implementation of ICZM is difficult. As highlighted above, Koutrakis et al. [21] deal with private stakeholders' perception of ICZM in all the BEACHMED-e regions. Through descriptive statistics they show that few beach visitors are fully aware of what ICZM is, though many of them are quite well informed about erosion consequences. Therefore, an informative campaign about ICZM is recommended to policy-makers in order to improve individual ICZM knowledge. Furthermore, Ioppolo et al. [18] deal with the application of ICZM dictates to a sustainable eco-tourism programme about a coastal site in Italy.

## 3. The study areas

This research concerns the following four coastal pilot sites: Nestos Delta in East Macedonia and Thrace, Greece; Tarquinia in Lazio, and Riviera del Beigua in Liguria, Italy; and Hérault Department in Languedoc-Roussillon, France (Fig. 1). They have different physical characteristics, and coastal management policies complying with the EU Recommendation 2002/413/EC and the MAP [21].

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[4] When the valuation question is phrased as willingness to accept (WTA) it is referred to a loss of benefit. Experience shows that respondents tend to elicit higher WTA values than WTP values for the same good [28].

[5] We highlight that the mean values obtained in the research studies described in Section 2.1.2 are presented in the national currency of the considered sites and are not converted in euro. This is because the year of publishing is generally different to that in which the survey is carried out.

**Fig. 1.** Greece: (1) Nestos Delta in East Macedonia and Thrace Region; Italy: (2) Tarquinia in Lazio Region (3), Riviera del Beigua in Liguria Region; France: (4) Hérault Department in Languedoc-Roussillon.

### 3.1. East Macedonia and Thrace Region: Nestos Delta

The Delta of River Nestos is located on the East side of the Kavala Gulf of East Macedonia and Thrace, Greece. It has an extension of 2226 km$^2$ and about 22,000 residents, and is part of the National Park of East Macedonia and Thrace mainly managed by the Municipality of Nestos, the Regional Council of East Macedonia and Thrace, and the Management Body of the National Park of East Macedonia and Thrace. Due to its ecological value, it is a Wetland of International Importance according to the Ramsar Convention, and a Natura 2000 area. There are eleven developed beaches managed by private stakeholders who pay a concession tax to the Municipality of Nestos. Access to beaches is free of charge. This coast is under erosion. In particular, the erosion in the Eastern side of the Kavala Gulf intensely affects the local natural environment and human activities. The regional authorities implemented projects on ICZM, such as the 'Concerted Actions for the Management of the Strymonikos Coastal Zone', the TERRA CZM Project (Integrated Management Plan for the Kavala Prefecture Coastal Zone) and INTERREG IIIC, BEACHMED-e, sub-project ICZM-MED. In order to defende the beach from erosion, no defence structure[6] has been implemented [21]. The management plan for ICZM 'Implementation of a program for the preservation and sustainable development of Coastal Zone in the Region of Eastern Macedonia and Thrace' is in progress (Region of East Macedonia and Thrace, 2012).

### 3.2. Liguria region: Riviera del Beigua

The Riviera del Beigua (RdB) in Liguria, Italy, is a coastal area consisting of 6 Municipalities situated between the cities of Genoa and Savona. Residents are about 55,800. It is a narrow coastal strip, 23 km long, characterized by rocky areas, sandy, sandy-gravel and cobble pocket beaches. Two marine Sites of Community Importance are included in the Cetaceans' Sanctuary of the Mediterranean Sea. Human pressure is heavy, mainly due to urbanization and tourism activities. Tourism is well developed, mainly in

spring–summer, when resources (water, sewage treatment plants, etc.) and facilities (parking, roads, transport, etc.) are under pressure. In 2006 tourist night-stays were about 1.15 million (Regional Tourism Observatory) with a tourists/residents ratio per month up to 3 in some resorts. In particular, out of 44,000 beds available in this area, only 14% are in hotels and 78.7% in holiday homes [23]. Day-visitors are not officially recorded. Sunbathing establishment managers provide services on most beaches where visitors pay an entrance fee. RdB beaches are under erosion, which is contained by implementing hard techniques and nourishment. In particular, in 2003–2007 four municipalities out of six implemented nourishment. In recent years, local and regional authorities have undertaken several ICZM actions in order to pursue sustainable coastal development.

