Prioritizing Impacts in Environmental and Social Impact Assessment: developing a semi-standardized and participatory approach applied to a golf-based tourism project

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Abstract

Environmental and Social Impact Assessment is an extremely useful tool for identifying and evaluating the social and environmental repercussions of a wide range of projects. Especially when the project and its impacts are very complex, an ESIA can result in the identification of a high number of impacts needing to be prioritized in order to be addressed effectively and efficiently. This paper presents a methodological proposal for the prioritization of impacts within an ESIA based on participatory and social justice criteria. This methodological approach is structured into four main phases: 1) Creating the stakeholders' platform; 2) Preliminary identification and assessment of impacts; 3) Categorizing and reducing the selection of impacts; 4) Assessing and prioritizing impacts using MCDA. The process is illustrated by its application to an on-going ESIA on a golf-based tourism project in Huelva (Spain).

Keywords: Impact Assessment, MCDA, golf projects, participation, stakeholders.

Introduction

Environmental and Social Impact Assessment (ESIA) is an extremely useful tool for identifying and evaluating the social and environmental effects of a wide range of activities and projects. Normally such impact assessments yield extensive and exhaustive lists of impacts caused in numerous environmental, economic and social areas, particularly when investigating highly complex development schemes. These results are then communicated to the decision-making actor/s. These decision-makers should then make use of the information by dedicating resources to modifying the project in order to minimize or eliminate the negative impacts uncovered by the ESIA. One of the

problems encountered by the decision-maker is the need to identify those impacts which should be prioritized for attention in order to diminish the project's negative effects. While the end product of an ESIA normally provides an assessment and rating of impacts based on a range of different criteria, the sheer volume of information produced can be difficult to manage, hindering the ability of the decision-maker to choose priority paths of action [1], [2].

In the light of this situation, this paper aims to provide a tool for prioritizing impacts in an environmental and social impact assessment. We explain the criteria adopted in the case studied to obtain a prioritized breakdown of negative impacts which may be of use to the decision-maker. In designing these criteria we have used two of the cornerstones of ESIA as fundamental principles: the principle of public participation and that of environmental justice [3]. The participatory principle highlights the importance of involving affected communities in the assessment process [4], [5], [6], [7]. For this reason, our methodological approach is exclusively based on contributions from a platform of stakeholders, both in identifying and in assessing impacts. Secondly, the process was guided by the principle of environmental justice, closely linked to that of participation. Following this principle, the unequal distribution of impacts among social groups affected is acknowledged and given due attention, and the importance of prioritizing actions to minimize impacts on the most vulnerable social groups is stressed [3], [8], [9]. In fulfilling this principle, this project uses impact selection and prioritization criteria which ensure the most vulnerable actors' visibility, aiming to redress possible socio-environmental inequalities [10]. For all these reasons, the use of Multi-Criteria Decision Analysis (MCDA) techniques in prioritizing impacts was considered particularly appropriate. In fact, MCDA allows for the taking into account of multidimensional and controversial decisions in a systematic and structured way and, at the same time, for the integration of a participatory approach [11].

Lastly, we should comment that the approach adopted in this paper is also aimed at the design of a methodology that can be applied in cases other than that studied here. For this reason the procedure is designed in a semi-standardized form, to ease its adaptation and extrapolation to diverse socio-environmental contexts and projects.
Below we explain in more depth the methodology employed to achieve these objectives in the specific case of a golf-course project in the Province of Huelva, south-west Spain.

1.1 *The case study*

Located in southwest Spain, within the municipality of Cartaya (Province of Huelva) and in the coastal town of El Rompido, the project named "El Rompido Golf" comprises a 36-hole, 50-hectare golfing area made up of two 18-hole courses. To the southwest the project borders on a dense pine wood (part of the Río Piedras y Flecha de El Rompido Natural Site, an officially protected area), and to the north on orange groves. The project is also linked to a hotel development comprising a four-star aparthotel with 305 apartments and 844 beds, and a five-star hotel with 184 bedrooms and 12 suites (394 beds), both of which are connected to the golfing area.

The project also features a considerable amount of residential property. On its south-east border there is a housing development consisting of 165 luxury dwellings in separate plots, arranged around an artificial lake and next to the golf club facilities. Also, bordering on this development to the east, there is a further estate, partially built (construction was halted for lack of sales) and comprising 200 projected dwellings, with shared sports and leisure facilities (tennis and paddle tennis courts, football pitch, swimming pools, etc.). Both developments enjoy private security, controlled access and fences around their entire perimeters. The project also includes a shopping mall and leisure port or marina.

