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Blue growth and ecosystem services

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ABSTRACT

The recent years have witnessed a rise in interest in the ocean economy. To cover a more sustainable dimension, terms such as 'blue economy' and 'blue growth' have been coined, and are increasingly used in international contexts and academic literature. However, there are no generally accepted definitions of these 'blue' concepts. In particular, it is not clear what connotation of sustainability and what role of natural environment is linked to these terms. The objective of this study is to retrace the meaning of the concepts of blue economy and blue growth and include them in a coherent environmental accounting framework. Starting from the System of Environmental-Economic Accounting of the United Nations, a set of assumptions is proposed to link blue economy/growth and ecosystem services, including the creation of an adjusted measure of value added, while considering the depletion and degradation of the environment and the value of non-market benefits provided by the ecosystem. Finally, an example of this approach in the case of the Mediterranean Sea is presented.

1. Introduction

Recent years have witnessed a rise in interest in the ocean economy, both at the national and international levels [38,39,49]. Moreover, to cover a more sustainable dimension, with a growing awareness of the damage of the ocean ecosystems, terms such as 'blue economy' and 'blue growth' have been coined prior to the 2012 Rio + 20 United Nations Conference on Sustainable Development. These have often been used by different institutions with inconsistent or incompatible meanings, including references to economic growth, food security, livelihood, and ecosystem services. Now, a tinge of 'blue' can be found in several national policies [49], especially in the European Union. However, there are no generally accepted definitions of these 'blue' concepts. In particular, it is not clear what connotation of sustainability is linked to a blue economy and blue growth and what is the role of ecosystems in this growth perspective.

Ecosystems provide a large range of benefits to human well-being. The concept of ecosystem services (ESs) has been increasingly used after the results of the Millenium Ecosystem Assessment [34]. It has several definitions in the literature. In a framework of environmental accounting, Boyd and Banzhaf [4] defined ecosystem services as 'the components of nature, directly enjoyed, consumed, or used to yield human well-being'. Ecosystem services contribute to both market benefits, which are valued in measures of national accounting such as the gross domestic product (GDP), and non-market benefits. There are many studies on the value of marine ecosystem services. De Groot et al. [12] calculate average values of the ecosystem services provided by some coastal and marine biomes (i.e. open oceans, coral reefs, coastal systems, and coastal wetlands) through a review of empirical studies.

The objective of this study is to retrace the meaning of the concepts of *blue economy* and *blue growth* in the international context and attempt to link them coherently with concepts such as *sustainability* and *ecosystem services* in an environmental accounting framework [37].

This paper is structured as follows. Section 2 analyses the traditional scope of ocean economy studies and the emergence of the concepts of blue economy and blue growth. Section 3 considers blue growth in the framework of the European Union, which has applied these terms more frequently in official policy documents. Section 4 reviews the scientific literature concerning these themes; it presents important contributions on the relationship between blue growth, sustainability, and ESs. Section 5 introduces the System of Environmental-Economic Accounting (SEEA) of the United Nations. Section 6 uses this methodological approach to build a coherent framework to define the blue economy and blue growth in the context of sustainability and ESs. Section 7 presents an example of this approach with regard to the Mediterranean Sea and Section 8 concludes the paper.

2. Ocean and blue economy

2.1. Ocean economy

In the 21st century, the main coastal countries have reassessed the value of marine and coastal industries, establishing strategies for development and conservation, and considering the ocean as a source of

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jobs, innovation, and competitive advantage [38,39,49]. Indeed, the world's marine industries create a value added equivalent to 3–4% of the global GDP[1] [39].

Initiatives to measure the contribution of the ocean to the GDP are not new, with the first attempts at the beginning of the seventies in the USA [7]. With time, interest stemmed from academics to governments [30]. In the last 20 years, institutional interest in this exercise, which entails a classification of the activities that are a part of an ocean economy, has been increasing, starting from Canada, the United Kingdom, Australia, France, and New Zealand [30]. Park [39] extends the analysis of an ocean economy to the approaches used in China, Japan, and South Korea. Finally, Surís-Regueiro et al. [48] consider later applications in some EU Member States, including Ireland and Spain.

Works dealing with the ocean economy may find difficulties in collecting data, which leads to a different number (and disaggregation) of maritime activities. However, the accountability methodology is similar for all studies. For theoretical and accounting consistency with standard economic theory, the data should not permit the double counting of economic activity, which implies that all measures can be summed across industries [7]. Thus, the general approach involves assessing the economic activities using standard measures related to production (value added) and employment. Considering the gross value added (GVA) specifically removes the danger of double counting and allows the determination of the share of an ocean economy in the national GDP.

