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ANALYSIS

Integrating stakeholder analysis in non-market valuation of environmental assets

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Abstract

This study employs a mixed methodological approach, using questionnaire surveys of individuals and stakeholder focus groups to investigate economic values placed on a wetland surrounding Kalloni Bay on the island of Lesvos, Greece. The questionnaire survey of local people and visitors to the area included a rating exercise of four possible development scenarios, and each individual was then asked their willingness to participate in payment for their chosen scenario, and if they were willing to participate, they were then asked a willingness to pay question. Participants were also asked a series of attitudinal questions concerning the local environment and issues relevant to the area. This information was then combined with qualitative information derived from the focus groups, which elicited opinions from important local stakeholders, such as fishermen, elected representatives, constructors and hotel owners about their priorities for both conservation and development. By combining these methodologies, information and conclusions of greater relevance to policy makers can be obtained than using either methodology in isolation.

Keywords: Contingent valuation; Environmental values; Stakeholder groups; Mixed methodology; Wetland conservation

1. Introduction

The drainage, degradation and destruction of Mediterranean wetlands has proceeded at an historically unprecedented rate during the 20th century. During this period, such losses have included 73% of marshes in Greece, 86% of the most important wetlands in France, 60% of wetlands in Spain and 15% of lakes and marshes in Tunisia (MEDWET, 1996). The reasons for drainage have included the prevention of water-born diseases, the development of agricultural land and the expansion of cities.

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Partly as a result of these losses, fundamental changes have occurred in our understanding of the functions and values of wetlands, and these have prompted many recent international efforts to protect and sustainably use the Mediterranean wetlands. Today, nearly 100 Mediterranean wetland sites have been listed as being of international importance under the Ramsar Convention. Since 1991, these efforts have been coordinated through MEDWET, a partnership between the European Commission, the Ramsar Bureau, the governments of France, Greece, Spain, Italy, Portugal and several non-governmental organizations. MEDWET is an initiative for concerted action, joint fundraising and mutual cooperation in wetland conservation policy. It adopts the 'wise use' imperative of the European Union, but also takes explicitly into account a number of factors considered to affect specifically the management of Mediterranean wetlands, namely:

- poverty and economic inequality;
- pressure from population growth, immigration and mass tourism; and
- social and cultural conflicts.

The Venice Declaration, detailing MEDWET's strategy for the period 1996–2006, states the necessity of increasing knowledge and raising awareness of wetland values and functions throughout the Mediterranean. For this purpose, MEDWET advocates collaboration with organizations and institutions experienced in the field of identification, quantification and assessment of the economic values of wetland functions and benefits, with a view to adapting and applying such techniques for Mediterranean wetlands (MEDWET, 1998).

The main objective of this case study was the evaluation of alternative scenarios for the future development of the Kalloni wetland on the island of Lesvos, Greece, using both ecological risk analysis and monetary valuation as assessment methods. However, in this paper we focus specifically on the evaluation of preservation versus development scenarios estimated via the contingent valuation (CV) method (Mitchell and Carson, 1989; Bateman and Turner, 1993; Bateman and Willis, 1999), informed by the ecological risk analysis which is presented in detail elsewhere (Skourtos et al., 1999). The CV method uses direct questionning of individuals, usually administered via a survey, to obtain values for the assets under investigation. The most common variant of this approach is to elicit respondent's willingness to pay (WTP) either to ensure some gain in the asset or, as in the current application, to avoid some degree of loss. However, this individual-based method is often criticised for failing to account for institutional structures and the compartmentalisation of different social milieu, in this case into stakeholder groups, who may have joint goals which they strive to obtain for their common good. To address this possibility, qualitative analysis of focus groups is also applied in order to understand stakeholders' perception of risks and developmental potentials. Information from the focus group discussions was also used to develop the final questionnaire survey used. In addition, a rating exercise was conducted amongst the various development/preservation scenarios in order to determine the most preferred of the alternative scenario options using a non-monetary-based choice exercise, and to test the consistency of this choice with the monetary valuation.

This paper describes in detail the analysis of the social, environmental and economic impacts of future development options in Kalloni. The following section describes the background to the environmental and management issues of Kalloni bay, and Section 3 describes the methods of analysis used and their rationale. Section 4 describes the qualitative analysis of stakeholder focus groups and Section 5 details the quantitative results from the questionnaire survey. Section 6 provides a general discussion of the results obtained and reflects on the usefulness of a mixed methodological approach, using surveys of individuals and stakeholder focus groups, to environmental valuation.

2. Background to the case study

Administratively, the Kalloni wetland complex belongs to the Prefecture of Lesvos, Greece, and extends to the periphery of the communities of Agra, Parakoila, Keramion, Kalloni, Agia

Paraskeyi, Basilika, Arisvi, Lisvori and Polichnitos. The drainage basin of the wetland also includes the communities of Anemotia, Dafia, Napi, Pelopi, Stipsi, Ypsilometopon and Kapi. Under new legislation anticipating the integration of small communities into municipalities, the communities of Arisvi, Dafia, Kalloni, Keramion and Parakoila have recently merged together with the municipality of Kalloni.