Cartaya, the municipality where the project is based, adopted a tourism development strategy with significant emphasis on golf-based projects at the beginning of the 90s. Its geophysical environment is characterized by undulating terrain with few slopes, the mouth of the River Piedras, and a wide expanse of pine woods, scrub and wetlands. The climate is Mediterranean, with mild winters and hot summers and an average annual temperature of around 23 degrees centigrade. In the last two decades, Cartaya has considerably increased its sociopolitical and economic weight in the province of Huelva (in the region of Andalusia, Spain), due to growth in agroindustry and associated activities. Cartaya has 19,168 registered inhabitants (2014), and in the last ten years has increased its population by 29.8%, mainly thanks to this increase in agriculture, which has attracted workers from the Maghreb, sub-Saharan Africa and Eastern European countries (Poland, Rumania, Lithuania, etc.) [12].

Until the mid-1990s, tourist facilities were virtually nonexistent. In El Rompido, a small fishing village on the coast, there was some residential sun-and-sand tourism, but this was seasonal, low-intensity and basically local. During the second half of the decade the town council boosted tourist initiatives with a more mixed (golf-project-based) model, more extensive and with lower density.

The main golf-based projects in the area, El Rompido Golf and Nuevo Portil, are low-density developments (as few as five homes per hectare on some plots). This, together with their idyllic settings, the landscaping of urbanized areas, and the symbolic-natural presence of the golf courses with their associated facilities, earn the projects "high quality" and "sustainable" status in the town's General Urban Ordinance Plan (GUOP). At the same time their proximity to the sea confers added value.

Shortly before the collapse of the building sector, the town council approved a new phase of development: an extension inland of the Nuevo Portil complex, with 225 hectares planned (a 125% increase in the surface area of the existing project), 1,532 homes, three hotels and a golf course. The El Rompido Golf project covers around 250 hectares. In 2005 the projects built or approved in the area, all linked to golf courses, envisaged the construction of 6,000 new tourist homes, 18,500 hotel beds and five 18-hole golf courses (in addition to the two already in existence), as well as 5,100 first-residence dwellings. Between 1981 and 1991, housing stock in Cartaya increased by 36%; between 1991 and 2001 (the height of the construction and agricultural booms) by 17%; while between 2001 and 2011 (the last years of the construction boom and the ensuing financial collapse), the increase was 82%, as a consequence of accelerating growth in second-home building [13].

2 Methodology

The procedure adopted for prioritizing impacts in the ESIA presented here was divided into four main phases: 1) Creating the stakeholders' platform; 2) Preliminary identification and assessment of impacts; 3) Categorizing and reducing the selection of impacts; 4) Assessing and prioritizing impacts using MCDA.

2.1 *Building the stakeholders' platform*

Creating the stakeholders' platform was the first essential step to ensure the participatory nature of the process. The project adopted a wide definition of stakeholders, according to which a stakeholder is considered to be any individual, group or organization that may be affected by, or may have an interest in the project, or which may hold information or experience relevant to the implementation and/or assessment of the project. To build the stakeholders' platform, we identified the social groups fulfilling these conditions, and sought two representatives per group to cooperate in our research. To draw up the list of stakeholders we based ourselves on a literature and document review, the experience acquired by the study's coordinating team in previous research, and a number of consultations with social and academic experts in various areas. For the group of academic experts, the number of participants was raised to five in order to include experts from a range of different disciplines. In total, the platform comprised 41 participants. Below, Table 1 shows the definitive list of stakeholders in the platform:

Table 1. Members of the stakeholders' platform.

Categories of stakeholders
(1) Regional administration
(2) Town council
(3) Entrepreneurs' associations
(4) Large hotel entrepreneurs
(5) Small businesses, restaurants, bars (owners and staff)
(6) Tourism services and golf providers
(7) Builders and estate agents involved in project
(8) Agricultural entrepreneurs
(9) Staff from the golf courses and large hotels
(10) Building and estate agent staff
(11) Golf tourists
(12) Non-golf tourists

(13) Residents' association (Spanish and foreign residents)
(14) Hunters, sportspeople, sailors, etc.
(15) Ecologists
(16) Golf sports federation
(17) Population – local community in general
(18) Seasonal population (summer)
(19) Academic experts in the fields of geography, economy and development strategy, sociology, company management and ecology

2.2 *Preliminary identification and assessment of impacts*

In order to identify and make a preliminary assessment of the impacts we conducted semi-structured interviews with two representatives from each stakeholder group, who identified the project's impacts from their own experience, knowledge and perceptions. Thus as a first step the interviewer asked an open, generic question aimed at giving rise to a brainstorm of impacts, the results of which were noted down by the interviewer. On completing this identification task, interviewees were asked to evaluate impacts based on two criteria:

- Positive/negative character of impact on the project-affected area: the interviewee was asked to rate the positive potential (to benefit the project-affected area) or negative potential (to damage the project-affected area) of each of the impacts identified in the interview, on a scale of 0 ("very negative") to 10 ("very positive").
- Level of damage/benefit received by the stakeholder: the interviewee was asked to rate the degree to which each impact harmed or benefited the social group which s/he represented, on a scale of 0 ("severely damaged") to 10 ("strongly benefited"). In the case of interviewees chosen for their academic specialization – who could not therefore receive direct or indirect impacts from the project – we did not ask them to rate this item.

