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Economic valuation of ocean-based and ocean-related tourism and recreation

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Abstract: Coastal and marine ecosystems provide many essential services to society. Despite the benefits offered, these ecosystems are subject to a number of human pressures, including the constant and often uncontrolled growth of tourism activity in coastal areas. Current intensity of coastal tourism, one of the fastest-growing forms of tourism in recent decades, has raised concerns about its sustainability and, thus, an urgent need for better regulation and management of coastal ecosystems. This chapter focuses on the economic value of tourism and recreational ecosystem services as an appropriate tool for the management of these fragile ecosystems. Economic valuation may play a crucial role in financial modelling and decision-making processes since it enables comparing the social costs and benefits associated with tourism and recreation. Most studies estimate ecosystem services' non-use values and direct non-consumptive use values, usually linked to cultural services. A common outcome of these studies is that people are willing to pay to protect coastal and marine ecosystems and that their economic valuation can contribute to a more sustainable management of these critical resources.

Keywords: Ecosystem services, economic valuation, recreation and tourism.

1. Introduction

Oceans are a source of energy, nourishment, commerce, transportation, recreation, medicines, and freshwater. They also supply jobs and support industries, but the ocean economy's sustainability relies heavily on robust ocean health. Furthermore, oceans are directly affected by anthropogenic impacts which are likely to be intensified by climate change (Waycott et al., 2009). Valuing oceans' ecosystem services (ES) has proven to be a way forward to acknowledge their contribution to human wellbeing. However, this is not without problems, for example, the lack of a monetary value for ecosystem services, which often leads to an implicit assumption that their value is zero. Moreover, the benefits provided by ES and the costs of their degradation are often not correctly incorporated into the evaluation of projects and public policies (Jacobs et al., 2016). In practice, this has translated into various processes of destruction of natural capital and ecological services around the world. That is why policymakers, planners and managers are increasingly demanding information about the economic implications of biodiversity loss and require tools to incorporate the value of ES into their decisions.

Tourism, the largest economic sector dependent on marine ecosystem function (Ghermandi et al., 2019), also contributes to ocean degradation, especially in coastal areas. Coastal recreational activities, which have been increasing in volume and number over the past decades, occupy a unique place in coastal tourism. They comprise two main types of recreational uses of coastal areas: (1) consumptive activities such as fishing, shellfishing and shell collecting; and (2) non-consumptive activities, including swimming, diving, sailing, surfing, windsurfing, jet-skiing, bird watching, snorkelling, etc. Tourism is one of the primary income sources in many countries and regions. However, the growing tourism industry, although providing significant amounts of investment and being considered an easy way to strengthen national economies, has pushed a constant and often uncontrolled growth of tourist activities in coastal areas around the world. The rapid growth of the recreation sector over the last two decades has also raised concern over the sustainability of its current recreation intensity, thus calling for improved regulation and management of coastal ecosystems (UNEP, 2009).

In this context, environmental and natural resource valuation and wealth accounting approaches can contribute to a more sustainable use of resources (Ebarvia, 2016). The economic valuation of ES allows to estimate a monetary value for the goods and services provided by nature and, at the same time, to estimate the economic impacts of human activities, taking as a reference the damage caused to ecosystems and their respective services. Additionally, the economic valuation of environmental goods and services enables the comparison of ES with market goods and services (TEEB, 2010).

This chapter aims to contribute to the literature on ecosystem service valuation by assessing the benefits provided by ocean-based and coastal ecosystems to ocean-related tourism and recreation, thus helping policymakers designing more sustainable management policies. This chapter is structured as follows: section 2 highlights the

importance of oceans for tourism and recreation. Section 3 describes the main methodologies for the economic valuation of ecosystem services and section 4 reviews the ongoing literature on monetary estimates for cultural services around the world, with an especial focus on tourism and recreation. A conclusion section ends the chapter.

2. Ocean-based and ocean-related tourism and recreation

This section will emphasize not only the importance of oceans but also the relevance of tourism for economic growth, especially in coastal areas. The development of sustainable tourism is essential not to degrade marine ecosystems. The Earth is called the "Blue Planet" due to the large extension of water on its surface; oceans play a crucial role in society. More than 70% of the planet is covered by water, 96.5% of which corresponds to oceans (Pidwirny, 2006). The oceans are an abundant source of food, energy, medicines, commerce and recreation. They are also a means of transport, trade and a source of income and jobs (Ebarvia, 2016).

Tourism is a large contributor to the world economy, making up for 10.3% of global gross domestic product (GDP) – approximately $8.9 trillion – as well as 330 million jobs, and 10.4% of total employment in 2019. Over the past five years, one in four of all net new jobs created worldwide has occurred in travel and tourism sector. Moreover, tourism-related GDP growth outpaced the overall economic growth for the ninth consecutive year. The region with highest increase in tourism is Central Asia, followed by Northeast Asia, Middle East, Southeast Asia, South Asia, Caribbean, North Africa, North America, European Union, Sub-Saharan Africa, Latin America and, finally, Oceania (WTTC, 2020).

