

GUIDELINES FOR STRENGTHENING THE SUSTAINABLE SOCIO-ECONOMIC ROLE OF MEDITERRANEAN MARINE AND COASTAL PROTECTED AREAS



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Study required and financed by:

MedMPA Network Project

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Preamble

In view of the conclusions and recommendations of the 1st meeting of the Ad hoc Group of Experts for Marine Protected Areas in the Mediterranean (AGEM) (Tunis, Tunisia, 22-23 February 2018), SPA/RAC proposed to develop draft of Guidelines for Strengthening the Socio-Economic Role (GSSER) of Mediterranean Marine and Coastal Protected Areas (MPAs).

This draft was discussed and validated during the 2nd meeting of the AGEM (Tunis, Tunisia, 15 March 2019).

This final product will be presented at the 14th meeting of SPA/BD Focal Points (Portorož, Slovenia, 18-21 June 2019) as one of the AGEM deliverables on its trial phase during 2018-2019.

As a main objective, this guideline document (GSSER) is intended to *provide practical guidance for developing a socio-economic analysis of the role of MPAs in the Mediterranean*.

The specific objectives of this document are:

- To initiate a sustainable socio-economic approach applied to the context of Mediterranean MPAs.
- To strengthen the socio-economic role of Mediterranean MPAs.
- To guide MPA managers and stakeholders towards income generating activities in MPAs and surrounding territories.
- To change the perception of decision-makers on MPAs as a natural capital investment project.
- To guide integrated marine and coastal conservation policies in the Mediterranean.

To the extent, this document represents an interesting piece of work for MPAs programme staff, economists, scientists, decision-makers in charge of the management of marine and coastal natural resources in the Mediterranean countries that are Contracting Parties in the Barcelona Convention.

Guiding Principles

This GSSER document builds also on the following guiding principles that should be kept in mind throughout its reading:

- 1) Any assessment of socio-economic benefits should be presented within the *context of biodiversity and based on a basic understanding of both ecology and environmental economics* (TEEB, 2010). Failure to do so may impede efforts to conserve and improve the marine environment and instead contribute to the continued degradation of marine ecosystems, placing at risk blue economy objectives, economic growth, and the wider benefits obtained through marine ecosystem.
- 2) Analyzing the socio-economic role of MPAs does *not aim to undermine the intrinsic value of biodiversity*. We are separating the intrinsic value and the benefits that MPAs provide in terms of biodiversity from those more anthropogenic-oriented considerations such as the socio-economic benefits. This document acknowledges that the ecological benefits that well managed MPA provide are key to obtaining socio-economic benefits.
- 3) *Sustainability* should be the *main driver of socio-economic assessments*. The role MPAs play in supporting well-being should not be seen as replacing or undermining MPAs focus, nor should it jeopardize their set objectives and goals for conservation. Identified benefits should always be used inside a sustainability framework that respects the area's overall biodiversity, conservation or management goals beforehand.
- 4) Assessments should *consider the MPA carrying capacity* as the baseline against evaluations.
- 5) Socio-economic analysis *cannot always be captured in economic (monetary/market value) terms*. These can be structured and carried out in different ways and using different metrics of value (monetary/market; non-monetary/non-market; indirect use; non-use).
- 6) The term socio-economic analysis will be used along these guidelines so as to refer to the *analysis of incremental costs and benefits of MPAs* that affect the economic welfare and economic activity and the potential distributional or social impacts of these MPAs.
- 7) These guidelines are expected to serve as the first entry point to a socio-economic assessment for Focal Points and everyone needing first guidelines on why they should perform a socioeconomic analysis and the complexities behind it. Thus, these guidelines are not meant to show step-by-step how this analysis is done as it all depends on the context, the type of MPA (as you mention mature MPAs or not), the amount of data available, the resources available to perform the analysis and the expertise (that is why Table 3 shows the full list of methods and shows the reader which are more complex, the level of knowledge and resources required etc.)
- 8) Anyone who would like to perform a socioeconomic analysis of an MPA can read this document and see the full range of possibilities to be analyzed.
- 9) The compilation in italics in Table 1 does not come from a brainstorming, but from a long analysis of references on costs and benefits of MPAs in the Med and outside the Med.

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1. INTRODUCTION

Marine Protected Areas (MPAs) are usually established to protect the world's biological diversity (ecosystems, habitats, species and genes). However, in addition, these areas also maintain and deliver a range of benefits (direct and indirect) to societies and economies when well managed.

Highly and fully MPAs have been scientifically proven to enhance the earth's natural capital in the marine ecosystem, thus contributing to improved human wellbeing by providing healthy habitats that would enhance human activities and serve as buffers against environmental impacts.

While the awareness, understanding and appreciation of the value of nature is increasing, the benefits and related socio-economic values provided by MPAs remain limited and still there is a widespread under-appreciation of the variety of social and economic benefits that MPAs can provide us, especially at the practical level (Kettunen and ten Brink, 2013).

A concern sometimes raised about MPAs is that they may constrain or limit economic activities, adding costs to businesses and restricting opportunities for growth and jobs (even when businesses may benefit from improved marine biodiversity and environmental conditions). As such, MPAs and nature conservation can often be considered as a hindrance and perceived as imposing costs or restrictions on communities and economies rather than a benefit to increasing our welfare.

In this sense, work remains to be done to increase the understanding of the benefits associated with MPAs, raise socio-economic arguments and to demonstrate and take account of their values in concrete decision-making (Kettunen and ten Brink, 2013).

Being aware that sometimes the objectives of MPAs and those objectives of achieving socio-economic benefits can sometimes work in the same direction and sometimes not, causing conflicts, the potential positive outcomes of assessing and communicating

the benefits merits their systematic assessment, while the risk of conflicts can often be addressed through careful planning.