2.1. Ecological significance

The Kalloni wetland is one of the most important wetland sites in the Aegean archipelago. The gulf of Kalloni is located in the southeastern part of the island of Lesvos (longitude 28°11′–28°13′, latitude 38°12′–39°13′N). The gulf is a closed, shallow bay (20 km long, 10 km wide, average depth 10 m) connected to the open Aegean sea through a 4 km-long narrow channel (see Fig. 1). The wetland extends over a large part ($\approx 50\%$) of the bay (11 000 ha) where the well-known salt pans (2630 ha) play an important role. Part of the wetland is also the coastal area surrounding the bay with a complex of shallow brackish zones, small freshwater marshes, salt marshes and salt pans. The catchment area of the wetland includes olive groves, pine forests and shrub lands. Ecologically, the Kalloni wetland is considered as an important Bird Area, is classified as a CORINE biotope and ranks among the very first areas to be included in the NATURA 2000 network in Greece. The region is extremely important for its variety of birds and wildfowl with 259 bird species already registered in the area of which 32 are listed in Annex 1 of the EU Directive 79/409. The role of the Kalloni wetland here is three-fold: it functions as a wintering, reproduction and migration station for the birds. Kalloni bay is furthermore one of the most important fishing grounds in Greece, especially for oyster, and a promising site for the development of aquaculture. Besides its ecological value, Kalloni wetland is a tourist attraction with a prominent bird watching tradition. The sea-part of the wetland is well known for its richness in benthic organisms, endemic fish stocks and oysters.

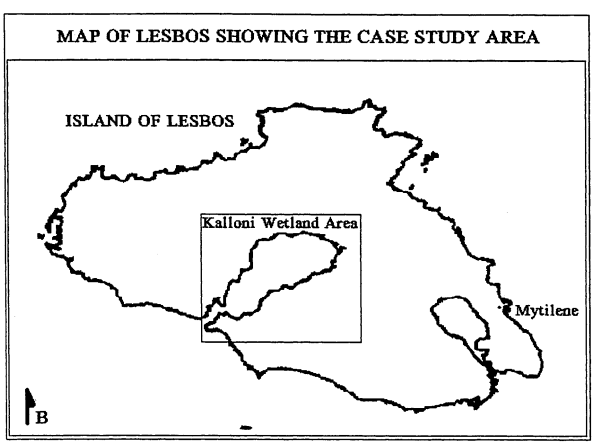

Fig. 1. Map of study area.

2.2. Social and economic pressures

The Kalloni bay wetland is a prime example of a complex, multifunctional environmental asset under pressure. The wetlands are under pressure from increased population requirements, and plans for new housing have gradually stimulated the clearance of natural and semi-natural forested areas. This trend has been exacerbated by the extension of agricultural projects subsidised by the European Union (through the Regional Mediterranean Programs), and by the recent push for tourist development in the area. The island economies and ecosystems in the Northern Aegean face important structural problems from the increasing globalisation of trade and opening up of markets, especially within the borders of the European Union. The lack of suitable policy measures designed to counterbalance the fragile economic structure in the region and take into account the social, environmental and distributional issues inherent in the marginalisation of their societies are increasingly apparent. In fact, the very notion of a 'common market' can be seen as running counter to the islands' main feature, i.e. their spatial isolation and compartmentalisation (Spilanis, 1998).

2.3. Institutional pressures and management goals

Amidst a wealth of legal and administrative provisions, Greek environmental policy is to a great extent characterized as being 'symbolic' rather than effective. For example, Spanou (1998:13) notes that 'issues are addressed either in an abstract or in a highly technocratic way, with very few comments on their socio-economic origins or on existing policies.' The record of wetland protection in Greece reveals a significant implementation gap (Papadimitriou, 1995), and agricultural subsidies and uncontrolled construction activity have led to gradual decline and degradation of natural ecosystems.

Recent reports, undertaken mainly on behalf of the Ministry of the Environment, draw attention to this fact and propose a conservation strategy based on the development of ecotourism and a suitable zoning of human activities (Kilikidis, 1992). However, these were met with suspicion and strong resistance from both local authorities and social groups. Constrained economic activity in favour of wetland preservation was a socially unacceptable option in the early 1990s, and the only conceivable policy goal was the regulation of fisheries through quotas and seasonal fishing prohibitions. However, the situation is slowly changing. A number of factors have contributed to this, such as growing awareness of the ecological and economic importance of wetlands, and gradual institutional adaptation towards more decentralized environmental jurisdictions. These developments have culminated in the establishment of a number of important conservation principles, including implementation of the precautionary principle and the legal right of bringing environmental disputes to court (Lazaretou, 1995).

Based on these principles, a specific National Wetlands Strategy is currently under preparation by the Ministry of the Environment. The strategy aims at operationalising the notion of 'wise use' of wetland resources in Greece, incorporating basic precautionary principles in other policy areas (transport, agriculture and tourism) and, last but not least, raising public awareness about the importance of conserving wetland resources (Amphibion, 1998).

According to the EU's Directive 92/43/COM, the Kalloni region is included in the national inventory of sites eligible to be classified as Areas of European Community interest. The Kalloni wetland is also included into the pan-European ecological network of protected areas known as NATURA 2000, and is further classified as a 'zone of special conservation' (Section 4.4). The Greek environmental framework law 1650/96 (section 21.1) also states the necessity of legal protection of an ecologically important area, and the appropriateness of specific measures taken should be documented with the Specific Environmental Assessment (SEA). However, in spite of these regulations, no specific legal status currently exists for the Kalloni wetland, although due to changes in public attitudes towards the wetland, a distinct administrative and legal framework for the protection of the Kalloni wetland is slowly emerging. Therefore, within commissioned studies for land use planning in Lesvos (financed by the Ministry of the Environment), proposals have been made for the establishment of specific Zones of Land Use Control for Kalloni bay. These include specific targets for controlling urban development, designation of the coastal area of the bay as a 'most ecologically sensitive area' and zones where only activities associated with the functioning of the saltpans and aquaculture are permitted. The study detailed here was undertaken in the light of these new management initiatives.