Much of the world's tourism is concentrated on the marine and coastal environment, and it is expanding. Trends in an ageing population, rising incomes and relatively low transport costs make coastal and oceanic locations increasingly attractive (UNEP, 2014). In Europe, for instance, coastal tourism is a leading economic sector in the Mediterranean region in terms of revenues and occupation. While coastal areas around the globe represent 2% of the land area (McGranahan et al., 2007), half of the 300 million international arrivals recorded in 2011 in the Mediterranean region took place in coastal areas, accounting for a significant 15% of world figures. Benefits generated by tourism and recreational activities in coastal regions exceeded 250 billion euros. Estimates also indicate that the tourist sector in 2012 provided 3.3 million direct jobs and 8.5 million total jobs in coastal Mediterranean areas (UNEP, 2016). These figures illustrate the economic importance of coastal tourism as well as the close relationship between tourism and economic growth (Sequeira & Maçãs Nunes, 2008). It should also be noted that tourism is a sector vulnerable to external shocks, such as potential climate change impacts or the actual COVID-19 pandemic. According to the latest edition of the UNWTO World Tourism Barometer, the lockdown imposed in response to the pandemic led to a 98% fall in international tourist numbers in May of 2020 as compared with the previous year[1].

The marine and coastal environment is a crucial resource for the global tourism industry. It supports all aspects of the tourism development cycle, from infrastructure and the well-known "sun, sand and sea" formula to the diverse and growing nature-based tourism field (UNEP, 2014). Over the decades, coastal tourism has been identified as the largest tourism market segment globally and it is gaining even more importance (UNEP, 2011). According to (Hall, 2001, p. 602) "*coastal tourism embraces the full range of tourism, leisure, and recreationally oriented activities that take place in the coastal zone and the offshore coastal waters. These include coastal tourism development (accommodation, restaurants, food industry, and second homes) and the infrastructure supporting coastal development (e.g., retail businesses, marinas, and activity suppliers). Marine tourism includes ocean-based tourism such as deep-sea fishing and yacht cruising*". This definition of coastal and marine tourism is essential as it acknowledges the multiple elements involved in the tourist sector, from demand to offer, using the coastal and marine environment as the contextual background for tourism activities (Moreno & Amelung, 2009).

[1] https://www.unwto.org/news/impact-of-covid-19-on-global-tourism-made-clear-as-unwto-counts-the-cost-of-standstill

Nonetheless, many coastal areas experience constant and uncontrolled growth of tourism activity, leading to the degradation of marine ecosystems. Some of these external effects of tourism include urban expansion, urbanization, habitat destruction and fragmentation, waste production, water pollution, and the loss of social and cultural identity and values. Furthermore, many of these effects are likely to be aggravated by climate change, including flooding and coastal erosion, loss of biodiversity and ecosystems (coral reefs and mangroves), alteration of the productivity and distribution of wildlife (sport fish, bird migrations), and changes in the availability and quality of freshwater resources. In addition, tourism is a significant contributor to greenhouse gas emissions and therefore, to climate change (Rosselló-Nadal, 2014; Scott et al., 2012; UNEP, 2012).

Many tourism forms and activities rely directly or indirectly on the use of environmental resources to supply tourists with various goods and services. The relationship between tourism and the environment is one of mutual dependence: not only does tourism depend heavily on the quality of the environment, but the quality of the environment is also very vulnerable to tourist development. Moreover, evidence shows that the demand for traditional mass tourism has reached a maturity stage, which encourages the demand for more responsible forms of tourism (UNEP, 2009). Sustainable tourism requires, firstly, the rational and efficient use of local resources such as water and energy; secondly, proper waste management for pollution, wastewater, rubbish, gas emissions, etc.; thirdly, the protection and conservation of fragile coastal and marine environments like dunes, wetlands, beaches, seagrass beds or coral reef assemblages; and fourthly, the security and respect of local culture and lifestyles and social structures have to be included (UNEP, 2016).

In this context, UNWTO and UNEP (2005) stated that *"sustainable tourism development guidelines and management practices apply to all forms of tourism in all types of destinations, including mass tourism and the various niche tourism segments. Sustainability principles refer to the environmental, economic and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability".* Three issues can be highlighted from the previous quote, namely:

I. The vital importance of making the best use of environmental assets that represent a crucial function in tourism development, retaining essential ecological processes and supporting to preserve natural heritage and biodiversity.
II. The appreciation of the socio-cultural authenticity of host communities maintain their cultural heritage and traditional values. It also includes the commitment to inter-cultural information and tolerance as vital points.
III. The essential contribution of sustainable tourism to poverty mitigation. Therefore, making crucial to ensure viable, long-time financial operations, providing evenly distributed socio-economic advantages to all stakeholders, along with stable employment and income-earning possibilities. Social services to host communities are also demanded.