### 3.3. Lazio region: Tarquinia Lido

Since 2008 the Lazio Regional government, under the authority of the Coastal Management ICZM Group, has commissioned several studies to investigate the physical (duration) and economic viability of beach defence in several beaches of the region in order to assess direct and indirect impacts of beach nourishment on the local economies. Tarquinia Lido is one of these pilot sites. It is the seaside resort of Tarquinia, an old Etruscan city located 90 km north of Rome in Lazio, Italy. Its fine sandy black beach (due to volcanic elements) is 2 km long. Due to a constant erosion rate from 1 to 2 m per year, since the 1990s the beach has been periodically defended through nourishment and groynes in order to sustain the local economic activities. Sunbathing establishment managers provide services on the beach. Tourists are officially recorded and mainly stay in hotels and own holiday homes. Tourist arrivals are about 20,000 per year, and about 16% of them are foreigners [3], mainly from the UK, Germany and France. Day-visitors are not officially recorded, but this research shows that they are about 30% of beach visitors.

### 3.4. Languedoc-Roussillon region: Hérault Department

Four sites were chosen in Hérault Department, Languedoc-Roussillon, France, located from the Rhône Delta (east) to the Spanish border (west): Valras-Plage, the lido from Sète to

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[6] In order to preserve a beach from erosion different structures can be used. Hard structures are breakwaters (emerged and submerged) and groynes, while nourishment is a soft structure. A composite intervention is a combination of hard and soft structures.

**Table 1**
Characteristics of the study-areas.

| Beach characteristics | | | | |
|---|---|---|---|---|
| | East Macedonia and Thrace | Liguria | Lazio | Languedoc-Roussillon |
| Natural beaches | Yes | Yes | Yes | Yes |
| – Sandy beaches | Yes | Yes | Yes | Yes |
| – Pebble beaches | Yes | Yes | No | No |
| Eroded beaches | Yes | Yes | Yes | Yes |
| Defended beaches | No | Yes | Yes | Yes |
| – Soft structures | – | Yes | No | Yes |
| – Hard structures | – | Yes | No | Yes |
| – Composite interventions | – | Yes | Yes | Yes |
| Social characteristics | | | | |
| Heavy human pressure | Yes | Yes | No | Yes |
| Marine mass tourism | Yes | Yes | No | Yes |
| Visitors | Yes | Yes | Yes | Yes |
| Free of charge access to beaches | Yes | Partially | Partially | Yes |
| Private stakeholders financing ICZM | No | No | No | No |
| Public administration funds for ICZM | | | | |
| Public administration funds for ICZM | Yes | Yes | Yes | Yes |
| National (%) | No | No | No | Yes (50%) |
| Local (%) | Yes (20%) | Yes (-) | No | Yes (50%) |
| Regional (%) | Yes (80%) | Yes (-) | Yes (100%) | No |

Marseillan, the lido of Villeneuve-lès-Maguelone and Palavas-les-Flots. Residents are about 54,000. In this region there are 70 mainly sandy beaches (160 km) distinguished into rural beaches (51%), town beaches (33%) and half rural/half town (16%). Visitors are estimated to be: residents 60%, tourists 25% and daily visitors 15%. Therefore these four sites were selected in order to cover a range of rural and town beaches. Two of these sites have river outlets: the Orb River on Valras-Plage beach and the Lez River in Palavas-les-Flots. Beaches are under erosion, and defended through nourishment and hard structures such as groynes and breakwaters (emerged and submerged). Access to beaches is free of charge. In summer, recreational activities on the beach attract many people, and tourist arrivals are estimated to be about 80,000 per year. Since 2003, in these four sites, local and regional authorities have been carrying out ICZM initiatives through a regional strategic ICZM scheme [27].

### 3.5. Comparing characteristics of study-areas

Table 1 compares some characteristics of these study-areas, distinguished according to beach attributes, social characteristics and public administrations financing ICZM. All beaches are natural, and sandy beaches are present in all sites, while pebble beaches are also in East Macedonia and Thrace and Liguria. They are under erosion, and only in the East Macedonia and Thrace site no defence structure has been implemented. In the other three sites, composite intervention was implemented, while other structures were implemented in Liguria and Languedoc-Roussillon sites. All beaches are visited for recreational activities; only in the Lazio site mass tourism and heavy human pressure are not present. Access to beaches is partially free of charge in the Liguria and Lazio sites, while it is completely free of charge in the other sites. In all these regions private stakeholders do not fund beach conservation projects; while they are funded by public administrations, mainly local and regional. In East Macedonia and Thrace and Lazio regional funds prevail, while in Languedoc-Roussillon also national

funds (50%) are used for ICZM projects (this percentage is not available for Liguria).