3. Data collection and methods

Three main techniques were used to evaluate the management options for Kalloni bay. First, an ecological analysis was performed to identify realistic scenarios and current risks and pressures on the wetlands, followed by the development of a set of management scenarios. Secondly, four stakeholder focus groups were convened with important interest groups in the area. Thirdly, a large-scale questionnaire survey of residents and visitors to the area was undertaken which examined preferences for four different management scenarios. Descriptions of these three stages of the research follow.

3.1. Ecological analysis

Ecological analysis was performed using an 'ecosystem valuation model', the objective of which was to identify the ecological value of landscape elements of the Kalloni wetland and its catchment area. This model focused on the sensitivity of the natural habitats of the Kalloni catchment to further disturbance by human activities. The areas that have already been heavily disturbed, such as area or point settlements and annual cropland, have already lost much of their biodiversity and ecosystem function value in comparison to natural habitats. These would therefore be minimally affected by more intense human activity, at least from an ecological perspective. On the other hand, remnants of natural habitats would be highly susceptible to degradation by man-caused activities and area reduction. The full details of the ecological analysis are beyond the scope of this study (see Skourtos et al., 1999, for further details), but briefly, environmental cartography using satellite images was combined with ecological surveys conducted in the region to construct a GIS from which different outcome scenarios could be generated. These informed the choice of management scenarios which are presented below.

3.2. Development of management scenarios

The scenarios for future development of the Kalloni wetland were designed to refer to the lowland, coastal area of the region and to a time horizon up to the year 2010. We therefore concentrated on possible land use changes around the bay for the next decade, assuming that these medium-term changes will influence the long-term pattern of development in the watershed of the wetland in such a way that they will be practically irreversible. The scenarios used in the study were composed of a number of exogenous factors, common for all scenarios, and of a number of specific, endogenous provisions, derived from informed judgement and current socio-demographic and policy trends. The exogenous factors are:

- The rate of population change. We assumed that the general rise of living standards in the region, in combination with increasing unemployment in major urban centres such as Athens (which historically attract migrants from the North Aegean), will stop the loss of human resources from the island and will contribute to a moderate population increase in the Kalloni bay area.
- The inflow of EU funds for structural investments in the region will continue to play an important role, based on increasingly reliable frameworks for environmental impact assessment.
- The legal protection of the forested areas. We assume that areas that have been already characterised as forests will continue to be protected as such. Accordingly we exclude forests from the variables included in our scenarios.

The endogenous factors included in the different scenarios are:

- The degree and the kind of support that is expected for the tourist sector.
- The degree and the kind of support for the protection of the wetlands and the wildfowl population.
- The degree and the kind of support for housing development in the region.
- The importance of agriculture and livestock raising in the region.

Using the information from the ecological analysis of the Kalloni wetland, land-use changes and their impacts on the biodiversity of the region were made realistic. Furthermore, we also ensured that the scenarios presented answer meaningful economic questions. Four development/conservation scenarios were finally chosen for evaluation, which were explained to respondents in brief descriptions of 100–200 words each. These were as follows (a full technical description being given in Skourtos et al., 1999):

Scenario A: An increase in wetland area and tourist accommodation, with a modest decrease in agricultural land — 12 new species of birds come to the wetland, bird watching associated tourism increases.

Scenario B: More than half the wetland is drained for new housing, hotels and holiday

homes, agricultural land remains unchanged. Consequently, there is a large loss of habitat for birds in the area, with the loss of 78 species of birds. Bird watching possibilities are severely reduced and the associated tourism practically ceases.

Scenario C: A modest reduction in agricultural land is used to more than double the built area. The wetland areas remain the same, though the loss in agricultural land is expected to lead to a modest loss of nine species of birds, and some reduction in associated tourism is also expected. Housing and tourist accommodation increase as the agricultural land decreases in area.

Scenario SQ: Maintenance of the status quo, which involves reversing the incremental damage caused to the wetland by rubbish tipping, encroachment and illegal sand removal, with the establishment of protected areas. Land use attributes were described as staying at their current (1998) levels.

Although fishing is an important activity in the Kalloni area, both economically and culturally, it was not referred to in the scenarios for two main reasons. First, it is not easy to predict the impact on fishing from different conservation or development strategies for the wetland, and the area we concentrated on was situated above sea level, which does not directly impact on fishing activities. Secondly, we were focusing on the provision of habitat for wildfowl, and fishers do not compete for land in the low-lying coastal areas as construction and farming activities do.

3.3. Qualitative analysis: the stakeholder focus groups

The stakeholder analysis was designed for identification of conflicting uses of environmental assets, the conceptualisation of conflicts on the basis of property rights allocations among social groups, regions and nations, and, last but not least, the understanding of the institutional mechanisms by which costs and benefits are appropriated (Munasinghe, 1992; Brouwer et al., 1999; Langford et al., 1999). The conceptualisation of the conflicts on the basis of the notion of property rights must take into account the fact that property regimes are often undefined and/or of a mixed nature in the Kalloni area. This fact poses a number of questions relating to traditional class divisions, property ownership by potentially conflicting social groups, and the real nature of the environmental debate in Kalloni bay. Is it simply a forum for expressing dissatisfaction and asserting influence over property rights issues?

A number of conflicts in the use of the Kalloni wetland are apparently the result of the uncoordinated character of its use. The specificity of the management problem of the Kalloni wetland lies in the early and latent nature of the risks for the region which neither the state nor the local people and their organizations seem to be conscious about. The region sees itself before unavoidable structural changes that the Greek state and EC Regional Directives try to introduce, while the population aspires to a development path similar to the one taken by most successful Greek island economies.