So, sustainable tourism policies require the informed participation of all sectors involved and strong political leadership to ensure broad participation and consensus-building. Achieving sustainable tourism is a continuous process and requires constant monitoring of impacts, introducing the necessary preventive and corrective measures whenever necessary. Sustainable tourism should also maintain a high level of tourist satisfaction and ensure a meaningful experience for tourists by raising awareness of sustainability issues and promoting sustainable tourism practices (UNWTO & UNEP, 2005). A good example of sustainable tourism is the Republic of Costa Rica, one of the most-visited nations in the Central American region. Since the late 1980s, Costa Rica has become a popular nature-based tourism destination. A pioneer of ecotourism, the country draws many tourists to its extensive series of national parks and other protected areas (Honey, 1999). So, it attracts ecological tourists due to its rich biodiversity and abundant wildlife. This growing tourist sector required planning to introduce sustainability principles in the main tourist activities. Box 1 summarises some programmes implemented in Costa Rica to ensure sustainability within the sector.

BOX.1: Initiatives for sustainable tourism in Costa Rica

- The Blue Flag Ecological program

Costa Rica's Blue Flag Ecological Program helps in protecting the environment and social landscape of Costa Rica. This programme began in 1996 as an incentive for coastal communities to keep their beaches clean and, since then, it has grown to encompass a wide variety of destinations and categories. The Blue Flag programme is a driving force behind Costa Rica's healthy communities and ecosystems (Nature Air, 2019).

- Certification for Sustainable Tourism (CST)

CST is a national programme aimed at balancing three fundamental factors within the tourist industry: the interaction of business with natural and cultural resources, improving the quality of life within local communities and the economic contribution to other national development programmes. CST encourages companies to adopt a sustainable orientation in every business decision. It includes the use of recycled products, proper waste disposal and treatment, the implementation of water and energy-saving devices, conservation and expansion of Costa Rican forests, and better information management systems, among others. The rating system used by the CST is essentially a set of standards that classify and certify each company according to the degree to which its operations comply with a sustainability model (Molina Murillo, 2019).

- Ethical Traveler destination

Ethical Traveler, an international non-profit organization, publishes an annual report on social and environmental policies in developing countries. According to this institution, Costa Rica was included in the 2019 list of The World's Ten Best Ethical Destinations. This country supports decarbonization and green energy, including plans to add five new marine protected areas. In September 2019, Costa Rica was one of a dozen countries to sign the historic Escazú Agreement, guaranteeing rights to a clean and healthy environment. It was one of ten pilot sites to implement Land Degradation Neutrality by 2030 (Lefevre et al., 2019).

In sum, greater attention should be given to proper planning and better integration of tourism into coastal development to minimize tourism-induced problems and ensure both the sustainability of the tourism industry and other sectors' coastal resources (UNWTO & UNEP, 2005). The following section will describe different methodologies to incorporate the value of the ecosystem services provided by the oceans into economic modelling and decision-making processes.

3. Methodology for valuing coastal and ocean-based ecosystem services

Economic valuation is a means to describe the value that people ascribe to natural resources. Estimating a monetary value for the ecosystem services provided by nature, including marine and coastal ecosystems, begins by understanding the many different services that these ecosystems provide to people's well-being. The concept of ecosystem services provides a framework for identifying and quantifying the variety of benefits obtained from the environment (Salcone et al., 2016). Under the framework of the Millennium Ecosystem Assessment (MEA), ES are classified using four categories: provisioning, regulating, cultural, and supporting services (MEA, 2005).

Valuing the benefits of ES to society is of outstanding importance when formulating environmental o sectoral policies, such as tourism. However, the importance of preserving these ecosystems is often not fully met, partly because many ESs are considered free and unlimited. Furthermore, ecosystems offer intrinsic benefits that cannot be valued in economic terms, making it difficult to implement natural resource management policies. So, proper

information on the economic implications of the loss of nature and biodiversity and tools to incorporate the value of ES could be very relevant for environmental decision making.

The value of natural resources is often considered within the Total Economic Value (TEV) framework, that represents the value of the sum of all ecosystem services flows that the natural capital generates both in the present and in the future, given an appropriate discount rate (AEMA, 2010; TEEB, 2010). TEV can be further divided into use and non-use values.

Use values are related to the current or future use of a particular good or service by individuals and can be further classified into direct use values, indirect use-values and option values. Direct-use values derive from the actual use of a resource, either consumptively (the use of resources extracted from the ecosystem) or non-consumptively (the use of services without removing any elements from the ecosystem). They refer to the benefits obtained from the direct use of ecosystem services such as raw materials, food products, leisure and tourism. Indirect-use values, on the other hand, are the benefits derived from ecosystem functions and they are usually associated with regulating services, such as disturbance regulation, nutrient cycle control, carbon sequestration or waste treatment. Finally, option values form a separate category, representing the value placed on having the option of using ES in the future, even if they have no present use.

Non-use values reflect the satisfaction that individuals may derive from ecosystem services that other people have or will have access to (Kolstad, 2000). Non-use values have typically a good public character, so no market price is usually available, and they include two main categories: on the one hand, existence value refers to the amount people get from merely knowing that an environmental resource is conserved; and, on the other hand, bequest values refer to the value that individuals gain from passing a resource on to future generations even if they may not ever directly use or experience the help themselves. These can be altruistic values, which are values attributed by individuals given the knowledge that a resource can be available to other individuals in the current generation. In general, cultural services and non-use values involve the production of experiences that occur in the valuer's mind.

