

# Discussing the blue economy: considerations from a public expenditure review on tax exemption and subsidies

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## ABSTRACT

How should one assess whether traditional ocean industries and new ocean emerging activities have the right incentives to engage into a blue sustainable economy path? The case of Brazil's Public Expenditure Review (PER) of tax exemption and subsidies applied to ocean related economic activities from 2011 to 2018 opens the debate. The extra-budgetary PER is applied with the Rio Markers from Organization for Economic Co-operation and Development (OECD), the economic activities listed by the World Bank's Blue Economy, Ocean Decade's results and Sustainable Development Goal 14 targets. The data on tax exemption and subsidies was obtained from official sources, from the Federal Government Budget System maintained by the Ministry of Economy. The screening was carried out for all national level tax relief and subsidies applied during 2011 and 2018. There were 316.4 billion reais (US\$ 80.2 billion) spent by Brazil's Federal government on ocean-related economic activities, either directly or indirectly, through subsidies and tax relief over 2011-2018. The accumulated GDP over that period was equivalent to 45.9 billion reais (US\$ 11.6 billion). The sector that most benefitted is Agriculture (includes fishing), which received around 229.1 billion reais (US\$ 58.0 billion) in incentives during this period. As for the method, it is necessary to develop and establish standardized ocean related markers in the economy and in PER reviews.

**Descriptors:** Public Expenditure Review, Blue Economy, Sustainable Development, Subsidies, Tax Expenditure.

## INTRODUCTION

The blue economy is an unsettled field of knowledge that is being addressed by a growing number of White Papers as well as scientific publications from 2012 onwards. The landmark for this debate took place at the Rio+20 Conference of the United Nations for Sustainable Development, where the concepts of "green growth" and "blue growth" were presented (Pereira, 2020). Over the years the blue economy has proved its importance for the wealth of several

countries, enabling paths for economic growth with-in sustainability.

The boundaries of the concept of "blue economy" have been addressed differently by the stakeholders as shown on the Table 1. In common, all these definitions encompass a strong sustainability view as a pillar for the blue economy concept. The concept may be better understood in two parts. First, it contains a descriptive selection of ocean related economic activities. Second, it contains a prescriptive understanding of strong sustainable development. For that, we use Dasgupta's view for impact equality, meaning that the demand over natural assets cannot exceed its supply, considering the biosphere stock and its regenerative capacity; the stock of ecosystem assets and its regenerative capacity must be the threshold

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**Table 1.** Concepts for Blue Economy.

WWF, Principles for a Sustainable Blue Economy (2019)	"A Marine-based Economy that provides social and economic benefits for current and future generations, by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity, and political stability; restores, protects and maintains the diversity, productivity, resilience, core functions, and intrinsic value of marine ecosystems – the natural capital upon which its prosperity depends, and is based on clean technologies, renewable energy, and circular material flows to secure economic and social stability over time, while keeping within the limits of one planet". (WWF, 2019, page 2)
EU, The 2018 EU Annual Economic Report on EU Blue Economy (2018)	The concept of the blue economy emphasizes conservation and sustainable management based on the idea that healthy ocean ecosystems are more productive and are fundamental to sustainable, ocean-based economies. It embraces the same desired outcomes inherent in the concept of the 'green economy' (EU, 2018, page 12)
OECD, The Ocean Economy in 2030 (2016)	The present report, however, considers that any definition of the ocean economy is incomplete unless it also encompasses non-quantifiable natural stocks and non-market goods and services. In other words, the ocean economy can be defined as the sum of the economic activities of ocean-based industries, and the assets, goods and services of marine ecosystems. (OECD, 2016, page 22)
UNEP FI, The rising tide (2021)	"provides social and economic benefits for current and future generations; restores, protects and maintains diverse, productive and resilient ecosystems; and is based on clean technologies, renewable energy and circular material flows". It is an economy based on circularity, collaboration, resilience, opportunity and interdependence. Its growth is driven by investments that reduce carbon emissions and pollution, enhance energy efficiency, harness the power of natural capital and the benefits that these ecosystems provide, and halts the loss of biodiversity. By this definition, and for the purposes of this report as well as the guidance to the Principles, the sustainable blue economy excludes non-renewable extractive industries (e.g. offshore oil and gas, and deep-sea mining). (UNEP FI, 2021, page 17)
World Bank, The potential of the Blue Economy (2017)	The "blue economy" concept seeks to promote economic growth, social inclusion, and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of the oceans and coastal areas. (The World Bank, 2017, page 1)
FAO, Blue Growth Initiative (2017)	The concept of Blue Growth is similar in many respects to that of the Blue Economy—a concept that came out of Rio +20—in that both center on the pillars of sustainable development: environmental, economic, and social. FAO uses the term Blue Growth to emphasize the need for growth in many Member States particularly in the fisheries and aquaculture sectors. The goals of the Blue Growth Initiative are to maximize economic and social benefits while minimizing environmental degradation from these sectors. These goals are closely aligned with the 2030 Agenda for Sustainable Development (supported by the Sustainable Development Goals—SDGs). (FAO, 2017, page 2)

Source: authors.

for demand drives on the biosphere (Dasgupta, 2021).