Most recent literature review analysis performed under the "Study on the economic benefits of Marine Protected Areas" (EU, 2018) gathered 94 evidences from which 44 studies provided evidence of economic benefits of MPAs to fisheries, 33 studies to maritime tourism and 15 studies compared costs and benefits of MPAs to various degrees. This review also highlighted the observation that evidence base on blue economy benefits of MPAs is still incomplete and largely dominated by literature on economic benefits to maritime tourism and fisheries (those to fisheries seeming to be smaller and, in comparison, more difficult to quantify than those to tourism). Most evidences were also geographically located primarily in the Mediterranean and the North-east Atlantic Ocean.

Other previous socio-economic efforts for assessing Mediterranean MPAs impacts onto wider maritime activities (Pascual et al., 2016, Ojea et al., 2017) also highlighted other evidences of positive and negative impacts of MPAs onto other maritime uses such as recreational maritime uses, mariculture and marine aggregated, minerals, oil and gas and energy extractions. These authors, however, also found most benefit evidences to fisheries, recreational activities, tourism and beach-related activities and scientific activities, whilst little or no mentioning of either positive or negative impact evidence were found for the remaining maritime uses and, when found, these mostly relate to MPAs outside the Mediterranean basin (those in italics at Table 1 below).

The following table aims at summarizing the role of Mediterranean MPAs for positively and negatively impacting other maritime activities built from the literature reviews of Pascual et al. (2016), Ojea et al. (2017) and EU (2018). This table does not aim to measure impacts, but to gather all narratives of evidences found so far regarding the positive and negative impacts of MPAs in the Mediterranean.

Table 1. Stated positive and negative impacts of Mediterranean MPAs onto the various types and sub-types of maritime activities.
 (Source: Own source based on Pascual et al. (2016), Ojea et al. (2017) and EU (2018);
 Note: In italics those impacts that have been evidenced at MPAs outside the Mediterranean, but not yet at MPAs inside the Mediterranean Basin).

Type of Activity	Sub-type of Activity	Potential Positive Impacts	Potential Negative Impacts
Fisheries	Industrial / Commercial fisheries / Large scale	<ul style="list-style-type: none"> • Improved catch mix • Increased catch ('spill-over effect' and 'recruitment effect') • Provide export of egg and larvae • Increased biomass (reserve effect) • Increased fish size (reserve effect) • Reduce overfishing • Higher functional diversity • Protection of spawning stocks • Undisturbed spawning sites/habitats • Increased income and jobs, for professional and pleasure fisheries and for diving • <i>Increased population fecundity</i> • <i>Foster reproductive capacity</i> • <i>Enhancement of eggs and larvae production</i> • <i>Diminished fishery-related genetic impacts</i> • <i>Increased selling prices</i> • <i>Higher diversification of activities</i> 	<ul style="list-style-type: none"> • Closure of areas to fisheries / Loss of access /Displacements • If retention rates inside the MPA are high (dispersal ability is low comparing to MPA size) there might be no benefit for nearby fisheries • Lead to 'trophic cascade effect' • Increased opportunistic and predatory species • Increased invasive species • <i>Lost income and jobs and impossibility to compete with imports</i> • <i>Food security losses</i> • <i>Increased competitions/conflicts</i> • <i>Further expenses (time/fuel)</i> • <i>Further environmental impacts from emissions</i> • <i>Further collision risks</i> • <i>Increased access costs (park fees)</i> • <i>Increasing reporting costs (logbooks, VMS systems)</i> • <i>Need to compile with regulations / limitations in gears or mesh size / amounts of discards or catch</i>
	Artisanal fisheries / small scale	<ul style="list-style-type: none"> • Improved catch mix • Increased income and jobs, for professional and pleasure fisheries and for diving • Exclusive access / less competition • Increased catch ('spill-over effect' and 'recruitment effect') • Built up fishery recruitment • Reduce overfishing • Protection of spawning stocks • Undisturbed spawning sites/habitats • <i>Increased security</i> 	<ul style="list-style-type: none"> • Closure of areas to fisheries / Loss of access /Displacements • Limitation of access • Income decrease • Increased competitions/conflicts • If retention rates inside the MPA are high (dispersal ability is low comparing to MPA size) there might be no benefit for nearby fisheries • Lead to 'trophic cascade effect' • Increased opportunistic and predatory species • Further expenses (time/fuel) • Further environmental impacts from emissions • Further collision risks • Increased access costs (park fees) • <i>Increasing reporting costs (logbooks, VMS systems)</i>