As a first step towards understanding the stakeholders' positions on the issue of management of the Kalloni wetland, we applied the focus group technique in order to identify the underlying goals, risk perceptions and the ranking of alternatives by four social groups. The aim was to elicit stakeholders' perceptions in a number of ways as follows (Desvouges and Frey, 1989):

- in determining the proper order and magnitude of information presented in the survey;
- in targeting respondents who may have difficulties answering the survey questions;
- in identifying the opinions and arenas of concern of different groups;
- in identifying the proper extent of the population affected, and how different sectors of the population may frame the issues involved;
- in sorting out realistic scenarios which covered the range of opinions and issues discovered.

The purpose behind the focus groups was therefore twofold:

1. to aid the development of the questionnaire survey;
2. to gain important insights into the attitudes and motivations towards the Kalloni wetlands of important stakeholder groups.

Unfortunately, due to resource implications and the timetable of the research, it was not possible to have a roundtable discussion with all stakeholders involved after the results of the final survey were completed. However, the authors intend to further investigate views of different stakeholder groups in Kalloni in future research.

3.4. Quantification of preferences: the contingent valuation survey

In order to test whether the questionnaire was adequate, a pilot survey analysis was undertaken prior to the main study, particularly in respect of the wording of the questionnaire and valuation scenario. Data collection was carried out by face-to-face interview, with each interview lasting approximately 30–45 min. The survey was conducted during May, 1998, and the total sample size was 330 people. The results of this pilot survey are given in Skourtos et al. (1999).

The main survey questionnaire was based on the pilot questionnaire and information and feedback from the focus group discussions with stakeholders. In particular, the following design improvements were made:

- the payment vehicle was discussed, tested and understood by respondents;
- the realism of the scenarios was discussed, and minor alterations made;
- some technical terms were replaced by those used in everyday language, for example, the more scientific term for wetland (υγροβιότοπος) was replaced by the word υγρότοπος, which is in common usage in the Kalloni area;
- the air photographs edited in Photoshop to visually represent the scenarios were modified to present a more realistic depiction of future development possibilities.

The main survey consisted of a number of sections. Respondents were first asked some general questions on their attitudes concerning the major problems facing the local area, and how they viewed environmental issues relative to these. Next, respondents were asked about their familiarity with the wetland and their perceptions of the issues involved. This included questions about their use of the area, how long they spent there and why, and if they knew which areas make up the Kalloni wetland. Respondents were also asked how attractive they rated the landscape of Kalloni, how they rated Kalloni Bay as a habitat for wildlife, and what they considered to be the main risks facing the area.

The valuation section followed, in which the respondents were given information about the present day condition of Kalloni Bay. They were then asked to rate how happy they were with the present state of the Bay on a Likert type scale which ranged from 0 = dreadful (could not get worse) to 100 = superb (could not get better). Descriptions were then given of the scenarios A, B, C mentioned above. This included a graphic representation of the scenarios and status quo on a large information board, made up using digital imaging and manipulation techniques (for example, in scenario C the urban area was expanded in size).

Respondents were then asked to rate these three scenarios on the same Likert scale as above. After presenting respondents with a summary of their preferences (as a consistency check to see that respondents had understood what was being asked), the questionnaire moved onto the monetary valuation exercise. Here, the respondents were asked to value the most favoured scenario from the ranking (rating) exercise, i.e. the one with the highest rating given by them on the Likert scale.

A 'payment principle' question was used to first see if respondents were, in principle, in favour of paying at least some amount in order to finance their preferred scenario option. Those who were not in favour of any amount were asked to state their reasons for this answer. Those who were in favour were asked to state (as an open–ended amount) the maximum amount of money that they would be willing to pay every 3 months for the next 2 years to finance their preferred scenario. They were then asked to state their main reason for their answer. Respondents were not asked to state willingness to pay values for their three less preferred scenarios. Hence, because we have different populations answering the payment question for each scenario, we cannot calculate a

total economic value for the wetland from this data. However, this was not our aim in this study. Here, we are examining the relative values calculated for each scenario, and exploring the explanatory factors that determine WTP amount in each of the four cases. The payment vehicle used for each scenario was an increase in water bills collected every 3 months for a period of 2 years, with the resulting fund being administered by the Public Water and Sewerage Corporation of Kalloni, which would supervise the execution of the necessary works required by each scenario (household water bills are issued every 3 months in Greece).

Finally, respondents were asked a number of questions regarding their socio–economic characteristics in order to provide information on representativeness of the sample, and for the willingness to pay bid function analysis. A full list of the variables used in the analysis is given in Table 1. The interviews were carried out using a random selection procedure at a variety of locations in the Kalloni Bay area. The main survey was again carried out by face-to-face interview, each lasting between 30 and 45 min. The survey was conducted over the period 10th July until 24th September 1998, with a total sample of 914 respondents.

4. Stakeholder focus group analysis

Four focus group interviews were undertaken in the summer of 1998, comprising representatives of local fishers, building constructors, hotel owners and elected representatives of villages in the Kalloni Bay area. The discussions were between 1.5 and 2.5 hours long, and participants were invited by telephone or fax. A series of general questions relating to the wetlands was prepared for each group, and these formed the focus of the group discussion. The focus groups were organised in accordance with guidelines given by Morgan (1988); Stewart and Shamdasani (1990) and Morgan and Krueger (1993). Farmers were not interviewed in a group discussion as they were identified as a non-cohesive set of individuals, who did not rely on farming as their only (or