In this context, it is important to distinguish the sustainability factor that is embedded in the blue economy concept, but not necessarily in the ocean-based economy or economy of the sea. Worldwide, the economy of the sea is defined in a variety of ways as shown below (Carvalho, 2018):

- United States of America: Coastal Economy: all economic activities carried out on the

coast. Oceanic Economy: economic activity that comes, in whole or in part, from the seas or the Great Lakes.

- United Kingdom: Activities that involve working in and with the ocean.
- China: Ocean Industries: operate in the production or provision of services for the development, use and / or protection of the ocean. Ocean-related industries: refer to supplier companies and consumers of oceanic industries.

In this study, the blue economy is understood as a selection of ocean-related economic activities that are sustainable towards assets, goods, and services of marine ecosystems, as the OECD (2016) suggests. An assessment was conducted of if and how the economy is being incentivized by public tax expenditure and subsidies to perform at the standards of the blue economy. This assessment was made using the method of Public Expenditure Review (PER) on subsidies and tax exemption applied from 2011 to 2018 in Brazil.

To perform an extra-budgetary PER, we use the Rio Markers from Organization for Economic Co-operation and Development (OECD, 2016). Furthermore, we correlate the marker's sectors with three different frameworks: the economic activities listed by the World Bank's Blue Economy, Ocean Decade's results and Sustainable Development Goal, target 14: Life below Water. The data on tax exemption and subsidies was obtained from official sources, from the Federal Government Budget System maintained by the Ministry of Economy.

From this case, we discuss if Brazil is on the path towards the blue economy, and we highlight the need of an applied PER classification for ocean related activities so that the debate can unfold in a common and comparable manner.

The importance of this research is to shed light on the application of the blue economy concept in a PER assessment. The benefit of this type of assessment is to raise awareness of the tendencies of public expenditure and its probable impacts to improve transparency and accountability for fiscal incentives. It may also influence future budgetary allocation by identifying current financing externalities and gaps. Finally, it may alert public managers regarding blue economy policy priorities. The World Bank (2021) reports that expenditure reviews may offer evidence for policy implementation, impacts and considerations of the role of private and public stakeholders. Also, it is a useful tool to assess the alignment between expenditures with policy goals and the incidence of spending.

Using the opportunity of the ongoing international efforts of Sustainable Development Goals (SDG) and the United Nations Decade of Ocean Science for Sustainable Development, we highlight the need for a concerted effort to recommend parameters that

enable accurate and comparable assessments of the blue economy. After completing this first step, nations will be able to discuss the incentives and tradeoffs that are needed to put the business-as-usual economy on a blue economy path.

## METHODS

### LITERATURE REVIEW

The study of Carvalho (2018) presents a relevant proposal for a concept of marine economy for Brazil, divided into twelve sectors of the economy (sections) with a total of forty activities (classes). It encompasses two hundred and eighty municipalities located in seventeen states and in the three regions - North, Central and South, with the southern coast concentrating the highest indicators of population, Gross Domestic Product (GDP) and employment in marine activities.

The author defines the Brazilian marine economy as the "economic activities that have direct influence of the sea, including economic activities that do not have the sea as raw material, but which are developed in nearness to the sea." (Carvalho, 2018, page 8)

The author also quantifies the Brazilian marine economy for 2015:

- R\$ 1.11 trillion of Gross Domestic Product (GDP), corresponding to 19% of the total GDP.
- employed more than 19 million people, generating almost R\$ 500 billion in wages.
- The final demand of the marine sectors was estimated at R\$ 1.3 trillion.

Carvalho (2018) states that the Brazilian marine economy is dominated by the service sector, with a highlight on tourism. Within the marine's GDP in 2015, sea services (including tourism) have the largest share of 5.4%, followed by manufacturing at 3.4% (industry), defense with 2%, energy with 1.5%, living resources with 0.96% and 0.82% for transport. Other adjacent sea sectors (economic activities that take place in the coastal zone but do not use inputs from the sea) correspond to 86% of the GDP of the sea. In table 2 Carvalho's selection of economic activities are presented according to the National Classification of Economic Activities 2.0.