Different valuation methods can be found for estimating the economic value of ES. A first classification distinguishes whether market data is available or not (Abdullah et al., 2011). As for market approaches, monetary values are directly inferred through the interactions observed in markets. Under certain conditions, market prices are assumed to provide with valid monetary values of an individual's willingness to pay (WTP). Consumers are assumed to reveal their preferences through the choices they make in real markets, where they allocate limited resources among different alternatives. In this context, market valuation approaches can be divided into (1) market price-based approach, (2) cost-based approach, and (3) production functions (Montenegro, 2017).

In the absence of market data (which is the case in many of the goods and services provided by nature), different non-market valuation methods have been proposed. There are two approaches to estimate the economic value of non-market goods and services: revealed preferences and stated preferences approaches. Revealed preference methods infer the preferences of individuals by observing the choices that individuals reveal in a related market. Revealed preference methods include travel cost method and hedonic pricing. Travel cost method uses the travel costs that people incur when visiting a site, as a proxy for the price for accessing the site. A latent demand curve is estimated by accounting for the number of trips and costs associated with these trips (Kolstad, 2000). Hedonic pricing methods rely on surrogate markets, e.g., the housing market, to estimate the economic value for ecosystem or environmental services that are part of such property prices (TEEB, 2010).

Rather than observing a related market, stated preference methods simulate a market and the demand for ecosystem services using surveys on hypothetical policy-induced changes in the provision of ES. Individuals are typically provided with hypothetical scenarios, based on plausible outcomes and options, and their choices determine the value of the environmental good or service in question[2]. Stated preference methods are most commonly applied to non-marketed goods or services because markets cannot reveal individuals' preferences. In the contingent valuation method, respondents are directly asked to express their WTP to improve the quantity and quality of a specific good that is not exchanged in a traditional market (Hoyos & Mariel, 2010). Instead of asking directly, discrete choice experiments (DCE) present respondents with different alternative hypothetical scenarios among which they need to choose their preferred option (Salcone et al., 2016). A typical DCE contains

[2] https://www.oceaneconomics.org/nonmarket.

several sets of options, each containing a set of mutually exclusive alternatives from which respondents have to choose their preferred one. A set of attributes defines the other options, and each of these attributes takes on one or more levels. The levels indicate the range of the alternative. Individual choice involves implicit trade-offs between the levels of attributes in the different alternatives included in a choice set. When there is an attribute that incorporates the program's cost, it is possible to transform marginal utility estimates into WTP estimates for changes in attribute levels. By combining the different attribute changes, Hicksian welfare measures are obtained (Hoyos, 2010). For a more detailed description of this method, the reader may refer to Mariel et al., (2021). Although both revealed and stated preference methods can be used to estimate use values, only stated preference methods can be used when non-use values are involved.

Finally, benefit transfer consists of exporting previous benefit estimates from a study site to another, at one point in time, regarding the researcher's area of interest (Abdullah et al., 2011). That is, benefit transfer is a process by which economic values that have been generated in one context - the "study site" - are applied to another context - the "policy site" - for which values are required. Its main advantage is that it can reduce the need for primary valuation studies (Defra, 2007).

The TEV and MEA frameworks can be complementary when categorizing ecosystem services (Defra, 2007). In fact, table 1 shows how both approaches can be combined. The TEV framework is a useful tool for exploring what types of values are trying to obtain for each ecosystem service. This framework helps in determining the valuation methods required to capture these values. Additionally, some advantages and drawbacks for each method are raised.

Table 1: Summary of valuation methods for different ecosystem services.

Valuation method	**Element of TEV captured**	**Ecosystem service(s) valued**	**Benefits of approach**	**Limitations of approach**
Market prices	Direct and indirect use	Those that contribute to marketed products e.g., timber, fish, genetic information	Market data readily available and robust	Limited to those ecosystem services for which a market exists.
Cost-based approach	Direct and indirect use	Depends on the existence of relevant markets for the ecosystem service in question. Examples include human-made defences being used as a proxy for wetlands storm protection; expenditure on water filtration as a proxy for the value of water pollution damages.	Market data readily available and robust	Can potentially overestimate actual value
Production function approach	Indirect use	Environmental services that serve as input to market products, e.g., effects of air or water quality on agricultural production and forestry output.	Market data readily available and robust	Data-intensive and data on changes in services and the impact on production often missing.
Hedonic pricing	Direct and indirect use	Ecosystem services that contribute to air quality, visual amenity, landscape, quiet, i.e., attributes that can be appreciated by potential buyers	Based on market data, so relatively robust figures	Very data-intensive and limited mainly to services related to property.
Travel cost	Direct and indirect use	All ecosystems services that contribute to recreational activities.	Based on observed behaviour	Generally limited to recreational benefits. Difficulties arise when trips are made

				to multiple destinations.
Contingent valuation	Use and non-use	All ecosystem services	Able to capture use and non-use values	Bias in responses, resource-intensive method, hypothetical nature of the market
Choice modelling	Use and non-use	All ecosystem services	Able to capture use and non-use values	Similar to contingent valuation above

Source: (Defra, 2007)

In sum, some valuation methods are more appropriate than others for valuing particular ecosystem services and eliciting specific value components. Moreover, the type of valuation technique chosen will depend not only on the kind of ecosystem service to be valued but also on the quantity and quality of data. The next section will present a review of valuation studies, where different methodologies are applied to get the value for ocean-based and ocean-related recreational and tourism services.