Table 1
Explanatory variables used in the quantitative analysis

Variable name	Description
Issues considered important	
UNEMP	Unemployment
HOUSING	Housing problems
HEALTH	Provision of health services
ENVPROT	Protecting the environment
CRIME	Crime
TRANSPORT	Transport problems
EMMIG	Emigration
RECESS	Economic recession
EDUC	Education
Living and employment	
LSKALA	Lives in Skala Kalloni (the port)
LKALLONI	Lives in Kalloni (the town)
LAGIAP	Lives in Agia Paraskevi
LPOLYCH	Lives in Polychnitos
LNOTLESV	Does not live on Lesvos
LMYTIL	Lives in Mytilene (the capital of Lesvos)
HOLREC	Comes to Kalloni for holiday/recreation
FARMER	Works as farmer
FISHER	Works as fisherman
Risk issues for Kalloni	
BUILDING	Building/construction
INDWASTE	Municipal and industrial waste
WASTEWAT	Waste water
AQUACULT	Aquaculture
HUNTING	Hunting
Miscellaneous variables	
ATTRACT	Finds Kalloni very attractive
BIRDS	Rates bird habitat as very important
AWARE	Aware of other wetlands in Aegean
KALBAD	Rates present state of Kalloni as bad
KALGOOD	Rates present state of Kalloni as good
AGE < 30	Age less than 30
EDU > 6	More than 6 years education
FEMALE	Female
INCOME	Income
ENVGROUP	Member of environmental group
Reasons for positive response to payment principle question	
LOCECON	For development of local economy
NATENV	In favour of enhancing natural environment
GOODCAUSE	Likes giving to good cause
WETCONS	In favour of wetland conservation
HYPOTH	Hypothetical question, won't really pay

often main) source of income, but also worked in hotels and other occupations.

4.1. Representatives of local fishers

Three representatives of local fishers were invited to the group discussion. However, only two attended, one from Kalloni (male, over 50-years-old) and one from Parakoila (male, about 30-years-old), a sub-division of Kalloni, who was particularly interested in shellfish. The representative from the village of Polychnitos refused to attend due to potential conflicts of interest with fishers in Kalloni.

The representatives had a perception of Kalloni Bay as being the centre of the island, and that the sea was very rich and there was a responsibility to preserve this richness. In association with this perception of value was a negative view of outsiders (i.e. non-local fishers), from other islands and from Italy, who would come and exploit a very local resource. The representatives believed that they had a responsibility towards the bay, but also rights over use of the bay.

Discussion was focused around the value of the bay, and issues surrounding it such as the development of aquaculture and the problem of pollution from agricultural practices. The representatives acknowledged that bad fishing practices had led to depletion of fishing stock in the past, and accepted that the state had passed laws to make fishing more sustainable. However, they felt there was also a need to address the problems of chemical pollution of the bay arising from overuse of agricultural fertilisers and pesticides — they again emphasised that noted changes in the quality of the bay, in their opinion, were largely attributable to farming practices. Aquaculture was also perceived as a negative development leading to further pollution of the bay.

Their perceptions of the wetlands were framed in terms of it being a natural habitat for fish and shellfish, which, like the rest of the bay, is under threat from pollution. However, they felt it was not their responsibility to talk to the farmers, but that of local government officials. The younger representative from Parakoila believed that many of the problems of the past, involving conflict and division between different groups of local fishermen, could be resolved by the younger people working together towards a common aim.

4.2. Hotel owners

The hotel owners' focus group comprised six people, five of whom owned hotels in the area (four males and one female) and one male who was president of a local development company. The president was not invited to the focus group, but came of his own accord. This group provided the most vivid discussion, mostly about the potential for the development of tourism and the problems of waste disposal regarding the wetlands and the bay. Some of the group members were farmers as well as hotel owners, but did not acknowledge that the pollution problems of the bay were linked to use of agrochemicals. Overall, the group perceived the problems of the Kalloni area in terms of development potential, and in some respects had a negative perception of the wetlands as this was land that was unsuitable for building, and that high water levels may threaten existing buildings.

The group stated categorically that they had no responsibility for improvements in the natural habitat of the area, and problems such as high water levels were not their fault, but simply natural phenomena that they had to accept. However, they also commented that high water levels were 'a curse' and wanted more land to be drained. They later acknowledged that their perceptions of the wetland were changing — in previous years they had seen the wetlands as 'useless land', but were now beginning to see the potential of the wetlands for attracting tourists.

Concern was expressed about the conflicts between 'eco-tourism' and mass tourist activities. The group was against the building of large hotels and favoured the development of smaller units, and a mixture of activities for tourists, such as building of a marina. One group member who came from Crete suggested the building of self-contained tourist villages, as they have in Crete. In contrast to the fishermen, who did not mention the possibility of building a new airport for the

area, there was significant discussion about this issue, and disagreement about the consequences of building a new airport. Some group members thought it was a good idea as tourists would arrive in greater numbers, and gain easier access to the area. However, other members pointed out that the building of the airport could harm the wetlands, and the birds would leave, having negative consequences for tourism in the longer term.

4.3. Local elected representatives

The group of elected representatives (subsequently referred to as 'mayors') of local villages comprised four individuals, all males over 50-years-old from the municipalities of Kalloni, Agia Paraskevi, Polychnitos and Basilika. The mayor of Kalloni was particularly dynamic in his approach, and provided a number of interesting, if speculative, ideas concerning future development of the Kalloni area, and insisted that the new airport need not affect the wetlands. The other mayors tended to focus on very local problems, such as scarcity of water resources, poor road access, and limited development opportunities. They all favoured development of the new airport to move the focus of the island towards its centre, around Kalloni, and away from Mytilene, the capital city of Lesvos.