The objective of this assessment was to obtain a complete selection of impacts, along with information on the frequency with which each impact appeared. At a later stage, the information gathered would also enable us to classify impacts according to their importance.

Also, each interviewee was questioned on how they perceived other stakeholders' relationships with the project. To this end, we provided the interviewee with the list of stakeholders in the platform and asked about:

- The degree of damage/benefit (0-10) received by each stakeholder from the project.
- The degree of influence (0-10) that each actor has on the planning, implementation and consequences of the project.

The ultimate aim of this process was to obtain a collectively constructed indicator of social vulnerability, which could enable us, when combined with the other criteria mentioned above, to classify and filter impacts during a subsequent phase (see section 2.3.1).

2.3 *Categorizing and filtering impacts*

Once all the members of the stakeholders' platform had been interviewed, they had identified a total of 224 impacts. Given the huge number of consequences identified, we sorted them into categories, aiming to reach a final selection which would be free of redundancies. Accordingly, each of the impacts identified by the actors was assigned to a category grouping together elements with similar semantic content. In total, we identified 103 impact categories.

While this exhaustive breakdown of negative impacts itself already formed a useful decision-making tool, its utility was significantly increased by the inclusion of a further stage in which impacts were sorted according to their social importance or effects. This further classification can considerably ease the decision-making process, since it affords a selection of prioritized items, thus indicating which impacts require urgent action, or where the investment of mitigating resources is most pressing.

To complete this prioritizing task, we decided to use Multi-Criteria Decision Analysis (MCDA from here on). MCDA is a methodological framework that provides tools for dealing with complex decision-making situations

involving multiple and often conflicting objectives that stakeholder groups and/or decision-makers may assess differently [14], [15]. MCDA is a comprehensive process involving a rich interplay between human judgment, data analysis, and computational processes [16]. It is of enormous help in eliciting preferences, i.e., in constructing a model of users' preferences, whose exploitation can then produce recommendations such as a ranking of the options in play, as was necessary in the case studied here.

MCDA processes are grounded in operational research and mathematics, originally developing to assist single decision-makers [17]. However, recently MCDA has emerged as a widely used approach for supporting multi-stakeholder decisions, as well as a potentially practical method of dealing with the social dimensions of conflict (e.g., [18], [19], [20], [21], [22], [23] since it can be combined with participatory approaches.

The main purpose of MCDA methods is to evaluate the performance of alternatives or options according to criteria representing the key dimensions of the issue/s to be decided on, involving human judgment and preferences. There are five basic steps in MCDA: identifying the alternatives or options; establishing assessment criteria; rating the alternatives against each criterion; weighting criteria; and aggregating all of this information [14]. The first four steps can be combined with and/or integrated into participatory approaches allowing stakeholders to express their preferences and thereby contribute actively to the decision-making process. The final step should include a thoroughgoing sensitivity and robustness analysis [24] to explore how different preferences could modify the outcome of the aggregation and how robust the outcome is with respect to changes in preferences.

Therefore, the main characteristics of MCDA make it suitable for the objective of this study. In summary, reasons for applying an MCDA are: its ability to support multi-stakeholder priority-setting decisions, to generate a structured ranking or scoring of options (project impacts), and to guarantee a participative and transparent decision-making process, while facilitating the learning process and dialogue between stakeholders on the relative merits of different options [11], [25].

Bearing in mind that in the case studied here the "scoring alternatives against each criterion" step will be carried out exclusively by stakeholders, a maximum number of alternatives to be assessed must be established. However, the methodological literature does not reach definitive conclusions on what this number should be. The range of alternatives should be wide enough to represent a realistic selection for the decision-maker, while not being so numerous as to make analysis unnecessarily complex [26]. In technical terms, the procedure is similar to the application of an "attitude scale": the impacts could be considered as stimuli in relation to which the participants have to position themselves. Also, as in such scales, we start from the hypothesis that subjects respond according to their sociological and psychological characteristics. While it is difficult to find solid arguments for establishing a maximum number of items on a scale, there is a widely-used argument for including "only the necessary ones." A high number of items on a scale is generally acknowledged to be a means of improving its reliability. However, if a scale is too extensive, this is assumed to affect its reliability negatively (although this has not been demonstrated yet), since the informant tires of the number of items [27], [28], [29], [30], [31]. Looking at the specialized literature and at the circumstances and objectives of our study, we decided that an interval of between 20 and 25 impacts was appropriate (from the technical point of view) and realistic (from the point of view of the circumstances and needs of ESIA and the participatory application of MCDA).