Countries use different terms to indicate the branch of economy related to coasts and oceans. Park [39] stresses that 'ocean' is usually used in Ireland and the USA, while 'marine' is preferred in Australia, Canada, the UK, and France, and 'maritime' is used by the European Union and Norway. Terms such as 'economy' and 'industry' may also be seen as equivalent, but ocean (or maritime) economy is more correct if both private and public sectors (e.g. research, environmental conservation, and defence) are considered. However, when countries focus on the accountability of their ocean economy, they generally exclude non-market benefits (e.g. protection against coastal erosion, waste treatment, and climate regulation) [39]. Moreover, as stressed by Kildow and McIlgorm [30], the sustainability of ocean activities is not measured with this national accounts approach.

The Organisation for Economic Co-operation Development (OECD) considers that any definition of an ocean economy is incomplete unless it encompasses non-market goods and services, which are, in most of the cases, either public goods or commons [38]. In this perspective, the Chinese marine policy explicitly considers sustainability aspects and protection of ecosystems [54]. The Ocean Economy Accounting System of China includes four basic parts and, besides the *principal account* that measures *gross ocean product,* there is a *natural capital account* concerned with the assessment of the non-market values. Market and non-market analyses should be finally combined in the *green ocean account*. However, currently, the natural capital account is still at an early stage of development [54].

2.2. Blue economy

The concepts of 'blue economy' and (less frequently) 'blue growth' slowly emerged and circulated prior to the 2012 Rio + 20 United Nations Conference on Sustainable Development (UNCSD).[2] Throughout UNCSD's formal negotiations and less formal discussions, the blue economy was used by different institutions with different meanings, often in ways which were inconsistent or incompatible [45]. One of the paradigms discussed in the conference was the use of blue economy in association with natural capital and ecosystem services, focusing on the challenge of measuring and accounting the economic value of oceans [45]. Different interpretations focused on other aspects, such as small-scale fisheries or economies of island states. Finally, the concept was not included in the official UNCSD outcome document.

Despite several inconsistencies, discussion on the blue economy has continued with the publication of an informal 'Blue Economy Concept Paper' published on the United Nation's Sustainable Development Knowledge Platform [50] as a support for the Blue Economy Summit held in the United Arab Emirates in January 2014. Here, a blue economy is once again considered as a way to incorporate ocean values and services into economic modelling and decision-making processes.

The Economist Intelligence Unit [49], in a briefing paper prepared for the Economist Events World Ocean Summit 2015, considers a blue economy as synonymous to a sustainable ocean economy, which implies that '*economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy*'. However, it also considers, from a careful reading of national development plans, that blue economy and blue growth concepts seem little more than public policy aspirations, and plans are very similar to conventional ocean economy plans, that is, neither conservation nor sustainability are the primary goals.

Finally, as a continuation of the Rio + 20 debate, the Food and Agriculture Organisation (FAO) uses the term 'blue growth' to support sustainable approaches which reconcile economic growth and food security together with the conservation of aquatic resources and ecosystem services [20].

3. Blue growth from the EU's perspective

In 2006, the European Commission published a Green Paper on the future of the EU maritime policy [8] where ocean economies were considered under the framework of sustainable development, stressing the concept of ecosystem-based management. The Green Paper was followed by the communication on the Integrated Maritime Policy (IMP) with its first goal as the creation of '*optimal conditions for the sustainable use of the oceans and seas, enabling the growth of maritime sectors and coastal regions'* [9]. Here, ecosystem services are mentioned to highlight the importance of the '*recreational, aesthetic and cultural uses we make of the seas'*. Several directives and communications followed the launch of the IMP, particularly the Marine Strategy Framework Directive (MSFD) (European Parliament and Council of the European Union, [18]), the communication on Blue growth [16], and the directive establishing a framework for maritime spatial planning (European Parliament and Council of the European Union, [19]). These three documents are presented in the following sections, highlighting some inconsistencies among them.

3.1. Marine Strategy Framework Directive

The Maritime Strategy Framework Directive (MSFD) is generally considered the environmental pillar of the IMP,[3] representing an ecosystem-based approach towards marine management. It aims to achieve Good Environmental Status (GES) of the EU's marine waters and to protect the resource base upon which marine-related economic and social activities depend.

To achieve GES by 2020, each Member State is required to develop a strategy for its marine waters. Among different tasks for the assessment of the current environmental status of waters, Member States have to carry out '*an economic and social analysis of the use of those waters and of*

[1] Estimates can change considerably depending on the industries (especially related industry having economic link with major marine industries) under consideration [54].

[2] The literature includes other uses of 'blue economy' and 'blue growth', which are not strictly related to ocean economy and policy, but they are beyond the scope of this paper.

[3] However, it should be stated that IMP is under the supervision of the Directorate-General for Maritime Affairs and Fisheries, while MSFD has been developed by the Directorate-General for Environment.