Fisheries (cont.)	Anglers	<ul style="list-style-type: none"> • <i>Protection of spawning stocks</i> • <i>Undisturbed spawning sites/habitats</i> 	<ul style="list-style-type: none"> • Closure of areas to fisheries / Loss of access • Limitation of access • If retention rates inside the MPA are high (dispersal ability is low comparing to MPA size) there might be no benefit for nearby fisheries • Increased costs (licenses) • <i>Lead to 'trophic cascade effect'</i>
	Spearfishing	<ul style="list-style-type: none"> • Supported sport trophy fisheries / recreational fisheries • Favor the return to natural behavior of fish fauna • Allow scuba divers (visitors) to see the positive effects of protection measures on fish assemblages (in case of spearfishing the fish has a very fearful behavior) • <i>Increased biomass (reserve effect)</i> 	<ul style="list-style-type: none"> • Closure of areas to fisheries / Loss of access • Limitation of access
Recreational water-based activities	Diving	<ul style="list-style-type: none"> • An increased visit • Expanded non-consumptive recreation opportunities (scuba) • Increased income and jobs for diving • Increased returns directly (through diving club activities, accommodation, meals) or indirectly (through transportation, purchase of materials and equipment, and other induced commercial activities) 	<ul style="list-style-type: none"> • Limitation of access (visitor number quotas, limiting the number of visitors allowed) • Non-consumptive divers impacts on the natural environment (Damage to ecosystem from tourist congestion / can end up in forbidding the activity) • Increased access costs (park fees, diving fees)
	Sailing	<ul style="list-style-type: none"> • Increased income and jobs for sailing and the use of boats to come and practice specific activities in a protected area (e.g. snorkeling, sea watching, scuba diving) or to simply enjoy the setting 	<ul style="list-style-type: none"> • Limitation of access • Non-consumptive sailing impacts on the natural environment (Damage to ecosystem from tourist congestion, anchoring on seabed, etc.)
	Marine sightseeing	<ul style="list-style-type: none"> • Increased in marine sightseeing related to marine mammals or seabirds • Increased wilderness opportunities 	<ul style="list-style-type: none"> • Limitation of access • Non-consumptive sailing impacts on the natural environment (Damage to ecosystem from tourist congestion, anchoring on seabed, population impacts, etc.)
	Other activities (surfing, wind-surfing, paddle surfing, canoeing, swimming...)	<ul style="list-style-type: none"> • Increased wilderness opportunities 	<ul style="list-style-type: none"> • Some activities may be restricted in the MPA
Tourism and Beach Access	<ul style="list-style-type: none"> • Increased number of visits • Increased wilderness opportunities • Increased protection of habitats for tourism • Expanded ecotourism • Increased income and jobs 	<ul style="list-style-type: none"> • Limitation of access (visitor number quotas, limiting the number of visitors allowed, limiting the time (day/night time)) • Increased access cost (park fees, accommodation taxes) 	

Cultural	Scientific Knowledge and Education	<ul style="list-style-type: none"> • Provided educational opportunities • Allowed research, monitoring and data collection from untouched sites • Provided control areas for assessing human-induced impacts • Provided income from scientific meetings • Provided income for scientist and researchers (budget to their research projects) • <i>Improved understanding of natural systems</i> • <i>Preserved and expanded historical knowledge</i> • <i>Provided cumulative understanding from multiple studies at one site over time</i> • <i>Enhanced synergies from cumulative studies</i> 	<ul style="list-style-type: none"> • Economic costs for administration, supervision, monitoring, information policies, etc. of research projects.
	Underwater cultural heritage / underwater archaeology	N / A	N / A
Aquaculture / Mariculture / Shellfisheries		<ul style="list-style-type: none"> • Increased in biomass (reserve effect) • <i>Increased cage size (offshore)</i> • <i>Increased productivity</i> • <i>Provided quality water/</i> • <i>Provided opportunities for diversification</i> 	<ul style="list-style-type: none"> • Increased competition • Limitations of extraction, time allowances, etc. • Need to compile with regulations (certification expenses) • <i>Loss of access (closure of areas to shellfisheries / aquaculture / mariculture) / Displacement</i> • <i>Lead to trophic cascade effects</i> • <i>Increased opportunistic and predatory species</i> • <i>Increased invasive species</i> • <i>Increased travel costs (travel further)</i> • <i>Increased environmental monitoring costs (escapees, fuel emissions, etc.)</i> • Increased pollution
Other Biological Resources extraction	Macroalgae extraction / Aquarium trade	<ul style="list-style-type: none"> • <i>Potential source of living resources now or for the future</i> • <i>Increased Macroalgae biomass due to changes in other trophic levels</i> 	<ul style="list-style-type: none"> • Limitations of extraction
Mineral, aggregates, oil and gas and energy resources extraction	Sand / Gravel extraction	N / A	<ul style="list-style-type: none"> • <i>Loss of access (closure of areas to sand and gravel extraction)</i> • <i>Limitations of extraction</i> • <i>Mitigation costs (wastes, noise...)</i> • <i>Monitoring and periodic review costs</i>
	Oil / Gas extraction	N / A	<ul style="list-style-type: none"> • <i>Loss of access (closure of areas to oil and gas extraction)</i> • <i>Limitations of extraction</i> • <i>Mitigation costs (wastes, noise...)</i> • <i>Monitoring and periodic review costs</i>
	Offshore Wind Farms	<ul style="list-style-type: none"> • <i>Coexistence with other marine uses (energy and aquaculture)</i> 	<ul style="list-style-type: none"> • <i>Limitation of allocation for cables</i>
	Wave Energy	N / A	<ul style="list-style-type: none"> • <i>Limitation of allocation for cables</i>

Maritime Transport	Commercial shipping	N / A	<ul style="list-style-type: none"> • <i>Effects on shipping lanes allocation</i> • <i>Increased transport time by reducing speed limits</i> • <i>Increased fuel costs</i>
Communications and Pipelines	Communication Cables	N / A	<ul style="list-style-type: none"> • Limitations in allocations
Building along the coastline	Ports, Harbours, Marinas, Pontoons, Service Areas	<ul style="list-style-type: none"> • Protection contre l'érosion côtière 	<ul style="list-style-type: none"> • Limitations for certain coastal activities
Military		N / A	N / A

If we look at the types of methods used within or outside Europe so as to determine the socio-economic impacts of MPAs, economic assessments such as Cost Benefit Analyses (CBAs) appear as the most common approach, few involving comprehensive ex-ante or ex-post CBAs (EU, 2018).

CBA involve: **1) Benefits Assessment & 2) Costs Assessment.**

Whilst benefits assessments have usually been divided into economic (i.e. financial capital at the private or household level, i.e. income and employment) and welfare benefits (i.e. human capital, i.e. health, education, culture, ethics and aesthetics), empirical evidence of benefits in monetary terms is very limited and CBAs generally appear more complete in their monetary valuation of costs than benefits.