## 4. Materials and methods: the questionnaire

In all the pilot areas a survey by questionnaire was carried out in 2007 by using CVM. Respondents were beach visitors, aged 18 plus, randomly selected. The survey was implemented through face-to-face interviews of approximately 15 min. The same questionnaire structure, discussed in many BEACHMED-e meetings, was used in all sites. In July/August a total of 846 questionnaires were completed. Anonymity was guaranteed to respondents, and interviewers were well-trained.

The questionnaire has two parts. After introducing the ICZM-MED research (its purposes and international nature) and asking visitors' social characteristics, the first part concerns questions on ICZM, coastal erosion and defence techniques. Focusing on the individual awareness of ICZM, visitors were asked to answer the following question: 'Do you know what Integrated Coastal Zone Management is?' They had to choose one of the following answers: (1) artificial beach defence from erosion; (2) preservation of the quality of the coastal water; (3) coastal conservation and protection from the environmental point of view; (4) sustainable coastal management considering social, economic and environmental aspects; (5) do not know. Answer (4) is considered full knowledge of the nature of ICZM; while answers (1), (2) and (3) are considered partial knowledge.

The second part concerns the WTP for beach preservation from erosion. Visitors are asked their WTP *per visit* for beach defence from erosion in order to guarantee present use benefits. In particular, in the questionnaire of East Macedonia and Thrace the WTP is distinguished in classes (€0–1.5; €1.5–3; and > €3) and visitors have to state their WTP class, while in that of the other regions respondents have to state their exact WTP (open-ended question). Finally, monthly family income is asked.

## 5. Willingness to pay for beach preservation from erosion

The procedure for the computation of the mean WTP for beach defence from erosion in the four regions needs to be specified, due to: (i) respondents in East Macedonia and Thrace stating WTP values in classes, and (ii) the presence of unrealistically high values mainly in the WTPs of Liguria (WTP values range from €0 to €100). Therefore: (a) the values of all the regions are classified as follows (four classes), €0 (for respondents unwilling to pay), (€0–1.5], (€1.5–3], and > €3; (b) the central value of the second and third class is considered, and (c) as regards the fourth class which presents unrealistic values, the truncation procedure is used by assigning €3 to all values above €3 in order to be conservative [25].

**Table 2**
WTP distribution (%).

| WTP Class (€) | East Macedonia and Thrace (N=201) | Liguria (N=270) | Lazio (N=74) | Languedoc-Roussillon (N=301) | Aggregate data (N=846) |
|---|---|---|---|---|---|
| 0 | 24.38 | 41.48 | 48.65 | 81.06 | 52.13 |
| (0–1.5] | 37.81 | 18.89 | 45.95 | 2.33 | 19.86 |
| (1.5–3] | 21.39 | 7.04 | 2.70 | 7.97 | 10.40 |
| > 3 | 15.92 | 16.67 | 2.70 | 7.31 | 11.94 |
| Missing | 0.50 | 15.92 | 0 | 1.33 | 5.67 |

**Table 3**
WTP: Mean values (€).

| WTP question | Kind of mean value | East Macedonia Thrace[a] | Liguria[a] | Lazio[a] | Languedoc-Roussillon[a] | Aggregate Mean WTP 2007 | Aggregate Mean WTP - Indexed 2014 |
|---|---|---|---|---|---|---|---|
| How much would you pay to protect and save beaches from coastal erosion, as a maximum per *visit*? | 0 included; | 1.34 ($N^a$ = 200) | 0.97 ($N$=227) | 0.60 ($N$=74) | 0.42 ($N$=297) | 0.83 ($N$=798) | 0.98 ($N$=798) |
| | 0 excluded | 1.78 ($N$=151) | 1.91 ($N$=115) | 1.17 ($N$=38) | 2.38 ($N$=53) | 1.85 ($N$=357) | 2.18 ($N$=357) |

[a] $N$ =number of valid observations for the mean computation

The distribution of WTP is presented in Table 2; while mean WTPs are presented in Table 3. In particular, the columns 'Aggregate data' in Table 2 and 'Aggregate Mean WTP' in Table 3 are respectively about the WTP distribution and the mean WTP of the four regions.

As regards the aggregate WTP distribution, Table 2 shows that the majority of respondents are unwilling to pay (52.13%), while 5.67% did not answer the WTP question (missing values), and that the highest percentage of respondents unwilling to pay is in Languedoc-Roussillon and the lowest is in East Macedonia and Thrace. Therefore, 42.20% of interviewees are willing to pay.