4. A review of valuation studies on ecosystem services related to coastal tourism and recreation

The previous section has provided a general overview of economic valuation methods for valuing ecosystem services. In this section, the applicability of these methods will be discussed in the context of cultural services, specifically recreational opportunities and tourism-related activities.

Marine and coastal ecosystems offer a wide variety of passive and active recreational services. Recreational activities provided by these ecosystems include swimming, diving, snorkelling, charter fishing, fishing from the shore, recreational gleaning, kayaking, surfing, free-diving, beach activities and passive appreciation of coastal scenery (Salcone et al., 2016). Research in this area has focused mainly on the cultural services provided by coastal and marine ecosystems, emphasizing their recreational opportunities (Torres & Hanley, 2016).

Recreation and tourism represent an opportunity and an essential link for managing the interaction between ecosystems and people (Berg et al., 2005). Recreational activities offer many people a chance to experience the benefits of ES directly through physical exercise, aesthetic experiences, intellectual stimulation, inspiration, and other contributions to physical and psychological well-being (Daniel et al., 2012). Studies show that the high recreational benefits associated with coastal and marine ecosystems, and the positive correlation between those benefits and environmental quality, can provide an economic justification for implementing conservation strategies. This issue is particularly relevant in nature-based tourism destinations, where the recreational opportunities offered by these ecosystems are at the core of their tourism product. More importantly, a large number of studies show that the economic justification for protection can be more substantial if the non-use values that recreationists often attribute to cultural services are also considered (Torres & Hanley, 2017).

Some recreational activities imply market services, such as diving and fishing for hire, and have observable market prices. Other activities are not usually traded on markets, such as swimming, beach activities and appreciation of coastal landscape. This distinction has implications for appropriate valuation methods and the extent to which values can be estimated without the need for primary data collection. In particular, the estimation of surplus consumption of non-market leisure activities by residents would require stated preference methods. Therefore, ideally all relevant tourism and recreation activities should be identified, qualitatively described and quantified before an assessment, when possible (Salcone et al., 2016).

A number of tourism-related ES valuation studies have been identified. We find that some authors address tourism-related ecosystem services in coastal areas, and a general analysis of this is described in sub-section 4.1. Others address the services provided by specific coastal ecosystems, such as wetlands, beaches and coral reefs. An overview of these ES is presented in sub-section 4.2.

4.1. Tourism and recreation ES in coastal systems

Recreational services are the cultural services with highest presence in coastal areas. Generally, these services are non-consumptive direct use values estimated through stated preference methods (Torres & Hanley, 2016).Some studies use the contingent valuation method to estimate the non-use value of recreational services in coastal areas. E.g. Östberg et al. (2012) value hiking, bathing, fishing and boating/water quality, noise and littering, showing clear support for coastal areas conservation. Evidence shows that both tourists and residents highly value the ecological features of coastal areas. Besides, recreational and tourism services of Marine Protected Areas (MPA) have also received specific attention. MPA's type of recreational service most valued is scuba diving, followed by snorkelling, recreational fishing/angling and glass-bottom boating. In addition, other studies estimate recreation and leisure values which results can help evaluate the effects of policy measures in certain protected areas (Wielgus et al., 2009). Valuation can also help decision makers and stakeholders to justify the sustainable use and management of the coastal systems (Batel et al., 2014; Thur, 2010). In regions where tourism is an important economic driver for the local economy, analysing tourists' options to integrate them into conservation management plans is found to be essential (Oh et al., 2009).

According to the TEEB database, the total monetary value of the potential sustainable use of recreational services of coastal systems has a mean value of about 7,000 Int$/ha/year (2007 values), based on seven original value-points (Van der Ploeg et al., 2010). According to another study held by Ghermandi and Nunes (2013), coastal ecosystems' estimated recreational values range up to 71.112 I$/ha/year. The lowest values found at high absolute latitudes, such as the Arctic Circle, North of Canada, East Russia, South of Chile and Patagonia. The highest values are located in large cities like Los Angeles, Caracas, Rio de Janeiro, Abidjan, Hong Kong, Taipei, Tokyo and Sydney. Mainly it is situated in European Mediterranean cities (e.g., Rome, Naples, Marseille and Barcelona) and in Florida (e.g., Miami, Orlando and Tampa), along with several tropical islands (e.g., Canary Islands, Puerto Rico and the Andaman Islands).