Costs assessments usually include management costs (direct physical expenditures on the equipment, infrastructure and human resources required to manage marine protected areas) and opportunity costs (land and resource uses which are foregone or precluded by protecting in marine areas and restricting the economic activities taking place in them, and the alternative income and profits which could have been generated by human, physical and financial resources had they been

allocated elsewhere in the economy instead of being used to establish and run marine protected areas).

As stated above at the guiding principles of these guidelines, socio-economic analysis cannot always be captured in economic (monetary/market value) terms. These can be structured and carried out in different ways and using different metrics of value (monetary/market; non-monetary/non-market; indirect use; non-use).

In order to capture this non-monetary, non-market, indirect and non-use value of MPAs, other studies have primarily used an ecosystem services (ESS) framework, involve ESS valuation methods and techniques and suggest that a large proportion of benefits relate to non-market improvements in societal welfare rather than real economy benefits to sectors (EU, 2018).

Having the perception of these values is also important. As such, socio-economic benefits can partly be calculated using market-based monetary values (perceived and with market value) and partly using non-market monetary values (perceived but with no market value), but there is an additional component of unknown quantity that simply cannot be reflected using monetary or other metrics as it is often passive and benefits are not perceived.

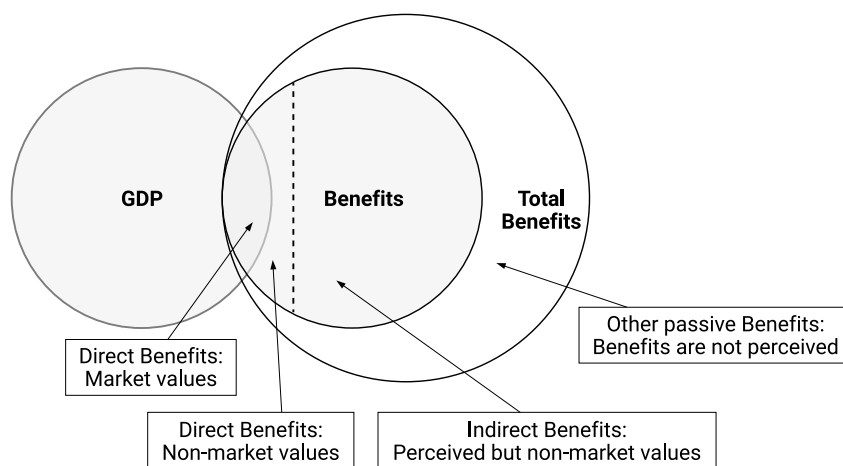


Figure 1. Direct, indirect, perceived and non-perceived benefits (Source: Own source modified from van den Belt & Cole, 2014).

As such, these guidelines do not solely focus on carrying out a monetary assessment of the final (net) value of MPAs nor to turn these benefits into a single aggregated monetary value. These guidelines aim to provide information on different approaches

and methods available (qualitative, quantitative and monetary alike) that practitioners can use to highlights the socio-economy importance of MPAs, depending in the information and resources at their disposal.

¹ Ecosystem goods and services in general comprises of the goods and services provided by nature that are in one way or another valued by society.





2. Mediterranean MPAs as a tool for sustainable socio-economic development

Efforts in MPA resource's management aims to strive for a balance between consuming now and leaving enough for future generations to continue to enjoy the benefits that MPAs provide us. Thus, one could say that MPAs become socially acceptable if they are able to contribute to both present and future needs and that their establishment should at least not be seen as a costs that outweighs the intended benefits that the present generation should be enjoying (Russi et al., 2016).

While, for some, biodiversity values alone might be enough to guarantee support to (and resources for) the establishment and management of MPAs, the assessment of the socio-economic role of MPAs could help to primarily evaluate the extent of how MPAs are delivering social and economic benefits to the surrounding communities beyond those already being measured by biophysical assessments (i.e. increasing fish biomass). When appropriately applied, identifying, assessing and valuing economically and socially related benefits and socio-economic values can be a useful tool for both supporting human welfare and stepping up or promoting conservation efforts.

Recently we have become increasingly aware that highlighting the social and economic values of biodiversity can help to shift the perception of MPA establishment from a public expenditure for conservation into a natural capital investment project (i.e. create incentives for businesses to change existing practices or invest in new opportunities through new fiscal mechanisms, new economic incentives for investing in nature-based solutions related to MPAs, etc. (Pascual 2018).

Furthermore, the understanding of the role nature plays in underpinning human welfare is slowly increasing thanks to initiatives such as The Millennium Ecosystem Assessment (MEA) (MEA, 2005), The Economics of Ecosystems and Biodiversity (TEEB) initiative, Aichi Biodiversity Targets 2 and 11 of the Convention on Biological Diversity (CBD) Strategic Plan (CBD, 2012). At the same time, various EU commitments (internal and international e.g. on the Natura 2000 network) envision a major role for MPAs as a method for reducing anthropogenic impacts, maintaining and improving biodiversity and building ecosystem resilience (Kettunen & ten Brink, 2013).

As such, MPAs can serve as a tool available to EU Member States to support the achievement of the requirements of various of their environmental directives such as the achieving of the good environmental status in their marine waters under the Marine Strategy Framework Directive (Directive 2008/56/EC), the sustainable development of marine areas and sustainable use of marine resources, applying an ecosystem-based approach under the Maritime Spatial Planning Directive (Directive 2014/89/EU) or those from the Habitats and Birds Directives.

With this increasing attention being focused on the benefits provided by nature and MPAs, there is arguably a need to provide information and advice to a range of interested stakeholders on how to identify, assess and communicate the values of MPAs. As many stakeholders have limited expertise in assessing the socio-economic benefits of nature, all efforts should be placed so as to allow those aiming to follow a socio-economic assessment in the most simple and efficient way.