As regards the aggregate mean WTP per visit, Table 3 shows that for 2007 it is €0.83 considering zero values and €1.85 excluding zero values, and these mean WTPs are fairly similar to those of Liguria; while the highest mean WTP (zero included) is in East-Macedonia and Thrace and the lowest in Languedoc-Roussillon. Since the situation of the sites has not changed significantly from 2007 to to-day, it seems reasonable to update the mean WTP of the aggregate sample. Because Europeans mainly visit these beaches, the Consumer price index OECD Europe 117.7 (2014; 2007=100) is used (http://stats.oecd.org < http://stats.oecd.org/ > freely accessed 27/09/2015). Therefore, Table 3 shows that the indexed (2014) aggregate mean WTP is €0.98 (zero included) and €2.18 (zero excluded).

More specifically, considering the single regions, as regards East Macedonia and Thrace, the majority of respondents (65.08%) are willing to pay for beach defence, and 37.81% of them are willing to pay €0.5–1.5 (Table 1). The mean WTP per visit is €1.34 if zero values are considered; while it is €1.78 when zero values are excluded (Table 2). In Liguria, 42.60% of respondents are willing to pay. The mean WTP per visit is €0.97 when zero values are considered, while it is €1.91 if they are excluded. As regards Lazio, just over 51% of respondents considered are willing to pay. The mean WTP per visit is €0.60 considering zero values, while it is €1.17 if they are excluded. In Languedoc-Roussillon, 81.06% of respondents are unwilling to pay. The mean WTP per visit is €0.42 considering zero values, while it is €2.38 if zero values are excluded.

## 6. Beach visitors' perception of ICZM and WTP

In order to find out WTP determinants, an ordered Probit model is estimated (software STATA) by considering the aggregate data of all regions. Data were collected without distinguishing visitors in nationals and foreigners, since nationals mainly visit beaches.

### 6.1. The econometric model

Since the WTP values are ordered into classes (see Table 2), an $m$-alternative ordered model is used, with single latent (un-observed) variable $WTP^*=y_i^*$ for simplicity [8].

In general, this is written:

$$y_i^* = \mathbf{x}_i'\boldsymbol{\beta} + \varepsilon_i, \tag{1}$$

where $i=1,\ldots, N$ is the sample size, $\mathbf{x}_i$ a vector of independent variables, and $\varepsilon_i$ the random error;

$$y_i = m \quad \text{if} \quad \tau_{m-1} < y_i^* \le \tau_m, \tag{2}$$

where $y_i$ is the observed variable, $m=1, \ldots, M$ the class, and $\tau_1,\ldots,\tau_{M-1}$ the cutpoints. When the error term $\varepsilon$ is standard normally distributed the ordered probit model is estimated; while when $\varepsilon$ is logistically distributed the ordered logit model is estimated.

In this study the ordered probit model is estimated, since it is recommended for WTP studies where the cutpoints are known (Verbeek, 2004, p. 205). As shown in Table 1, the WTP classes are $M=4$, and the cutpoints are: $\tau_1=0$, $\tau_2=1.5$ and $\tau_3=3$. Therefore:

$$\begin{aligned} y_i &= 1 \quad \text{if} \quad y_i^* \le 0, \\ y_i &= 2 \quad \text{if} \quad 0 < y_i^* \le 1.5, \\ y_i &= 3 \quad \text{if} \quad 1.5 < y_i^* \le 3, \\ y_i &= 4 \quad \text{if} \quad y_i^* > 3. \end{aligned} \tag{3}$$

The probability distribution is:

$$\begin{aligned} P(y_i = m|\mathbf{x}_i) &= P(\tau_{m-1} < y_i^* \le \tau_m|\mathbf{x}_i) \\ &= P(\varepsilon_i \le \tau_m - \mathbf{x}_i'\boldsymbol{\beta}) - P(\varepsilon_i \le \tau_{m-1} - \mathbf{x}_i'\boldsymbol{\beta}). \end{aligned} \tag{4}$$

### 6.2. The independent variables of the regression model

The distribution of the independent variables chosen for estimating the regression model is presented in Table 4. They are classified into three categories: respondents' characteristics; respondents' preferences about who should pay for beach preservation from erosion; and beach nationality (dummies).