**Table 2.** Components of the Economy of the Sea: National Classification of Economic Activities 2.0.

<b>Components of the Economy of the Sea: National Classification of Economic Activities 2.0 - Brazil</b>	
<b>Section</b>	<b>Class</b>
Agriculture, Livestock, Forestry Production, Fisheries and Aquaculture	Saltwater fishing
	Saltwater and brackish aquaculture
Extractive Industries	Extraction of oil and natural gas
	Extraction and refining of sea salt and rock salt
	Gem extraction
	Support activities for oil and natural gas extraction
	Support activities for mineral extraction except oil and natural gas
Manufacturing Industries	Preservation of fish and manufacture of fish products
	Manufacture of machinery and equipment for oil prospecting and extraction
	Construction of boats and floating structures
	Construction of boats for sport and leisure
	Manufacture of artifacts for fishing and sport
Construction	Maintenance and repair of boats
	Real estate development
Trade, Repair of Motor Vehicles and Motorcycles	Marine and river port works
	Wholesale of meat, meat and fish products
Transport, Storage and Mail	Retail trade of meat and fish - butchers and fishmongers
	Cable cars and similar tourist trains
	Marine cabotage transport
	Long sea shipping
	Support navigation
	Transport by crossing navigation
	Water transport not otherwise specified
	Management of ports and terminals
Marine agency activities	
Accommodation and Food	Auxiliary activities of water transport not previously specified
	Hotels and similar
	Other types of accommodation not otherwise specified
	Restaurants and other food and beverage service establishments
Real Estate Activities	Food mobile services
	Real estate activities of own property
Administrative Activities and Complementary Services	Intermediation in the purchase, sale and rental of real estate
	Rental of recreational and sports equipment
	Travel agencies
	Tour operators
Public Administration, Defense and Social Security	Reservation services and other tourism services not otherwise specified
	Defense
	Recreation and leisure activities not otherwise specified
	Management of sports facilities
	Social, sports and similar clubs

Source: Carvalho, 2018.

Also, the author indicates that, overall, considering that 19% of the GDP originated from the economy of the sea, Brazil's economy is qualified as largely dependent on the sea in comparison to 2.2% of participation in total GDP in the USA and 0.7% of the GDP in Ireland. Approximately 80% of the GDP originates from the 17 coastal zone states.

In order to understand the national economic performance in terms of international standards of the blue economy, the World Bank categorization is presented as follows:

- a. Harvesting and trade of marine living resources.

- b. Extraction and use of marine nonliving resources (non-renewable).
- c. Use of renewable non-exhaustible natural forces (wind, wave, and tidal energy).
- d. Commerce and trade in and around the oceans.
- e. Indirect contribution to economic activities and environments.

These sectors are presented in detail on the Table 3 (page 13, World Bank, 2017):

The Brazilian economy of the sea as proposed by Carvalho (2018) is compatible with the World Bank blue economy (2017) concept. Table 4 illustrates the

**Table 3.** Blue Economy by the (World Bank, 2021).

Type of Activity	Activity Sub categories	Related Industries/ Sectors
Harvesting and trade of marine Living resources	Seafood harvesting	Fisheries (primary fish production)
		Secondary fisheries and related activities (e.g., processing, net and gear making, ice production and supply, boat construction and maintenance, manufacturing of fish- processing equipment, packaging, marketing and distribution)
		Trade of seafood products
		Trade of non-edible seafood products
Extraction and use of marine non- living resources (non-renewable)	Use of marine living resources for pharmaceutical products and chemical applications	Aquaculture
		Marine biotechnology and bioprospecting
		(Seabed) mining
Use of renewable non-exhaustible natural forces (wind, wave, and tidal energy)	Generation of (off-shore) renewable energy	Oil and gas
		Desalination
		Renewables
Commerce and trade in and around the oceans	Transport and trade	Shipping and shipbuilding
		Maritime transport
		Ports and related services
Indirect contribution to economic activities and environments	Coastal development	National planning ministries and departments, private sector
		Tourism and recreation
		National tourism authorities, private sector, other relevant sectors
Indirect contribution to economic activities and environments	Carbon sequestration	Blue carbon
		Coastal Protection
		Habitat protection, restoration
		Waste Disposal for land-based industry
Existence of biodiversity	Assimilation of nutrients, solid waste	Protection of species, habitats

Source: World Bank, 2017.

**Table 4.** Comparing blue economy and economy of the sea.

<b>Comparison: Carvalho (2018) and the World Bank (2021) classification of the blue economy</b>	
Brazilian Section	World Bank's equivalent Type of Activity
Agriculture, Livestock, Forestry Production, Fisheries and Aquaculture	Harvesting and trade of marine living resources
Extractive Industries	Use of renewable non-exhaustible natural forces (wind, wave, and tidal energy) + Extraction and use of marine non-living resources (non-renewable)
Manufacturing Industries	Use of renewable non-exhaustible natural forces (wind, wave, and tidal energy) + Extraction and use of marine non-living resources (non-renewable)
Construction	Commerce and trade in and around the oceans
Trade, Repair of Motor Vehicles and Motorcycles	Commerce and trade in and around the oceans
Transport, Storage and Mail	Commerce and trade in and around the oceans
Accommodation and Food	Commerce and trade in and around the oceans
Real Estate Activities	Commerce and trade in and around the oceans
Administrative Activities and Complementary Services	Commerce and trade in and around the oceans
Public Administration, Defense and Social Security	Commerce and trade in and around the oceans

*Source: authors.*

equivalence of the Brazilian economic sectors identified by Carvalho against the type of activities categorized by the World Bank.