These guidelines here does not aim to overrule existing adaptive monitoring and evaluation tools for socio-economic analysis, nor those tools, toolkits, methods and material already existing for performing a socio-economic assessments based on the ecosystem services framework (The rapid ecosystem services assessment (RESA) method (van den Belt & Cole, 2014); Toolkit for Ecosystem Service Site-based Assessment (TESSA) (Peh et al., 2017); A Tool for Integrating Ecosystem Services into Policy and Decision-Making (InVEST) (Sharp et al., 2018); Artificial Intelligence for Ecosystem Services Modelling (ARIES) (Villa et la. 2014); Protected Areas Benefit Assessment Tool (PA-BAT) (Stolton & Dudley, 2012); Social Assessment of Conservation Initiatives (Schreckenberget al., 2010), The Socio-Economic Assessment Tool (SEAT) (Rosales, 2018); the MPA Effectiveness Assessment Tool (MEAT) (MPA MEAT. 2010).

Within this working scope, our efforts to provide these guidelines aim to support MPA program staff, economists, scientists, decision-makers in charge of the management of marine and coastal natural resources to better understand and systematically identify, assess and communicate the benefits associated with MPAs in the Mediterranean with due references to key existing literature and guidance documents.



3. Practical guidelines for a socio-economic analysis of the role of MPAs

The conceptual framework and systematic approach of these guidelines is based on previous works carried out by Kettunen et al. (2009) and Kettunen and ten Brink (2013).

Due to the multidimensional character of the role of MPAs, a range of information is needed in order to assess its role. Thus, market data, secondary data for the performance of simulations, survey based primary data, data provided from literature review, consultation with experts and stakeholders and information coming from environmental impacts assessments are all deemed as important in the framework of socio-economic assessment. The proposed guidelines here are developed using a general framework of analysis and a method of analysis depending on whether the data is available or not. Under sufficient data availability all steps of the guidelines can be fully applied. Under limited data availability a more generic approach can be employed.

Step 1. Rapid “scoping” assessment

The scoping assessment provides a useful tool for identifying the most important positive and negative socio-economic impacts provided by a MPA, currently and potentially in the future. The scoping assessment also provides an initial indication of what type of value estimates (monetary, quantitative or qualitative) might be available and/or possible to obtain. This quality of information is likely to affect the socio-economic assessment especially when timescale and resources for developing the assessment are limited. Thus, it is a first step that allows to obtain a general view of the full range of positive and negative socio-economic impacts, their relative importance and determine which of these impacts could be used for a further in-depth analysis and valuation. (Step 2).

Under Step 1 of the analysis it is also suggested to perform what is known as a “Context Analysis” where those context specific characteristics of the assessed MPA are gathered. This context analysis would mainly involve gathering MPA objectives, targets and baseline conditions and well as the governance and stakeholder mapping.

As such, before starting a socio-economic assessment it is necessary to start with the objectives, targets and baseline profiling of the MPA which are object of the case study. This is essential so as to identify the driving forces of the management efforts, the target objectives and the context baseline starting conditions of the MPA. At the same time, it is necessary to describe the governance structures and the stakeholder’s structure

so as to identify who is going to be impacted in terms of specific maritime activities stakeholder sectors as well as in terms of the regional and local population adjacent to the MPA. A regional profiling is also necessary in order to assess the indirect and the induced impacts. This regional profiling typically includes the population characteristics, the political and social resources, a description of historical factors, identification of the relationship with the biophysical environment, culture, attitudes and social- psychological conditions, the current status of maritime activities and the identification of the people who will be impacted by the MPA.

Once the context analysis is performed, Step 1 can be performed through filling-up a checklist table that gathers the following tasks:

- a) Identification of impacts: It is important that ALL possible or observed economic and social benefits and costs that MPAs can provide are accounted (with or without market value) as this “long list” of benefits and costs would serve as the basis for the entire socio-economic analysis.
- b) Definition of the impacts: Impacts should come with a definition so as to better explain what each of the benefits accounts or does not account for.
- c) Identification of the beneficiaries: Identification of those that directly and indirectly are benefited or affected by these impacts in terms of individuals, local communities, businesses and industries, local, regional and national governments or the global community.
- d) Scale of the impacts: Defining the scale of the impacts is also important as could be accounted at a Local; Regional; National or Global scale (with the various implications that these have).
- e) Estimated importance of the impacts: The overall socio-economic importance of the impacts is related not only to its “quantity”, but also to the number of people benefited or affected as well as on their subsistence dependency (few people benefited or affected, but essential for their subsistence). As such, the assessment should also analyze the estimated or perceived socio-economic importance of those benefits previously identified (on a scale of 1-5; being 0 = benefit is not relevant at the site; 1 = benefit is of very limited importance; 2 = benefit if or limited importance; 3 = benefit is of moderate importance; 4 = benefit if of high importance; 5 = benefit is of very high importance).

f) Estimated present and future value of the impacts: The estimation of the present and future value of those impacts listed through the use of various methods or approaches. Estimations can be pursued at three levels: qualitative, quantitative and

monetary (along a resource-intensive gradient). As Kettunen and ten Brink (2013) stated: "In practice, the type of approach used depends on the time and resources available and the type of impacts measured".

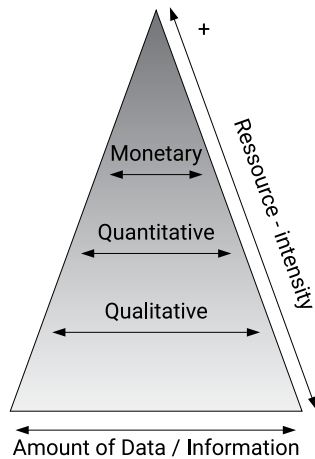


Figure 2. The three levels of the pyramid to perform estimations at a socio-economic assessment. (Source: Figure modified from Kettunen & ten Brink, 2013).

g) Method or approach used: Estimations can be performed through the use of various methods

or approaches (see Step 2).