Focusing on the aggregate data, Table 4 shows that among respondents who answered the WTP question, there are slightly more females, just under 50% of respondents are aged 29–49, and the majority of them do not work since they are students, housewives, pensioners and unemployed people. As regards monthly income, the majority of respondents have a family income of €1000–€3000. In addition, just less than 16% of the whole sample is fully aware of what ICZM is. We highlight that in East Macedonia and Thrace, Liguria and Lazio almost the same percentage of respondents (from 20.27% to 21.89%) are fully aware of what ICZM is, while in the Hérault Department, Languedoc-Roussillon, a small percentage (5.65%) of respondents know what ICZM is and the rest do not know, but those who are fully aware of it state the highest WTP ( > €3).

As regards respondents' preferences about who should pay for the defence of beaches, in these sites the majority (55.44%) of respondents believe that the state should pay, in particular in the Languedoc-Roussillon (81.06%). Nevertheless, a fair percentage of the whole sample believes that private individuals should also pay

**Table 4**
Independent variables: distribution (%).

| Independent variable | East Macedonia and Thrace | Liguria | Lazio | Languedoc-Roussillon | Aggregate data |
|---|---|---|---|---|---|
| *Respondents' characteristics* | | | | | |
| *Female* | 43.78 | 68.15 | 55.41 | 50.50 | 54.96 |
| *Aged 18–28* | 27.86 | 8.15 | 18.92 | 26.91 | 20.45 |
| *Aged 29–49* | 47.76 | 58.15 | 47.30 | 43.19 | 49.41 |
| *Aged over 49 (reference category)* | 24.38 | 33.70 | 33.78 | 29.90 | 30.14 |
| *White and blue collar* | 35.32 | 5.19 | 27.78 | 56.75 | 32.33 |
| *Manager/ self-employed* | 23.88 | 10.37 | 0.00 | 14.53 | 14.18 |
| *Other occupation (reference category)* | 40.80 | 84.44 | 72.22 | 28.72 | 53.49 |
| *Monthly income: < €1000* | 18.41 | 10.37 | 2.70 | 15.95 | 13.59 |
| *Monthly income: €1000–3000* | 61.19 | 41.85 | 54.05 | 63.46 | 55.20 |
| *Monthly income: > €3000 and missing income (reference category)* | 20.40 | 47.78 | 43.25 | 20.59 | 31.21 |
| *Knowing ICZM*[a] | 21.89 | 21.11 | 20.27 | 5.65 | 15.72 |
| *Respondents' preferences about who should pay* | | | | | |
| *The State should pay* | 40.30 | 37.41 | 58.11 | 81.06 | 55.44 |
| *Individuals should contribute* | 45.27 | 60.37 | 24.32 | 0.00 | 34.40 |
| *I do not know who should pay/no answer (reference category)* | 14.43 | 2.22 | 17.57 | 18.94 | 10.16 |
| *Beach nationality (% of interviewees)* | | | | | |
| *French beach* | | | | | 35.58 |
| *Greek beach* | | | | | 23.76 |
| *Italian beach (reference category)* | | | | | 40.66 |

**Q4** **Knowing ICZM means being fully aware of what ICZM is.

[a] *Other occupation* means students, housewives, pensioners and unemployed people

(34.40%), in particular the majority (60.37%) of respondents in Liguria.

### 6.3. Willingness to pay determinants

The ordered probit model has first been estimated with all the independent variables by using the aggregate data (complete aggregate model), and then it is re-estimated with only the independent variables (reduced aggregate model) which were found to be significant in the complete model.

Table 5 shows the determinants of the WTP for beach conservation obtained from the reduced aggregate model. The complete aggregate model is presented in Appendix, Table A. The coefficient of *Knowing ICZM* is significant and positive, showing that the more visitors know about ICZM, the higher their probability of paying, and thus confirming the result obtained by Marzetti and Disegna [24]. The coefficient of *Greek beach* is also significant and positive, therefore beach visitors in East Macedonia and Thrace seem to have a higher probability of paying than visitors in the other three regions. In addition, being *female* is significant, thus showing that women seem to have a higher probability of paying than men for preserving the beach.

**Table 5**
Reduced aggregate model: WTP determinants.

| Independent variables | Coefficient (Robust Std. Err) |
|---|---|
| *Knowing ICZM* | 0.32 (0.12)*** |
| *Greek beach* | 0.44 (0.1)*** |
| *Female* | 0.21 (0.1)** |
| *Aged 18–28* | 0.23 (0.14)* |
| *Aged 29–49* | 0.31 (0.12)*** |
| $\tau_2 = €0.5$ | 1.23 (0.12)*** |
| $\tau_3 = €3$ | 1.67 (0.13)*** |

$N = 798$; Wald chi2(5) = 40.39; Prob > chi2 = 0.0000;
Log pseudolikelihood = −548.58128.