Results clearly show support for the conservation of coastal areas. Notably, both tourists and residents highly value the ecological characteristics of coastal areas and their biodiversity. The body of literature also shows that the quality of the recreational experience influences the value that individuals place on the activities they undertake in coastal waters. Furthermore, as water quality contributes positively to the recreational experience, there is social support for its improvement. Finally, the economic valuation of the services provided by coastal waters can be used to assess the economic efficiency of different policies aimed at protecting coastal water ecosystems.

Table 2 shows the main findings of selected valuation studies of ocean based and ocean related tourism. The literature is classified in terms of the valuation technique, their main outcomes, the country and the year of such studies and the reference. All values are updated to 2019 US$ values.

Table 2: Economic valuation of ocean-based and ocean-related tourism and recreation around the world. Values have been standardised to USD/ha/year (2019), unless otherwise specified.

Valuation technique	**Value (USD_{2019}/ha/year)**	**Outcome**	**Country**	**Reference**
Benefit transfer	43	Individuals value for recreational services	Spain	Brenner (2007)
Travel cost	150.2 223.4 294.1 338.8	Swimming, boating, recreational fishing, and bird and wildlife watching.	USA	Johnston et al. (2002)
	6.25	Expected consumer surplus for visiting Jaizkibel	Spain	Hoyos & Riera (2013)
	2226,457.2	The total non-market use value associated with diving in the area.	Indonesia, Thailand and Malasya	Pascoe et al. (2014)
	61,454.8	The total annual recreation benefits	Various	Czajkowski et al. (2015)

Contingent valuation	0.07 – 0.25	Citizen and foreign visitors' WTP in addition to current park entrance fees, to support reef quality improvements.	Kenya	Ransom & Mangi (2010)
	0.03 – 0.06	Mean WTP for annual access.	Netherlands	Thur (2010)
	0.05 0.03	The mean WTP value for improved water quality: respondents from the East coast region and respondents from the West Coast region.	Sweden	Östberg et al. (2012)
	28.0 to 32.9 (USD/person)	Individuals are willing to pay between 10% and 29% more for guided dolphin watching tours, which leads to a total WTP.	Croatia	Batel et al. (2014)
Discrete choice experiments	0.6 and 1.2 0.01 and 0.03	Recreational anglers' WTP for unit increases in fish size and numbers during an average fishing vacation (10 days). Scuba divers' WTP for unit increases in coral-associated fish and large fish.	Mexico	Wielgus et al. (2009)

4.2.Tourism-related services provided by wetlands, beaches and coral reefs

A number of studies focus on ES provided by specific ecosystems, such as wetlands, beaches and coral reefs. In this sub-section we review the role played by these. Sharing the same structure as table 2 in the previous subsection, table 3 summarises valuation studies focused on wetlands, beaches and coral reefs, with all values updated to 2019 US$ values.

I. Wetlands

Coastal wetlands are transition zones between marine and terrestrial environments considered to be one of the most productive and valuable ecosystems, which offer a wide variety of goods and services that have an important global socio-economic value (Barbier et al., 2011).

The services provided by wetlands include habitat for species, protection against floods, water purification, amenities and recreational opportunities such as scuba diving, recreational fishing, and recreational bird watching, among others. Because many of these services typically have no market price, non-market valuation techniques are generally employed to value the services provided by wetlands (Woodward & Wui, 2001).

Overall, most studies estimate non-use values and non-consumptive direct use values associated with the final ES object valuation, since they are attached to cultural services. Some studies applied revealed preference methods, such as travel cost method (Gürlük & Rehber, 2008; Shrestha et al., 2002). Stated preference methods have also been used to value the recreational value of wetlands (Faccioli et al., 2015; Westerberg et al., 2010). Globally, Van der Ploeg et al.(2010) estimate that the total monetary value of the potential sustainable use of recreation and tourism opportunities of coastal wetlands is 684 int$/ha/year, based on ten original value points.

In general, studies show support for the protection of wetlands and mangroves. It is important to denote that that the value estimates vary greatly depending on the ecosystem service assessed and also on the valuation method used. The economic valuation of the recreational and tourism services provided by wetlands can contribute to more efficient wetland management. It can also serve to give guidance to policymakers in designing sustainable policies.

II. Beaches

Tourism is a key element in the economic development of many countries, and beaches play in many cases a central role of tourism activities. The essential services provided by beaches are recreational and amenity services. Moreover, tourism and leisure are an inherent part of setting up the desirability of beaches. As a resort-style destination, the beach is almost synonymous with the elements of modern tourism.

Water quality is an important aspect to consider when analysing tourism and recreation in beaches (Hess & Beharry-Borg, 2012; Loomis & Santiago, 2013). Considering congestion and noise issues in beaches is also of high relevance as they can affect residents' interest in developing and maintaining beach access and other management measures. Oh et al. (2009) carried out a DCE to analyse tourist preferences for management options and public beach access policies in South Carolina beaches. They show that tourist preferences are fundamental when dealing with management agencies to serve coastal tourists better. Although most papers estimate non-consumptive direct use values, cultural services can attach non-use values. For instance, Kontogianni et al.(2014) analysed European tourists' perceptions regarding beach rocks impacts on their recreational activities and their WTP to preserve beaches from further deterioration due to this phenomenon in Lesvos' islands Greece.