Table 2. Sample checklist table for Step 1 of the socio-economic analysis of the benefits provided by MPAs in the Mediterranean.
 (Source: Own source based on Kettunen et al., 2009, Cruz and Bendicoto (2009) and Cruz et al., 2011.
 Note: one sample on how to fill in this checklist table is given).

Identified Impacts	Type of Impacts			Definition of Benefits	Beneficiaries ²	Scale of Benefits ³	Estimated importance (1-5) ⁴	Estimated Present Value	Method / approach used	Estimated Future Value	Method / approach used
	Benefit	Cost	Economic								
Food (for subsistence)	X		X	X	Individuals, Local communities	Local	5	Fish Prices at local market value.	Market Prices Social statistics	Future estimates of fish prices or individuals feed	Modelling, Contingent Valuation, Choice experiment, etc.
Etc.											
Etc.											
Etc.											

² Individuals, local communities, businesses and industries, local, regional and national governments or the global community

³ Local; Regional; National or Global scale

⁴ On a scale of 1-5 ; being 0 = benefit is not relevant at the site ; 1 = benefit is of very limited importance ; 2 = benefit is of limited importance ; 3 = benefit is of moderate importance ; 4 = benefit is of high importance ; 5 = benefit is of very high importance).

Once all benefits and costs have been identified at table 2 the next step suggested is to build a joint qualitative table of net impacts (Table 3) so as to better align what has been found at Step 1; think

of preliminary assumptions to be made over the general outcomes of Step 1 and suggest which benefits and costs could be further looked at Step 2 of the analysis.

Table 3. Joint qualitative table of net impacts
(Source: Own source based on Kettunen and ten Brink, 2013.
Note: Some sample on how to fill in this table are given).

Identified benefits	Estimated scale of socio-economic value	Identified Costs	Estimated scale of socio-economic costs ⁵
Food (for subsistence)	5	Management Costs: guards	3
Natural medicines	5	Management Costs: infrastructures	2
Recreation	3	Opportunity Costs: Displacement of fisheries	2
Regulation of Floods	3	Opportunity Costs: Displacement of recreation	1
Etc.			

It is improbable that the information given by Step 1 would allow for any detailed quantitative and monetary comparison of the benefits and costs of MPAs. This is why, when resources and time are available a more detailed socio-economic assessment which looks at all the observed and potential impacts (as suggested by Step 2 here below) is encouraged.

Step 2. Detailed socio-economic assessment

As mentioned, this Step 2 of the assessment would allow to further estimate the socio-economic impacts of MPAs. Through the explanation and introduction of existing methodologies and approaches used to derive estimates of the qualitative, quantitative and monetary value, one could focus on those estimates that are considered as more feasible to obtain.

We should however highlight that the most appropriate approach and methods for socio-economic assessment would always depend on the decision-making context and the purpose of the assessment.

Values can be divided into: Direct, indirect, option, existence, bequest and intrinsic.

- **Direct values:** raw materials and physical products that can be bought, sold and consumed directly, such as recreation, foods, building materials, fuel and handicrafts which are obtained from MPAs and the species found in them.

- **Indirect values:** services and functions provided by MPAs which maintain and protect natural and human systems such as coastal protection, storm control, carbon sequestration and the provision of breeding grounds and habitat for marine fish, bird and mammal species.

- **Option values:** the premium placed on maintaining MPAs and their component species for future possible uses, some of which may not even be known now, such as extractive and tourism opportunities, pharmaceutical and industrial applications.

⁵ On a scale of 1-5 ; being 0 = very low ; 1 = low ; 2 = moderate ; 3 = significant ; 4 = high ; very high)

• **Existence values:** the intrinsic value of the existence of MPAs to people, regardless of their direct use, including cultural, scientific, aesthetic, heritage and bequest significance.

• **Bequest Values:** the value of satisfaction from preserving a natural environment for future generations.

• **Intrinsic Values:** the intrinsic value of MPAs. Non-human values.

The following Figure 3 below aims at summarizing these values.