The Brazilian sectors are more specific and fully encompassed by the World Bank's types of activities. This case gives evidence to the viability of having a common blue economy classification across countries and may endorse the World Bank classification as a good starting point for an international standard. Note that neither definition discriminates what is presumably sustainable, not even in the least aggregate classification levels. This is a relevant gap in the scientific and policy analysis as it hinders the impact assessment of these economic activities in terms of positive or negative sustainability.

Considering that sustainable development is the economic path that secures non-declining utility for future generations (Neumayer, 1999), there are a significant number of ocean-based economic activities that should not be part of the blue economy. The valuation of numerous cases of negative externalities from business-as-usual economic activities that degrade the natural capital and diminish the utility of future generations corroborates the need for a sustainable economy. Pereira (2020) indicates few impacts: loss of fish stock due to plastic in the sea may reach from US\$3,300 to US\$33,000 per ton of plastic; overfishing impact to losses of US\$ 83.3 billion;

invasive species may require additional control costs of €55 million. Nevertheless, these degrading activities still rely on public fiscal incentives across many countries.

The IPCC Special Report on the Ocean and the Cryosphere states that the negative impacts are only increasing, leading to "predominantly negative impacts on food security, water resources, water quality, livelihoods, health and well-being, infrastructure, transportation, tourism and recreation, as well as culture of human societies, particularly for Indigenous peoples (high confidence). Costs and benefits have been unequally distributed across populations and regions." (IPCC, 2019, page 15).

Given that a considerable share of the Brazilian sea economy relies on tourism and that the GDP largely originates in coastal zones, the integrity of natural resources is a fundamental asset. However, Gösling et al. (2018) states that "These resources are increasingly threatened: External and tourism-related pressures on coastal zones include land conversion and industrial developments, water pollution, loss of mangroves, introduction of invasive species, and overuse of resources (e.g., freshwater or marine species used as seafood and souvenirs). Climate change is exacerbating these problems through sea-level rise, changing rainfall patterns, or higher water temperatures linked to coral bleaching and algal blooms,

all of which affect the viability of coastal tourism destinations. In this situation, the management of coastal ecosystems for tourism is paramount. Even though a wide range of management tools are theoretically available, there is evidence that coastal governance is limited and hampered by economic interests and unequal power relations. Considerable political effort will be needed for tourism in coastal zones to become more sustainable and to adapt to ongoing environmental change Gössling et al. (2018).

Over the coming years, significant changes in the natural capital are forecasted, which place the business-as-usual economic activities at high risk of decay. "Over the 21st century, the ocean is projected to transition to unprecedented conditions with increased temperatures (virtually certain), greater upper ocean stratification (very likely), further acidification (virtually certain), oxygen decline (medium confidence), and altered net primary production (low confidence). Marine heatwaves (very high confidence) and extreme El Niño and La Niña events (medium confidence) are projected to become more frequent. The Atlantic Meridional Overturning Circulation (AMOC) is projected to weaken (very likely). The rates and magnitudes of these changes will be smaller under scenarios with low greenhouse gas emissions (very likely)." (IPCC, 2019, page 15)

The problem of business-as-usual economic activities is that, left alone, it produces negative externalities such as evidenced above. Thus, the economy becomes vulnerable to the risks of natural capital shortage and to systemic crises. The transition to a sustainable economy requires behavioral changes from producers and consumers, proper regulation with command-and-control mechanisms and economic incentives. An alternative to better manage the economy was indicated by (Pigou, 1920 apud Kula, 2000), who suggests that the solution to balance out those negative externalities is to use taxes to internalize the costs of externalities. Over the years it has been proved that tax and subsidies are key economic tools to intervene in the economy and turn it away from business-as-usual practices.

Beyond theoretical concepts, international bodies have paved the way to settle on a common policy, goals and targets directly linked to the blue sustainable economy. In this context, the Sustainable Development Goals (SDG) were defined in (United

Nations, 2015) with 17 goals for 2030. Amongst them, the SDG 14: "Life below Water" brings 10 targets to ocean-related economic activities (The Global Goals, 2021). It is important to note that many other SDGs are intrinsically linked to the SDG 14 and are relevant to its accomplishment. However, this research is limited to the analysis of the SDG 14 targets, considered those most ocean related:

- Reduce Marine Pollution (14.1): By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.
- Protect and Restore Ecosystems (14.2): By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.
- Reduce Ocean Acidification (14.3): Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.
- Sustainable fishing (14.4): By 2020, effectively regulate harvesting and end overfishing, illegal, unreported, and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time possible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.
- Conserve Coastal and Marine Areas (14.5): By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.
- End subsidies contributing to overfishing (14.6): By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral

- part of the World Trade Organization fisheries subsidies negotiation.
- Increase the economic benefits from sustainable use of marine resources (14.7): By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture, and tourism.
  - Increase scientific knowledge, research and technology for ocean health (14.A): Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries.
  - Support small scale fisheries (14.B): Provide access for small-scale artisanal fishers to marine resources and markets.
  - Implement and enforce international sea law (14.C): Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of “The future we want”.