About a third of the discussion focused on the problems of pollution and waste management, such as agrochemicals and waste treatment — a waste treatment plant had been constructed, but was not in use, as funds were not available for its operation. The wetlands were seen as an important local resource, and the mayors accepted that they had a responsibility for preserving the wetlands as a natural asset, but framed this in terms of future economic development. The mayor of Kalloni stated that the wetlands were pleasant, but should be restricted to certain areas, similar to parks, so they could be enjoyed but not interfere with future building developments. Hence, the wetlands were perceived as one of a number of important land uses, which should have defined boundaries, and should certainly not be expanded at the expense of other important land uses. The mayors also discussed the problems of property rights, as ownership of some areas of wetland is uncertain, and commented that this issue needed resolving in some way.

4.4. Building constructors

This group comprised four individuals (three males and one female) between 40- and 50-years-old. They were mostly concerned about wastes being generated by development and polluting the bay. They extract sand from the bay, and realised this was a destructive activity and damaged the wetland, but would not acknowledge it was their fault — they had to extract sand as part of their legitimate commercial activities. Responsibility was also accepted for the lowering of ground water levels, as more people were coming to the area and using water as a result of building construction. Again, this was not seen as a source of blame — it was simply an inevitable consequence of a natural desire for development and the result of legitimate economic processes. The group was in favour of further development, but unsure what direction this development should take. They were concerned that both tourism and agriculture should be considered in future plans, and there were trade-offs to be made between the two.

4.5. Discussion

It is important to set the focus group discussion in the context of the social processes operating in the Kalloni Bay area. Soon after the researchers started making phone calls to invite participants to the focus groups, almost everyone living in the locality knew about the research project and was discussing it. The participants therefore had prepared themselves to face the researchers from the University department in Mytilene, and indeed as noted, one participant arrived uninvited, as commented on earlier. Participants therefore stressed their interest in environmental issues, and the hotel owners in particular wanted to show how much they cared about the wetlands and the birds that visited there; for example, it was pointed out that local people had helped in a recent book written about the bird life on the wetlands.

Nevertheless, the focus groups revealed important differences in the social constructions made by different stakeholders on the wetlands and their place in the culture and economy of the Kalloni area. The issue of local people having rights over local resources was an important theme, and participants thought that problems and conflicts should be resolved locally. However, different stakeholders were reluctant to enter into discussions with each other — for example, the refusal of the fishermen's representative from Polychnitos to participate in the focus group. There was, in general, a belief that all the different activities involving the wetlands such as tourism, agriculture and fishing could co-exist — many local people combine occupations such as being farmers and hotel owners. However, the links between the consequences of different activities were not always accepted, for example, farmers refused to make the connection between use of fertilisers and pesticides on their fields and pollution of the bay. The uncertainty over property rights and responsibility was also a major area of concern, and inappropriate uses of land on one property were acknowledged as having detrimental effects on adjacent properties. Farmers in Agia Paraskevi owned a lot of the land around Kalloni, and there were important differences in the social perceptions of people coming from Kalloni and Agia Paraskevi. People in Kalloni were seen as being rather carefree, and interested in having a good time, while those in Agia Paraskevi were seen as hard working and industrious. Land around Kalloni has been acquired by people in Agia Paraskevi by purchase or through marriage, and hence it may be that people from the two villages have different motivations behind their perceptions of the wetland.

5. Results and discussion from quantitative analysis of the main survey

For the main survey, 52% of the sample were residents in the Kalloni area, and 38% were visitors either on day trips or holidays. 40.8% of those interviewed rated the current landscape as 'very attractive', with only 3.2% making a negative judgement. The most important risks to Kalloni bay and surrounding wetlands were thought to come from waste water (mentioned by 58% of respondents) and industrial waste (52%). Municipal waste (41%), aquaculture (32%) and hunting (29%) were also mentioned as posing risks.

5.1. Rating of scenarios

The respondents were asked to rate the four options discussed in Section 3 (scenarios A, B, C and SQ) on a scale of 1–100 in desirability. Table 2 gives summary statistics for the rating of each scenario, showing that on average scenario A was rated most highly, followed by the status quo, scenario C and finally scenario B.

We cannot directly analyse the rating scores given, as respondents may interpret the scale in different ways, i.e. a score of thirty given by one person may mean something different to a score of thirty given by another person (Cox et al., in press). However, we can compare whether one option is preferred above another in a qualitative sense, so for each respondent we have six pieces of information on their preference for: A versus SQ, B versus SQ, C versus SQ, A versus B, A versus C and B versus C. In addition, there may be ties, where the respondent shows indifference between two scenarios. Hence, we used a nominal logistic regression analysis for each piece of information, where we simultaneously model, for example, the preference for A compared to SQ and also the indifference between A and SQ compared to choosing SQ as the preferred scenario. However, here we only report the results where a definite preference between scenarios was shown.

Table 2
Summary statistics from the scenario rating exercise

Scenario	Mean rating (95% confidence intervals)	Median rating
Status quo	54.0 (52.8–55.2)	50
A	72.18 (70.8–73.6)	80
B	23.33 (21.9–24.7)	20
C	45.6 (44.0–47.1)	50

Table 3
Multiple logistic regression analysis for preference between scenarios[a]

Variable	A versus SQ	B versus SQ	C versus SQ	A versus B	A versus C	B versus C
ENVPROT	+					−
LNOTLESB	+					
ATTRACT	−−					
BIRDS	+++	−−		+++	+++	
KALBAD	+++	+++	+++			
KALGOOD			−−−			
FEMALE	+			+	+++	
WASTEWAT		+				
EDUC>6		−	−	+++		
INCOME		−−				−−−
BUILD			−			
AQUACULT				+++		−−
AWARE						−−−

[a] +/− = $P<0.05$; ++/−− = $P<0.01$; +++/−−− = $P<0.001$.