However, since the design of this study's methodology aimed to achieve a high level of applicability to a range of projects and contexts, it was necessary to bear in mind that the number of impacts identified in the previous phase could vary according to the case studied, and thus could well exceed the recommended maximum. If we add to this the large number of stakeholders usually involved in projects intervening in the environment – resulting in the identification of a higher number of impacts– this necessity becomes, if anything, more pressing. To address this issue, we propose here a number of criteria enabling us to reduce the number of impacts, if after categorization this should still exceed the recommended maximum.

2.3.1 Filtering the list of negative impacts

When, even after categorization, the number of impacts exceeds the recommended maximum and it is necessary to reduce them, we can proceed to filter them according to five criteria on which information is obtained in phase 2. These criteria are applied in the order laid out below, until the established limit is reached:

- Negative character of the impact. Since the ultimate aim of this method is the prioritization of impacts in order to identify those which should be addressed with most urgency, it would seem logical, when drawing up a selection of impacts for prioritization, to focus attention on those which are negative. While it is important to determine and account for a project's positive impacts, urgent action should be focused on the negative. For this reason, the first criterion for reducing the selection of impacts was that in phase 2.2, interviewees had rated

them from 0 to 4 for the criterion "Positive/negative character of impact on the project-affected area". Application of this filter yielded 36 categories of negative impacts.

- Frequency. As our second filtering criterion, we looked at the frequency of each impact for each category of stakeholders. That is, when the same impact was cited by two members of the same group of stakeholders, the appearance of this impact was counted only once. On the basis of this criterion (citation frequency), we included in the selection of impacts chosen for the MCDA all negative impacts cited by a minimum of two different categories of stakeholders, i.e. all negative impacts with a minimum frequency of 2. Applying this criterion yielded 14 impacts with frequencies varying from 2 to 7 repetitions.
- Perceived social vulnerability. Based on the information obtained in the previous phase, referring to the degree of damage/benefit and the degree of influence, we carried out an MCDA enabling us to obtain a breakdown of stakeholders according to their level of vulnerability[1]. In this case, stakeholders scoring over 6 (out of 10) were considered to be "highly vulnerable". Thus, impacts identified by stakeholders who were "highly vulnerable," and who also scored highly (8-10) in the "Level of effect received" variable, were chosen for the reduced selection of negative impacts. Thus the criterion of environmental justice which we cited in the introduction was effectively included, making visible the contributions of the most vulnerable actors in the case study's social context. Based on this criterion, 3 impacts were added to the reduced selection, reaching the figure of 17 impacts.
- Negative score given by academic experts: lastly, and since after applying the two previous filters the maximum number of impacts for an MCDA had not yet been reached, we factored into the reduced selection those impacts which the academic experts had rated highly damaging for the project-affected area (8-10). The reason for using this academic criterion stems from the possibility that some particularly important impacts may have passed unnoticed by the other social actors, due to the high level of academic or technical specialization needed to perceive them. Application of this criterion resulted in a final selection of 22 impacts, thus reaching the threshold established to enable application of a participatory MCDA designed to prioritize impacts.

Table 2 shows the final breakdown of impacts, which would be subsequently prioritized using MCDA:

Table 2: Selection of impacts according to criterion.

Frequency	Impact		Selection criterion
7	Increased consumption of water resources / diminished water resources		
4	Alteration of ecosystem		
4	Seasonality		
4	Urban growth		
3	Water pollution		
3	Increased property speculation/prices		
3	Increased tourist demand		
3	Changes in types of tourism services		
2	Loss of green areas		
2	Dependency on external economic factors		
2	Changes in activities/Loss of traditional businesses		
2	Tourist ghetto		
3	Loss of cultural identity/features		
2	Changes in types of services		Frequency
1	Economic growth vs social development		Vulnerability +

[1] For a better understanding of our analysis of vulnerability, see the article "Development of a Social Vulnerability indicator and its application in Environmental and Social Impact Assessment," by the authors of this paper.