In a more recent effort, the United Nations established the Decade of Ocean Science for Sustainable Development from 2021-2030 established results, goals and challenges for a healthier ocean and sustainable development. The 7 results are as follows (Oceandecade.org, 2021):

- a. A clean ocean where sources of pollution are identified and removed.
- b. A healthy and resilient ocean where marine ecosystems are mapped and protected.
- c. A predictable ocean where society has the capacity to understand current and future ocean conditions.

- d. A safe ocean where people are protected from ocean hazards.
- e. A sustainably harvested ocean ensuring the provision of food supply.
- f. A transparent ocean with open access to data, information, and technologies.
- g. An inspiring and engaging ocean where society understands and values the ocean.

The framework proposed by these two endeavors represent a window of opportunity to shed light on the research of public expenditure performance. Even more, they provide a policy framework and direction to assess the subsidies and tax exemption against it. We assume that the SDG’s targets and the Ocean Decade’s results offer proper criteria to monitor and evaluate if the economy is performing to a blue economy standard. Thus, considering the SDG and the Ocean Decade, we may ask, are the fiscal incentives fostering the blue economy?

In order to assess the national extra-budgetary investments (subsidies and tax exemption) we rely on the experiences of budget tagging methodologies. The World Bank (2021) states that there are three steps to proceed with the tagging: definition of the relevant expenditure for the specific topic; definition of appropriate coverage; and estimation of the relevant spending. The selection of the relevant activities and expenditure is done by objective-based definitions, meaning the intended impact of the expenditure. That is used by the OECD with the Rio Markers. Another selection can be made by policy-based definition, limiting the selection of activities to those that are identified in the national policy.

According to the World Bank (2021), the experience of budgetary tagging and PER reviews may contribute to understanding the macro level tendency of expenditure against policy priorities. It may also signal the urgent need for adjustments and alignments in budgets, taxes, and subsidies, according to policy priorities. The challenges for this area of study are to increase budget tagging and reviews at the program level, and increase activities and output indicating positive and harmful practices. The analysis of expenditures should be complemented by considerations of spending efficiency and effectiveness and not only values (the more, the better). The lack of data on tax expenditure in most countries makes this topic rather difficult to assess and compare.

The assessment of fiscal incentives and public and private financial flows for other areas, such as climate change and biodiversity, are far more advanced than for ocean related issues. These areas have benefitted from early coordination amongst countries, international financial institutions and UN bodies to define concepts and criteria to assess the economy.

In this context, we highlighted the experience regarding budgetary markers by the Organization for Economic Cooperation and Development (OECD) with the Rio Marker. The Rio Marker is a methodology for classifying financial transfers for international cooperation by the OECD's Development Assistance Committee (DAC) under the Biodiversity Convention (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC). Currently, the Rio Marker enables the identification and classification of international financial flows related to biodiversity, mitigation and adaptation to climate change and combating desertification, including bilateral transfers of official development assistance and other official flows, except for export credits (OECD, 2018). These markers are also suitable to be applied to fiscal incentives granted through tax expenditures and subsidies. The sectors of the Rio Markers are: Education; Health; Population policies/programs and reproductive health; Water and sanitation; Government and civil society; Other social infrastructure and services; Transport and storage; Communications; Energy generation, distribution and efficiency; Banking and financial services; Business and other services; Agriculture; Forestry; Fishing; Industry; Mineral resources and mining; Construction; Trade; Tourism; General environmental protection; Other multisector; General budget support; Developmental food aid/food security assistance; Debt; Humanitarian aid; Administrative costs; Refugees in donor countries; Unallocated.

In the Brazilian budgetary system, there is no budget tagging. The budgetary expenditure can be traced back to policy goals from the multiyear plan and the annual budgetary bill. However, the extra-budgetary expenditure is not directly associated with policy goals, making it harder to trace. The extra-budgetary expenditure is reported as an annex of the budget and there is no evaluation of its impacts. In the tributary system there is no green tax, despite ongoing attempts of tax reform Projects of Law in the Brazilian Congress.