The studies show social support for beach protection strategies: the estimated recreational value of the beach ecosystem range between 5 to 1,075,914.77 USD/person/year. Individuals show positive preferences for beach nourishment options. Besides, beach visitors show a greater preference for more beach access points. It is also noted that tourists prefer less crowding and noise on the beach and are willing to support specific management measures, such as introducing some beach use rules and regulations. The economic valuation of recreational services provided by beaches can also inform policymakers about the benefits of water quality improvements, as most studies show that people are willing to pay for these improvements. For this reason, the importance of considering non-use values for beach protection has also been highlighted in several studies (Ghermandi & Nunes, 2013; Kontogianni et al., 2014). Other studies argue that understanding the values that visitors attach to coastal recreational access can contribute to new regulations and more sustainable resource management (Oh et al., 2008, 2009).

As shown above, the economic valuation of the ecosystem services provided by beaches offers useful information for policymakers, that can contribute to the design of more efficient tourism strategies in those destinations that attract many tourists.

III. Coral reefs

Coral reefs are one of the most valued ecosystems because of the variety of goods and services they provide to humans. In particular, recreational services such as diving, snorkelling and viewing are the most valued according to different studies (Chen et al., 2013; Gill et al., 2015; Van der Ploeg et al., 2010). Recreational activities related to coral reefs are non-consumptive direct use-values so the most common methodology to estimate their value is the stated preferences (Gill et al., 2015; Wielgus et al., 2003). Other studies combine a stated preference method with travel cost method for estimating the recreational value and services like tourism, recreational boating and scuba diving (Ahmed et al., 2007; Chen et al., 2013).

A meta-analysis of 52 studies conducted by Brander et al. (2007) found that the average recreational value of coral reefs can reach US$3,726/ha/year. The economic valuation of the services provided by coral reefs can be used to show the importance of sustaining and appreciating these ecosystems. While most studies focus on tourism and recreation and estimate direct use-values, there are some studies that highlight the importance of non-use values, showing that coral reef conservation benefits are also significant to individuals. These results can be useful not only from an ecosystem conservation perspective but also for implementing strategies to manage recreational access. Environmental authorities could use the results of assessments such as these to, for example,

impose charges for damage to coral reefs. All in all, these results can serve as a tool to justify investing in conservation activities.

Table 3: Economic valuation of tourism-related ecosystem services provided by wetlands, beaches and coral reefs. Values for wetlands have been standardised to USD/ha/year (2019), unless otherwise specified. For beach-ecosystem services, values are shown in USD/person/year (2019).

Valuation technique	**Value**	**Outcome**	**Country**	**Ref**
I. Wetlands				
Contingent valuation	4.59	Total monetary value for the mangroves of Benut	Malaysia	Bann (1999)
Travel cost	97.14 to 156.27	Average consumer surplus per day of recreational anglers.	Brazil	Shrestha et al. (2002)
	60.35	Total monetary value for the marsh recreation in Muthurajawela Wetland.	Sri Lanka	Emerton et al. (2003)
	17.247,44	Annual value assigned by visitors to the Kuscenneti National Park	Turkey	Gürlük & Rehber (2008)
Discrete Choice Experiments	30 USD/person/year	Active and passive recreation.	France	Westerberg et al. (2010)
Benefit transfer	1.591,20	Total monetary value for wetlands in Shenzhen.	China	Tianhong et al. (2010)
II. Beaches				
Travel Cost	81,035.2 to 117,442.2 USA/ha/year	Gross recreational benefits (total recreational loss of the beach area of Zandvoot is closed for a year)	Netherlands	Nunes & van den Bergh (2004)
	5,256 – 19,590.8 5,256 – 38,225.9	The net benefits of a day at the beach in North Caroline for users making day trips, and for users staying overnight at the beach.	North Caroline	Bin et al. (2005)
	36.7 USD/beach trip	The value of a day at the beach.	San Diego	Lew & Larson (2005)
	1,095.7	For British tourists, the weighted average of consumer surplus for enjoying the beach.	Turkey	Blakemore & Williams (2008)
	14,595.4	Beach recreation value	Australia	Rolfe & Gregg (2012)
	489.7	The total annual recreational value of Queensland beaches	Queensland	Windle & Rolfe (2013)
	2,724 - 3,881.4 for residents 4,336.7 – 5,415.5 for visitors	The estimated consumer surplus from a single beach visit trip	Australia	Zhang et al. (2015)
Contingent valuation	857.3	The WTP for beach recreational activities as improved by beach nourishment at all beaches and among all visitor types.	South Florida	Shivlani et al. (2003)