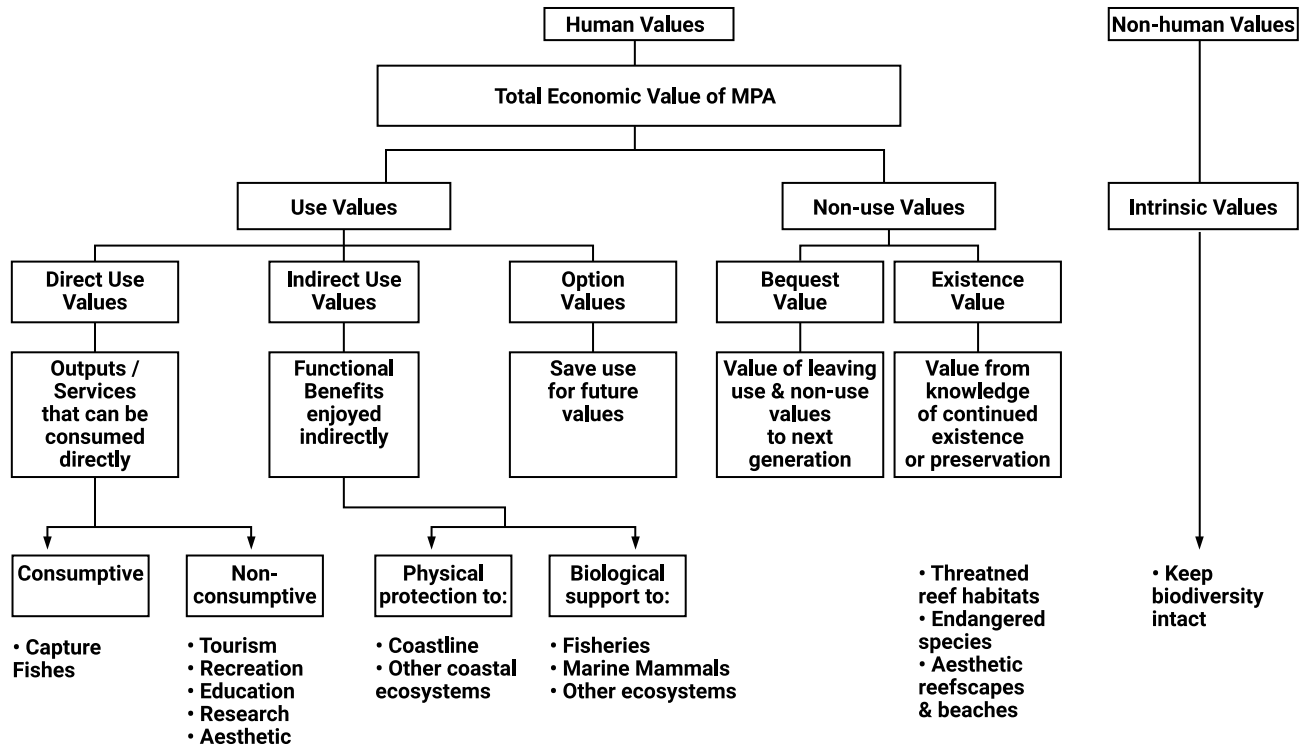


Figure 3. Human and non-human values from MPAs. Source (Modified from Emerton, 2005)

In order to measure all these values, various methods and approaches exist. The following Table 4 aims at summarizing currently existing methods including a short explanation, their implications in terms of

resources, their level of required knowledge so as to perform them and some examples on how these can be applied in a MPA context.

Table 4. Methods available for the socio-economic assessment of the impacts of MPAs
(Source: Own source based on Ojea et al., 2017 and Kettunen and ten Brink, 2013)

(Notes: **LOK** = Level of Knowledge ; **MP** = Market Price ; **PF** = Production function approach ; **AC** = Avoided Cost ; **RC** = Restoration Cost ; **REC** = Replacement Cost ; **TC** = Travel Cost ; **HP** = Hedonic Pricing ; **WTP** = Willingness to Pay ; **WTA** = Willingness to Accept ; **CV** = Contingent Valuation ; **CE** = Choice Experiment ; **P** = Participatory ; **FTE** = Full-time equivalents ; **PES** = Payments for ESS)

Value	Type of Use	Type of Method	Method / Approach	Explanation	Resource Implication	Required LOK	Some examples
Use	Direct	Monetary (Market)	MP (adjusted or non-adjusted)	Current selling price of the goods originated in the MPA and traded in domestic or international market. Preferably adjusted for distortions such as subsidies and taxes.	Easy to obtain (non-adjusted values) Resources needed (adjusted values).	Low (non-adjusted values) Basic economics (adjusted values)	Market price of fish; shells, algae, turtle meat, sea cucumbers, shark fin, aquarium fish...; market price for diving; entry fees; diving fees; hotel charges; taxes
			PF	Estimating the share of the market value that can be attributed solely to the MPA (- value of human inputs).	Resource-intensive and time-consuming.	High	Bio-economic models outputs of biomass of fish ; biomass-fishing efforts
		Revenue-based (monetary)	Jobs and employment	Direct employment and revenues values	Easy to estimate	Basic economics	N° of jobs; income equivalents ; FTE ; salary cost ; staff costs, guards costs
	Socio-economic investments		Investments values on MPAs	Easy to obtain	Basic economics	Public/ Private investments; donors; management costs; restoration costs; purchase costs, visitor infrastructure	
	AC		Costs which are avoided by not allowing damage. Relies on the assumption that damage estimates are a measure of value.	Easy to obtain	Basic economics	Avoided costs of protecting the shoreline from impacts of storms and floods, avoided costs of sequestering carbon ; displacement costs	
	Indirect	Monetary (non-market)	RC	Costs associated with restoration activities	Easy to obtain	Basic economics	Costs of restoring an ecosystem

				Prices of alternatives, substitutes or compensations (incentives, PES)	Easy to obtain ⁶	Basic economics	Market price of protein food ; plastic coral ornaments ; other building materials, infrastructure needed for the protection of the shoreline
		Revealed preferences (TC, HP)	Expenditures for using the goods provided by MPA. <ul style="list-style-type: none"> • TC = costs incurred in visiting and using the MPA • HP = revenues based on how close to the MPA (property prices, resting, etc.) 	Resource- intensive and time-consuming	Detailed understanding on economics	Costs of travelling for arriving to the MPA (petrol, bus fares, labor time, accommodation and other charges) ; Cost of a property nearby an MPA	
		Stated preferences (WTP, WTA, CV, CE, P)	Expenditure "potential" assessed via surveys exploring the "potential" demand for a benefit in a hypothetical market. <ul style="list-style-type: none"> • WTP = people's willingness to pay for maintaining/restoring MPA related goods • WTA = people's willingness to accept a situation in an MPA • CV = people's quantification of benefits which have no market and whose value simultaneously incorporates multiple components • CE = people's values for status choices/scenarios • P = focus group/survey/ review based valuations to express the values in non-monetary terms 	Resource- intensive and time-consuming	Detailed understanding on economics Participatory Methods knowledge	Replies to questions such as: <ul style="list-style-type: none"> • How much would you be prepared to pay for a license to collect shells? • What charge would you be willing to accept to enter this marine park? • If coral reefs became badly degraded how much compensation would you need to be given? 	
	Option	CV, CE	Future benefit for direct and indirect uses (insurance values)	Resource- intensive and time-consuming	Detailed understanding on economics Modelling scenarios knowledge	Replies to questions such as: <ul style="list-style-type: none"> • How much would you be prepared to pay certain scenario? 	
	Existence	CV, CE	Intrinsic value of species habitats, biodiversity...	Resource- intensive and time-consuming	Detailed understanding on economics and ecology	Replies to questions such as: <ul style="list-style-type: none"> • How much do you value MPAs biodiversity? 	
Non-Use	Bequest	Bequest	Is the value of satisfaction from preserving a natural environment for future generations	Resource- intensive and time-consuming	Detailed understanding on economics and ecology	Replies to questions such as: <ul style="list-style-type: none"> • How much will you pay so as to protect a habitat for future generations? 	