1	Lack of cooperation by complexes with local businesses		negatively affected
1	Loss of agricultural land		
1	Lack of connection with local culture		
1	Alteration of the quality of the land		
1	Changes in the landscape		
1	Creation of a tourism brand		
1	Lack of employment/investment returns		Experts

2.4 *MCDA Assessing and prioritizing impacts with MCDA*

As we commented earlier, classifying and ordering the selection of negative impacts is a useful way to increase efficiency in decision making. When determining actions to mitigate or eliminate negative impacts of a project, and particularly when resources available to take such measures are limited, decision-makers need to focus their attention and means on the most urgent and/or detrimental impacts. It is for this reason that we designed here an MCDA procedure affording an ordered classification for prioritizing negative impacts, based on information provided by stakeholders. In this way, prioritization will be grounded in the transversal knowledge that the various social actors have contributed throughout the project, thus steering clear of any bias stemming from the particular interests or limited knowledge of any single social actor.

We should point out that, at the time of writing, the fieldwork in this phase has not yet been carried out. Thus, we explain here the methodological design which will shortly be put into practice.

While in previous phases each member of the stakeholders' platform had the opportunity to make contributions and preliminary assessments of the impact selection, as we begin this fourth phase they have not yet had occasion to see and to assess the impacts identified by the other participants. It important that the final classification of impacts should be constructed by the whole group of actors, when all of them are fully aware of the entire set of impacts detected, and are thus able to evaluate those identified by other members of the platform, not only those indicated by themselves in the individual interviews.

It is for this reason that this fourth phase has been designed for stakeholders to assess each item from the filtered selection of negative impacts resulting from the previous phase, and to express their preferences by giving a weighting to each criteria used to classify impacts. This assessment will finally determine the prioritization of impacts to be communicated to the project developers. To make this prioritization, as we explained above, an MCDA will be applied. The stakeholders will be asked to score the performance of each project impact according to the following criteria on a scale of 0 to 10, as detailed below:

- Degree of social conflict created by the impact: this refers to the impact's potential to give rise to social movements combatting the project, with 0 = no active struggle against the project / 10 = mass and/or violent movements against the project.
- Degree of harm received by the respondent's category of stakeholders: degree to which each impact negatively affects the respondent's social group in the present or future, with 0 = no negative effects / 10 = extremely negative effects
- Intensity of the impact: Level of strength of the impact in the project-affected area, with 0 = very low or zero intensity / 10 = very high or maximum intensity.
- Reversibility of the impact: whether conditions prior to the impact may be recovered or not, with 0 = impossible to recover original conditions / 10 = possible to completely recover original conditions.

Next, the stakeholders will be asked to assign a weight to each of the four criteria, representing both its importance and the stakeholder's preferences. A rating technique will be used [32]. Each stakeholder will give a value from 1 to 5 (very low importance – high importance) to each criterion. These values will be then normalized to 1 and individual weights will be aggregated using a mean.

The actors will give their scores at a face-to-face session bringing together the stakeholders' platform. The session will set out with the presentation of the outcomes of the previous phases and collective reflection on these by participants. This group work has a two-fold aim: firstly, it will enable knowledge transfer between all members of the platform, and between the research team and the stakeholders. Thus, this session will allow us to inform participants of the procedure used to classify and select impacts, and enable participants to see the contributions of the rest of the platform. Secondly, this will ensure that all participants are aware of and understand equally the meaning and implications of the various impacts that they are to assess, along with the assessment criteria (being this

one of the methodological requirements of MCDA) [26], [33]. Thus, starting from the initial work of presentation and reflection, participants will have the opportunity to ponder the impacts selected, to put them in context, and to consider positions and interests other than their own; and hence this task will lay the basis for common ground in the subsequent rating activity.

3. Conclusions

This brief exposition of the work carried out so far reflects the problems encountered in the field by the social researcher in ESIA. But mainly it seeks to contribute to social research applied to studies prior to the implementation of development projects intervening in the environment. The integration of social and environmental impact assessments usually tends towards ad-hoc methodologies. This is usually seen as a handicap to the procedural efficiency required by developers or, more generally, decision-makers, the usual clients of these studies. The different phases of an ESIA should evolve towards methodological efficiency and the standardization, as far as is possible, of research methods and techniques, in order to integrate these into pre-project studies, and particularly in the case of Environmental Impact Studies. Initiatives such as that presented here encounter a range of problems relating to differences in scientific cultures (engineering vs social sciences) and management approaches (executive efficiency as against caution and/or appropriate forecasting and comprehensive risk management). Additionally, they face a scientific-academic challenge in terms of the extrapolation of knowledge or technology: how to make data-gathering and analysis processes more efficient, and the outcomes produced more functional.

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