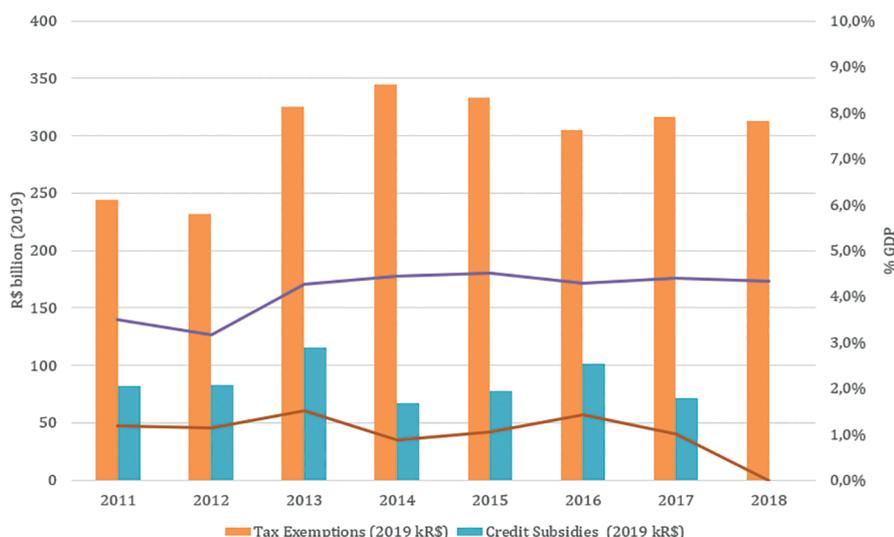
Despite the lack of transparency on extra-budgetary expenditure, it is considered a relevant tool for public incentives that can potentially impact economic growth. In recent years, indirect financing has surpassed the direct investments in many sectors of the Brazilian economy. Between 2011 and 2018, the total amount of government extra-budgetary subsidies reached R\$ 3.0 trillion, of which R\$ 1.4 trillion were tax benefits and R\$ 0.59 trillion were credit subsidies. The evolution of extra-budgetary subsidies, in relation to GDP, showed an increasing trend until 2013 (Figure 1), more than doubling when compared with 2003, and maintained levels above 5.0% of GDP until 2017. In 2018, credit subsidy totals are negative due to the compensation process of the Workers' Assistance Fund (in Portuguese, *Fundo de Amparo ao Trabalho*), although other credit subsidies stayed at similar levels to 2017.

The breakdown by modality shows that, on the revenue side, tax subsidies (benefits) reached 4.5% of GDP in 2015, compared to 2.0% in 2003; and, on the expenditure side, credit subsidies (benefits) increased from 1.0% in 2003 to 1.5% of GDP in 2013.

The importance of acknowledging subsidies and tax expenditures is due not only to its financial magnitude but also because of its governance and management singularities in comparison to direct investments. They must be established by law and may last indefinitely. In fact, in 2020 there were 123 tax expenditure cases at the Federal level, of which 89 are permanent. In contrast, direct investments are defined on a yearly basis during the annual budgetary cycle. Considering governance and management, those fiscal benefits lack transparency, accountability, and monitoring by governmental agencies (Silverwood-Cope; Ling, 2020). Thus, it is possible to affirm that subsidies and tax expenditures cause a lock in effect in the economy and hinder government's flexibility in maneuvering the economy towards innovative and sustainable practices.

## METHODOLOGICAL PROCEDURES

The research consists of an exploratory survey to analyze the tax expenditure and subsidies applied to the blue economy from 2011 to 2018 in Brazil. From the analysis of all registered credit subsidies (extra-budgetary) in the Federal Government's Subsidies Budget and in the Tax Expenses Report, prepared by the Ministry of Economy, we proceed with the



**Figure 1.** Comparison between GDP and credit subsidies and tax exemptions in Brazil, between 2011 and 2018. Source: SECAP, 2019.

classification of each of them and subsequent analysis.

The classification of the financial resources was carried out using the following criteria:

- A. Sustainable Development Goals (SDG), specifically for SDG 14 goals on Life on Water and its goals.
- B. The Blue Economy sectors indicated by the World Bank (2017).
- C. The 7 results of the United Nations Decade of Ocean Science.

The following financial data was collected:

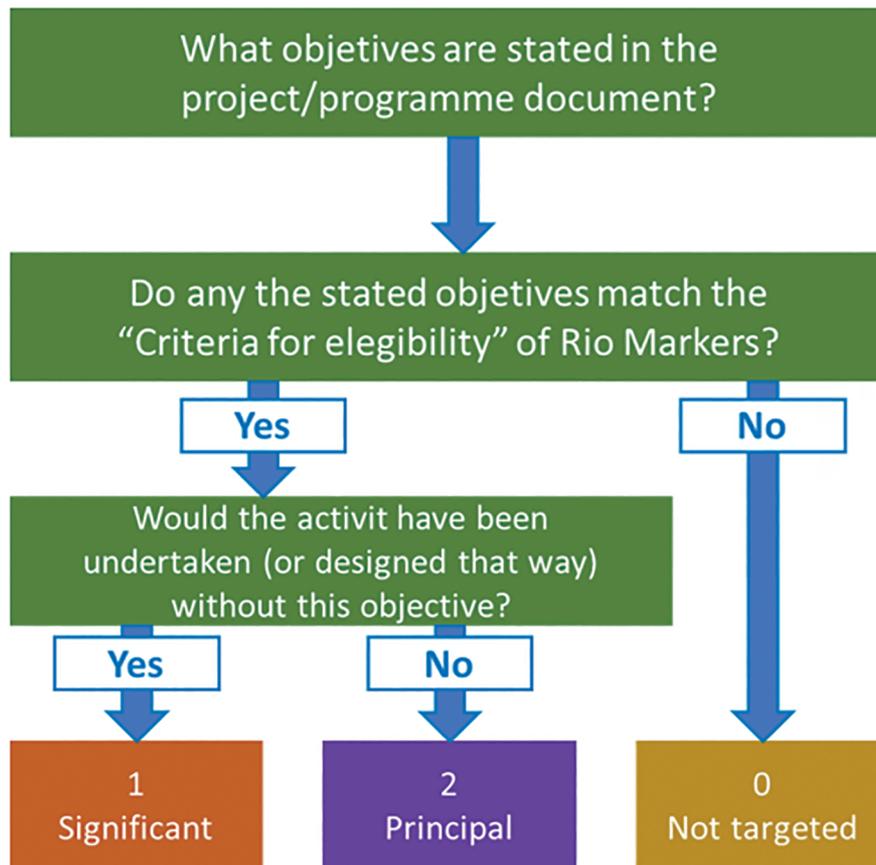
- Credit subsidies, in monetary value: credit benefits or subsidies are expenses resulting from official credit programs, operated through funds or programs, at an interest rate lower than the Federal Government's funding cost (Portaria nº 379 of the Ministry of Finance (MF), of November 13, 2006). The database used for this variable is the 3rd Federal Government Grants Budget (SECAP, 2019).
- Tax expenditures, in monetary value: Tax expenditures are indirect government expenditures made through the tax system, aiming to meet economic and social objectives and constitute an exception to the reference tax system, reducing potential collection

and, consequently, increasing the economic availability of the taxpayer (RFB, 2019). These data come from the Tax Expense Report (in Portuguese, Demonstrativo de Gastos Tributários), issued by the defunct Ministry of Finance (2015, 2016, 2017) and currently by the Ministry of Economy (2018, 2019).

For each case of subsidy or tax expenditures, its founding law was assessed to capture the targeted sector, goal, lifespan, and general conditions.

The application of technical classification followed the taxonomy and the decision tree established in its methodology, namely: "Non-target", "Significant Objective", and "Main Objective" (OECD, 2016), as presented in Figure 2. The classification was carried out through the following procedure:

- i. Mapping and compilation of the normative instruments that establish the instruments of tax benefits and credit subsidies to be analyzed.
- ii. Elaboration of databases comprising the normative instruments and their respective annual monetary values.
- iii. Individual analysis of the identified instruments that establish credit subsidies or tax expenditures and identification of their main objectives.
- iv. Categorization of the instruments that establish credit subsidies or tax expenditures in the Rio Markers Sectors.



**Figure 2.** Decision tree for scoring an activity against a Rio marker Source: OCDE, 2016.

- v. Evaluation of the compatibility of the main objectives of the legal instruments with the criteria A, B or C, mentioned above.
- vi. Classification of instruments by the categories "Non-target", "Significant Objective" and "Main Objective" - with adherence to the observed criteria.

It is noteworthy that the classification used does not allow assessment of the impact of subsidies and / or the efficiency of the policy. The use of the Marker helps to understand the distribution of subsidies in economic sectors and the potential application of these subsidies to combat climate change amongst other benefits mentioned in the literature review.

After classification, descriptive and inferential statistical analysis was applied to evidence the behavior of each variable in isolation and the relationship between them. Then, the analysis of the results is carried

out debating if the extra-budgetary expenditures of Brazil foster a blue economy.

To facilitate the understanding of monetary values by international readers, Table 5 presents the exchange rates between the Brazilian Real and US Dollar for the period under analysis. All monetary values are presented in nominal terms for 2019, adjusted using the Broad National Consumer Price Index (in Portuguese, Índice Nacional de Preços ao Consumidor Amplo - IPCA).

## RESULTS

After analyzing the instruments that establish credit subsidies or tax benefits and identifying their main objectives, credit subsidies and tax benefits were categorized by sectors of the Rio Markers. At this stage, there is still no value judgment as to the compatibility of its objectives with the SDG, Blue Economy and UN Ocean Decade criteria. The result of this procedure is present on Table 6, Table 7, and Table 8.

**Table 5.** US dollar Free Exchange rate (sale), annual average period, R\$/US\$, 2011 to 2020.

Year	R\$/US\$
2011	1.6746
2012	1.955
2013	2.1605
2014	2.3547
2015	3.3387
2016	3.4833
2017	3.1925
2018	3.6558
2019	3.9461
2020	5.1578

In order to conduct an evaluation given the established criteria, the additional methodologically established procedures were carried out.