	123.5	The annual mean WTP	Netherlands	Nunes & van den Bergh (2004)
	603.6	The value of enjoying the beach for British tourists	Turkey	Blakemore & Williams (2008)
	2,860.5	Visitors' WTP for additional beach access points and parking	South Carolina	Oh et al. (2008)
	21,630.6 41,258.4	The increased economic value for an increasing beach water clarity; The value of eliminating trash on beaches.	Puerto Rico	Loomis & Santiago (2013)
	23.6 – 29.3	WTP for an annual tax to contribute to preserve beaches from further deterioration.	Greece	Kontogianni et al. (2014)
	14,469 – 1,075,915	The WTP for SAI beaches	San Andres Island (SAI)	Castaño-Isaza et al. (2015)
Discrete choice experiments	15.5	Visitors WTP to acquire one more beach access point.	South Carolina	Oh et al.(2009)
	2.4 3.5	The median WTP is for a Marine Protected Area which allows fishing/fishing is not permitted. The median WTP for an increased chance of contracting ear infection from swimming in polluted water.	Tobago	Hess & Beharry-Borg (2012)
	20,428.9 39,255.6	The increased economic value for an increasing beach water clarity; The value of eliminating trash on beaches.	Puerto Rico	Loomis & Santiago (2013)
III. Coral reefs				
Travel cost	1,020.74 million – 2.3 billion USD/year	The annual recreational benefits of the Great Barrier Reef	Australia	Carr & Mendelsohn (2003)
	274.32 million USD/year	Recreational value of Coral reefs.	Hawaii	Cesar & Beukering (2004)
	297.3 USD/trip 367.5 USD/dive	Boat anglers' recreational benefits/ scuba divers' recreational benefit.	Taiwan	Chen et al. (2013)
Contingent valuation	338.5 USD/person/year 7.13 million USD/year	Consumer surplus, net revenues and individual WTP.	Philippines	Ahmed et al. (2007)
	13.5 USD/ticket	The projected ticket fare for boat fishing and for scuba diving.	Taiwan	Chen et al. (2013)
Discrete Choice Experiment	1.5 USD/dive 1.5 USD/dive	The value of coral and fish diversity	Israel	Wielgus et al. (2003)

		the marginal price of water visibility		
	80.28 USD/2-tank dive	Divers WTP. Strong aversions to fishing activity/gear encounters and divers with a low number of large fish, with WTP values over to avoid such trips.	Caribe	Gill et al. (2015)

5. Conclusions

This chapter aimed to provide an overview of the value of coastal and marine ecosystem services for recreational and tourism opportunities, considering that economic valuation can play a key role in the better management of these resources. It is important to properly value and incorporate the ecosystem services into nature-based tourism development planning in order to promote lower impact activities.

The volume of tourism and coastal recreation has increased considerably worldwide in recent decades. Coastal tourism has become a significant contributor to many countries' GDP and the well-being of large coastal populations. When assessing the impact of coastal tourism and recreation, it is essential to consider that a substantial component of the well-being generated by many recreational activities is not reflected in market transactions and, therefore, is outside the scope of market-based analyses. Such activities include consumptive uses such as fishing and shellfishing, as well as non-consumptive services such as swimming, sunbathing, sailing, windsurfing, bird-watching or diving. The aggregation of these non-commercial values and their extension to administrative levels can lead to significant improvements in environmental conservation management.

An economic valuation can be an essential tool for valuing the services that coastal and marine ecosystems provide to society. The TEV framework makes a clear distinction between use and non-use values, that may help to determine the valuation methods needed in each case. For certain ecosystem services, only some valuation methods may be suitable. Also, not all methods capture all elements of TEV. For instance, market prices are often used to value provisioning services; instead, stated preferences methods are more suitable for capturing non-use values. In many valuation contexts, such as cultural services, more than one technique can be used. Whereas stated preference methods may capture revealed preference methods such as travel cost capture the direct use values, non-use values associated with cultural services.

As there is no direct market to observe individuals' preferences, non-market valuation methods need to be applied to value cultural services directly related to recreation and tourism. These studies consistently find that people are willing to pay to protect coastal and marine ecosystems. Recreational activities and tourism in the coastal ecosystem are estimated at around 7,000$/ha/year. Coral reefs, on the other hand, have been estimated at 3.726$/ha/year. Finally, the services provided by beaches and wetlands are estimated between 5 to 1,075,914.77 USD/person/year and 684 $/ha/year respectively. As mentioned before, these results show that ecosystem services have a noticeable benefit to society, as reflected in the vast literature on valuation studies. Including this information into the decision-making process may help in designing sustainable and efficient management policies.

As for future directions, it is vital to bear in mind that economic valuation is a methodology that still needs to be refined. Uncertainty is the main problem when assessing environmental valuation studies. This should be taken into account when establishing the scope of the results obtained. Furthermore, the environmental, economic value obtained from using the methodologies depends on people's preferences and perceptions. This can vary between individuals, societies and over time.

All in all, the maintenance of biodiversity and ecosystems directly benefits people by contributing to economic prosperity, well-being and quality of life. It is crucial to recognize natural capital as a fundamental financial asset and a source of public benefits. Valuation and an appropriate accounting system can demonstrate that preserving ecosystems and protecting the environment is economically profitable. Moreover, stakeholders should incorporate the valuation of ecosystem services and environmental impacts, including climate change, to better

manage natural resources, contribute to the sustainability of the region's economic growth and move towards a blue economy.

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