Table 3 gives the results of the multiple logistic regression analyses, with the logit of the preference for one scenario over another as the response variable in each case. The symbols in the table refer to the significance of each explanatory variable, with a plus sign indicating a positive association, and a minus sign, a negative association.

Comparing A with SQ: The multiple regression shows that the ecologically friendly scenario A is likely to be chosen by those who believe in the importance of environmental protection and have an interest in birds, but a negative perception of the current state of the environment. Hence, these perceptions reflect a stated need for change. Visitors from outside the island are more likely to favour scenario A, perhaps because their reason for visiting Kalloni is likely to be linked to attractiveness of the environment. Females are more likely to prefer scenario A over the status quo, perhaps because the male population is more likely to be concerned with economic outcomes. Belief that Kalloni is already an attractive environment is associated with a preference for the status quo over scenario A.

Comparing B to SQ: Scenario B describes an increase in development at the expense of the wetlands compared to the status quo scenario, which maintains wetlands at their current level. A concern over waste water as a risk to the area was positively associated with choice of scenario B, reflecting the concerns of pro-development focus groups with stakeholders such as hotel owners and the construction industry (see Section 4). However, a concern over the impacts of aquaculture on the area was negatively associated with choice of scenario B over the status quo. There was a strong negative association with interest in bird life of the wetlands, and relationships with income and education were also negative. However, a strong positive association with believing the environment was currently poor was found, again suggesting a desire for change, but for different reasons than for choosing scenario A (see Section 5). Basically, choosing option B over status quo reflects the motivations of some local people with low education and income for the economic development of the Kalloni bay area, suggesting that the poorest sector of the population are more concerned with economic development than conservation.

Comparing C to SQ: Scenario C comprised a less radical development option than scenario B with the wetlands remaining the same, but some agricultural land and hence bird species being lost to urban expansion. The main predictors for choosing scenario C over the status quo was again a belief that the present environment around Kalloni was poor, and choosing the status quo

Table 4
Summary of Payment Principle and WTP responses

	Scenario			
	Status quo	A	B	C
Payment principle (% 'Yes')	53.8	77.6	41.9	57
Mean WTP Greek Drs[a] (95% confidence intervals)	6054 (3367–8741)	10 041 (8511–11 571)	6166 (−793–13 127)	9630 (5690–13 571)
Median WTP	3000	5000	1000	3000
Sample size considering each scenario[b]	91	643	43	136

[a] At the time of the survey, 1 Euro = approximately 350 Greek drachmas.
[b] From the sample considering each scenario, only those giving a 'yes' answer to the payment principle question were asked for a willingness to pay amount.

scenario was associated with belief that environment is already good. Interest in birds was not an important issue in this choice. Interestingly, belief that building and construction were important issues in the area was negatively associated with choice of scenario C, perhaps reflecting the opposition of some people to the loss of agricultural land to urban development.

Comparing A to B: These two scenarios were the most contrasting, with scenario A describing ecologically friendly expansion of the wetlands, and scenario B describing an increase in development at the expense of the wetlands. The main predictors for choice of scenario A in the multiple regressions were interest in birds, being educated and being female, plus an interest in aquaculture which may be seen as a less environmentally threatening economic activity than mass tourism.

Comparing A to C: Interest in environmental protection and birds and being female were associated with preference for scenario A over C.

Comparing B to C: Interest in environmental protection predicted preference for scenario C over the development scenario B, as did higher income, awareness of environmental issues, and a lack of interest in transport and aquaculture. This again suggests that poorer people, with concerns over economic matters, are less likely to be interested in the environment, and more likely to choose option B.

5.2. Analysis of the payment principle question for preferred scenario

Respondents were asked a payment principle question asking whether or not they would be prepared, in principle, to pay some amount for their preferred scenario. Those answering in the affirmative were then presented with a willingness to pay question. Summary results of the responses are given in Table 4.

As can be seen, a majority of respondents is in favour of an increase in water bills for achieving the preferred option in all cases except scenario B. χ^2 analysis indicated that there was a significant relationship between payment principle response and the scenario being considered (Pearson $\chi^2 = 57.2$, three degrees of freedom, $P < 0.0001$).

Table 5
Multiple logistic regression analysis for willingness to pay in principle responses[a]

Variable	Scenario A	Scenario C	Scenario SQ
ENVPROT	+		
BIRDS	++	+	
FEMALE	+		
EDU>6	+++	+	
AGE<30	++		++
ENVGROUP	+		
UNEMP		+	
AWARE			++

[a] +/− = $P<0.05$; ++/−− = $P<0.01$; +++/−−− = $P<0.001$.

Table 6
Multiple regression analysis for WTP amounts[a]

Variable	Scenario A	Scenario B	Scenario C	Scenario SQ
ENVPROT				+
BIRDS				−−
KALBAD		−		
KALGOOD			+	
EDU>6	+			
INCOME	+++			
LOCECON	−			
WETCONS	+	+	+	
NATENV				++
HOLREC	−−−			
LSKALA			++	
LKALLONI			++	
RECESS			−	

[a] $+/- = P<0.05$; $++/-- = P<0.01$; $+++/--- = P<0.001$.

Payment principle questions were analysed using logistic regression analyses, and the results are given in Table 5, in the same format as Table 3. Considering the results, we can draw the following conclusions:

Payment principle for A: Belief that environmental protection was an important issue for the Kalloni area predicted a willingness to participate in payment, as did an interest in birds. Younger, more educated people were more likely to pay, as were females and members of environmental groups.

Payment principle for B: No significant predictor variables (note that there were only 43 people who chose scenario B as their most preferred).