⁶ Assumptions need to be clearly stated as these are used as proxy for the real value of goods



4. Conclusions and recommendations

In the absence of guidelines to strengthen the socio-economic role of MPAs, efforts to promote income generating activities in MPAs are often doomed to failure. For all these reasons, conservation policies in the Mediterranean are struggling to make MPAs operational and effective in conservation while offering possibilities for socio-economic development.

As such, socio-economic assessments can provide some concrete benefits showing the wider value of MPAs. These include efforts for: advocacy and awareness, support for decision-making and management, identifying and addressing social impacts and increasing the potential for mobilizing funds.

Opportunities for MPAs also rise from Maritime Spatial Planning (MSP), Integrated Coastal Zone Management (ICZM), Blue Economy and Blue Growth, Climate Change adaptation and mitigation mechanisms and Risk protection (insurance values).

In what regards to MSP and ICZM, MPA designation may trigger opposition due to the real or perceived losses to interested parties potentially affected by use exclusions, possibly including economic losses. In these cases, socio-economic analysis and information can aid in designing the proposed MPA Regulations and management plans that lessen these impacts. This helps demonstrate that economic impacts may be less severe than is commonly perceived, thereby alleviating fears on the part of the interested parties active in the area. Indeed, a primary focus of economics is to better understand the economic trade-offs associated with public policy. Increasing stakeholder acceptance we will thus also increase the probability of conservation success.

Inside blue economy and blue growth efforts, proposals for income-generating activities could be promoted in Mediterranean MPAs with a view of stimulating the role of the Mediterranean MPAs as a socio-ecological system network generator of ecological, social and economic welfare. Without ecological benefits, however, there won't be any socio-economic benefits and thus the first step is always to support highly and fully MPA. MPAs may make an important contribution to the growth of a greener blue economy – one that places the conservation of marine resources and the development of innovative and clean industry at its heart. To plan and manage for this and to maximize the flow of potential

benefits (to the environment, the blue economy and society more generally) the linkages between maritime sectors and these potential benefits need to be better understood, including how the design and management of MPAs can help facilitate their realization.

Similarly, MPAs may also play an important role in supporting the monitoring and evaluation tasks for Climate Change adaptation/mitigation mechanisms as they can contribute to tracking and reporting on performance relative to the conservation objectives of the MPA.

Last, but not least, MPAs could improve risk protection (i.e. coastline and coastal community protection, erosion protection, etc.) through their insurance capacity, potentially increasing ecosystem's resilience and capacity to maintain benefits under changing conditions, over time, including the value of conserving genetic, species, habitats and functional diversity of ecosystems.

However, performing a socio-economic assessment may also entail some weaknesses and threats, none of which are insurmountable, but need to be taken into consideration when planning and carrying out a socioeconomic assessment.

Weaknesses include: the difficulty to assess the non-monetary benefits, difficulty to assess all complexity, difficulty in assessing net benefits (the assessment of net benefits (benefits minus costs) is crucial), the uneven distributional impacts (benefits may differ between stakeholders view), the need for stakeholder compliance and proper stakeholder engagement for management effectiveness, the need to understand the intensity and pattern of human uses, acknowledging that values change over time, that new values emerge over time and that the attention might be diverted from the primary role of MPAs.

Other difficulties to consider when performing a socio-economic analysis may include that the positive impact on local economy may be clear but it is difficult to measure, that the analysis is usually dependent on accurate data collection (in contexts of data limitations) and that it is usually difficult to segregate the effects of MPAs in local economy and employment from those in the neighboring municipalities (as people may be move or work outside the MPA core limits).

Having these opportunities, weaknesses and difficulties in mind, these guidelines also recommend to have in mind the following considerations:

- That because of its high complexity, it is recommended that socio-economic analysis focus on a selection of the main stakeholders, not on the broader community (Rodríguez-Rodríguez, 2015). Especially since the resilience to changes from different stakeholders should also be considered (some may recover soon from an initial impact whilst others in weaker condition may not).
- That conservation is the first objective in MPA and that any assessment should have this in mind at the same time that the carrying capacity of the different natural resources is being considered.
- That socio-economic indicators should be meaningful

for decision makers, and also easy to obtain by the MPA managers and local society.

- That most losses are not usually complete, inevitable or permanent, that values change over time, that new values emerge over time and that short-term winners (e.g. recreation) may compensate short term losers (e.g. local fishermen) (Sala & Giakoumi, 2017).
- That new fiscal mechanisms are emerging (e.g. PES) which can shift the way MPAs are being managed and incorporate new funding opportunities for MPAs and conservation initiatives (Pascual, 2018).

With all this, we hope these guidelines would help those aiming to follow a socio-economic assessment put the available data, information and estimates into a proper context, so as to better interpret and communicate their results.





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