*** $p \le 0.01$;
** $p \le 0.05$;
* $p \le 0.1$

Furthermore, being *aged 18–28* and being *aged 29–49* increase the probability of paying.

### 7. Discussion and conclusion

Results about these Mediterranean pilot-sites show that the number of visitors fully informed about ICZM is low in all the sites, despite local authorities having implemented ICZM strategies for conserving the coast.

As regards who should pay for coastal defence, the aggregate distribution shows that the majority of respondents believes that the State should pay for beach defence. Nevertheless, considering the single regions, while in Languedoc-Roussillon and Lazio the majority of respondents believe that only the State should pay, in Liguria the majority believes that individuals should also contribute. As regards the WTP, the majority of respondents is willing to pay in East Macedonia and Thrace and Lazio.

Regression results show that income does not determine visitors' WTP. This is considered an exception for the economic theory, and confirms the results of other case studies on the evaluation of public goods about which economic variables do not always affect visitors' WTP for coastal preservation (Marzetti and Disegna, 2012; **Q5** [25]. Among the variables affecting WTP, *knowing ICZM* is significant, thus showing that those who are fully informed about what ICZM is have a higher probability of paying for beach preservation. This suggests to policy-makers that in these Mediterranean coastal zones promoting public awareness of the nature of ICZM may increase visitors' probability of paying for beach conservation. As regards visitors' social characteristics, in these regions women have a higher probability of paying than men, thus suggesting that women are more sensitive to beach preservation than men. This confirms a result of the CVM literature, which shows that men have a lower awareness of environmental threats than women [35]. In addition, young and middle-aged people have a higher probability of paying than older respondents, and this seems to show that older people are less sensitive to coastal preservation than young and middle-aged people. This is another interesting result for coastal management, since European

statistics [13,14] show that, in the coming decades, population-ageing in all European Member States (EU27) is reflected in an increasing number of older people and a declining number of younger and working age people. More specifically, in EU27 the median age is projected to rise from 40.4 years in 2008 to 47.9 years in 2060, with an increase of 7.5 years in the period; comparing this increase with that of the Nations considered here, in France it is less than 5 years, in Italy about 8 years and in Greece 10 years. In addition, in EU27 the proportion of population aged over 65 is projected to increase from 17.1% in 2008 to 23.5% in 2030, with an increase of 6.4% in this period, which is almost the same in France 6.5%, while in Italy it is 5.9% and in Greece 5.3%.

Therefore, these results about social characteristics also suggest to policy-makers that, in promoting public awareness about ICZM, they should also pay specific attention to the categories of visitors who are less sensitive to beach preservation and less likely to pay.

## Uncited references

[19,31,4].

## Acknowledgements

## Appendix A

In Table A1 the coefficient of $\tau_1 = 0$ is insignificant, thus showing that there is no significant difference between the first and second WTP class. The complete aggregate model has been re-estimated without $\tau_1 = 0$, and the reduced aggregate model has been estimated (Table 4).

**Table A1**
Complete aggregate model.

| Independent variable | Coefficient (Robust Std. Err) |
| --- | --- |
| French beach | − 0.71 (0.14)*** |
| Greek beach | 0.35 (0.11)*** |
| Female | 0.18 (0.09)** |
| Aged 18 –28 | 0.39 (0.12)*** |
| Aged 29 –49 | 0.27 (0.11)** |
| White and blue collar | .18 (0.12) |
| Manager/ self- employed | 0.09 (0.14) |
| Knowing ICZM | 0.3 (0.11)*** |
| The State should pay | − 0.08 (0.17) |
| Private people should contribute | 0.16 (0.18) |
| Monthly income < €1000 | − 0.17 (0.16) |
| Monthly income: €1000–3000 | − 0.14 (0.1) |
| $\tau_1 = €0$ | 0.33 (0.21) |
| $\tau_2 = €1.5$ | 1 (0.21)*** |
| $\tau_3 = €3$ | 1.46 (0.22)*** |

$N = 758$; Wald chi2(12) = 139.37; Prob > chi2 = 0.0000; Log pseudolikelihood $= -812.46084$.

*$p \leq 0.1$.

*** $p \leq 0.01$

** $p \leq 0.05$

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