Payment principle for C: Positive responses were with a belief that unemployment was an important issue for the Kalloni area — scenario C includes urban expansion at the expense of agricultural land, which could lead to improved economic opportunities. An interest in birds and a higher education were also associated with increased willingness to pay in principle for this scenario.

Payment principle for SQ: For those who chose the status quo as the most preferred scenario, belief in the importance of environmental protection predicted a willingness to participate. It must be remembered that scenario SQ is not a 'do nothing' scenario, but involves reversal of the current decline in the status of the wetlands to maintain them at their current standard, by waste removal, and prevention of sand extraction and encroachment. Interestingly, younger people under 30-years-old were also more willing to pay for this scenario if they had chosen it as their most favoured.

5.3. Willingness to pay amounts for most preferred scenario

Participants who answered positively to the payment principle question for their most favoured scenario were then asked what extra amount they would be willing to pay every 3 months for the next 5 years. Table 4 shows mean WTP amounts. Highest individual WTP was for scenario A. An ANOVA found that we could not reject the null hypothesis that the four scenarios population means are equal. However, the Kruskal–Wallis non-parametric test indicated that we could reject the null hypothesis of identical population medians ($\chi^2 = 16.3$ with three degrees of freedom, $P = 0.001$).

The natural logarithms of these bid amounts were then used as response variables in Normal regression models for each scenario, the results being shown in Table 6. A logarithmic transfor-

mation was used to make the WTP amounts less skewed in distribution, and prevent the prediction of negative WTP amounts, which were not allowed in the survey.

Willingness to pay for A: Respondents were more likely to pay higher amounts for scenario A if they were more educated, of higher income and interested in wetland conservation. However, interest in the local economy was negatively associated with willingness to pay amounts for this scenario, as was visiting the area for recreation or holidays. Hence, it seems that of the majority of respondents who chose scenario A, the more educated, higher income people living in the Kalloni area are most likely to express their support via willingness to pay: perhaps these are the people who can most afford and are most committed to conservation because of their geographical proximity and higher socio-economic status.

Willingness to pay for B: Only 15 people responded positively as being willing to participate in the funding of scenario B, so the results must interpreted with caution. Belief that the environment around Kalloni was poor at present was associated with higher amounts, but surprisingly so was pledging the money for wetland conservation. This could be interpreted as a self-interested motivation in preserving some wetlands for tourism.

Willingness to pay for C: Belief in the importance of economic recession as an issue in the area was associated with lower willingness to pay amounts. However, those living in Kalloni village or the port of Kalloni (Skala Kalloni) were willing to pay higher amounts, perhaps because this scenario directly benefited them via urban expansion. Belief that the environment of the area was basically good, and pledging the money for wetland conservation were also associated with higher amounts.

Willingness to pay for SQ: An interest in environmental protection and being in favour of enhancing the environment were associated with higher willingness to pay amounts. As expected, interest in birds was negatively associated with size of payment — the status quo scenario included the loss of nine species of birds due to urban expansion onto agricultural land.

6. General discussion and conclusions

We believe that our study contains some important information for the economic analysis of value of wetland areas. First, it is clear that the local population is capable of expressing preferences for extension or reduction of the wetland in terms of economic values, which can be captured by contingent valuation. However, different individuals chose different preferred scenarios, and the stakeholder groups discussed different arenas of importance value and presented different portfolios for the future based on their needs, hopes and fears as particular interest groups, which informed the development of the scenarios and the choice of payment vehicle. By using these scenarios, and from the focus group discussions with relevant stakeholders, we found a rich diversity in the motivations of different individuals and groups. For economic information elicited to be relevant, it is vital that this complexity is investigated thoroughly. However, this does not mean that it is useless to attempt an economic analysis of value of the Kalloni wetland. It was clearly apparent from the focus groups and interviews that the great majority of people were quite willing and able to express economic preferences that were based on sound logic — after all, local people have been exploiting the economic potential of the wetland for centuries. However, when attempting to place an economic value on the wetland, competing motivations and needs must be explored. For example, the local mayors valued the wetlands as a tourist potential that should be managed as a 'park', with strictly defined boundaries and distinct uses. For the building constructors, the wetland was a nuisance, but even they could profit from increased exploitation of the wetland for tourism, and, as mentioned earlier, many people had not one but a combination of occupations.

Beyond this, we would also postulate from our study that local people are quite capable of functioning, in terms of 'utility', as both citizens and

consumers (Sagoff, 1988). As citizens, they do feel responsibility for their environment, though this is often expressed in very different ways, as the stakeholder focus groups demonstrated. However, these responsibilities are also to themselves as consumers of the wetland's economic potential. This again does not mitigate against an economic analysis, but calls for a more detailed and profound analysis than simply asking for a stated willingness to pay amount for a simple predetermined choice between alternatives. Different scenarios need to be considered, and disputes over property rights, conflicting interests of different villages and user groups, and the tension between local and more global needs are all real and apparent in our study.

Through the use of a mixed methodology, we have gone some way to uncovering some of these complexities, and collected information on the preferences of individuals and focus groups which we believe are of genuine use to policy makers. The results from this study have been accepted by the Ministry of Environment, Urban Planning and Public Works in Greece as input to the planning of zoning activities regarding NATURA 2000 sites — policy makers are obviously interested in monetary valuation of economic values, but we have stressed that public consultation and involvement, including discussions with local people about environmental and economic outcomes is an important part of the planning process. The Kalloni Bay study demonstrates that economic values can be elicited, but these are only useful when set in the context of social, economic and environmental pressures and the responses of different individuals and stakeholder groups to these pressures.

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