**Table 6.** Extra-budgetary subsidies (Tax exemptions and Credit subsidies) per Rio Marker Sector, in thousand of Brazilian Reais, 2011, 2012 and 2013.

Rio Marker Sectors	2011	2012	2013
Agriculture	28,351,451	26,796,755	25,800,008
Banking and financial services	36,315,809	43,173,620	66,766,200
Business and other Services	85,949,554	81,547,341	119,950,228
Education	8,272,647	9,010,589	9,744,499
General budget support	314,788	298,650	127,946
Other multisector	4,478,836	3,700,660	8,433,697
Trade	3,621,079	2,153,224	290,646
Transport and storage	6,988,110	1,653,725	11,309,474
Unallocated	36,514,102	36,291,201	59,705,975
Energy generation, distribution and efficiency	551,248	522,988	3,017,544
Health	21,703,685	20,591,048	24,523,186
Other social infrastructure and services	2,870,750	2,723,582	3,941,260
Communications	436,296	413,929	520,586
Construction	858,114	814,123	250,830
Developmental food aid/food security assistance	13,125,638	12,452,753	20,047,873
Government and civil society	24,104,822	22,869,091	26,902,727
Industry	34,189,855	32,437,116	39,578,285
Mineral resources and mining	0	0	82,812
Population policies/programmes and reproductive health	18,067,030	17,140,825	19,368,277
Tourism	0	0	130,450
Water and sanitation	10	9	0
<b>Total</b>	<b>326,713,824</b>	<b>314,591,230</b>	<b>440,492,502</b>

Source: authors.

Between 2011 and 2018, the amounts that have significance to the Ocean Decade agenda vary between R\$ 1.6 billion and R\$ 8.4 billion. These amounts consider credit subsidies made available through regional development constitutional funds and tax exemptions related to scientific research and technology development, both considered as Multisector in Rio Marker Categorization (Figure 3).

The application of markers to identify the relationship with SDG 14 for the same period resulted in significant extra-budgetary values between R\$ 1.5 billion and R\$ 1.9 billion. These are exclusively intended for tax exemptions related to scientific research, which were categorized in Rio Marker Categorization as Multisector and Governmental and Civil Society sectors (Figure 4).

Finally, the extra-budgetary resources that can be considered significant for the Blue Economy have

**Table 7.** Extra-budgetary subsidies (Tax exemptions and Credit subsidies) per Rio Marker Sector, in thousands of Brazilian Reais, 2014, 2015 and 2016.

<b>Rio Marker Sectors</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Agriculture	26,126,091	30,300,518	33,903,252
Banking and financial services	50,706,273	41,747,339	49,637,130
Business and other services	116,410,399	108,297,975	95,505,626
Education	11,815,981	19,500,944	24,090,259
General budget support	127,853	33,953	18,295
Other multisector	-4,248,137	6,388,798	3,133,561
Trade	814,764	735,988	1,128,179
Transport and storage	8,542,942	8,666,883	7,660,068
Unallocated	54,874,926	55,497,848	53,578,205
Energy generation, distribution and efficiency	4,493,947	4,132,781	2,281,506
Health	26,176,215	25,963,816	28,704,771
Other social infrastructure and services	4,019,426	3,715,926	1,822,079
Communications	1,977,228	928,005	1,179,201
Construction	59,202	103,284	161,201
Developmental food aid/food security assistance	20,033,292	20,315,827	17,473,953
Government and civil society	29,144,016	24,659,837	27,723,366
Industry	39,321,587	36,834,435	32,761,079
Mineral resources and mining	85,772	86,825	320,223
Population policies/programmes and reproductive health	20,736,449	22,801,540	23,519,816
Tourism	255,134	290,768	1,371,503
Water and sanitation	2,258	1,138	2,800
<b>Total</b>	<b>411,475,620</b>	<b>411,004,426</b>	<b>405,976,072</b>

Source: authors.

values between R\$ 30.8 billion and R\$ 42.4 billion annually, during the analyzed period. The amounts are mainly composed of funds related to constitutional funds for regional development, assignment of subsidized credit and tax exemptions for its financial operations.

The amounts that have significant adherence to the Blue Economy are analyzed in detail, as they are the resources with the highest volumes. To this end, a relationship is established with the Rio Markers to identify the sectorial application. Graphically, this relationship is demonstrated by Figure 5.

On average, 74.3% of the mapped extra-budgetary resources are related to the Agriculture sector, 14.8% to the Transport and storage sector, 7.2% to Energy generation, distribution, and efficiency, 3.4% to Trade and 0.4 % to Mineral resources and mining.

To relativize the magnitude of these figures, we recall that total accumulated tax and subsidies reached R\$ 3.4 trillion of each only (up to) R\$ 10.3 billion was directed towards SDG goals or Ocean Decade Results, less than 1%.

In another comparison, the total accumulated fiscal incentives for SGD goals and Ocean Decade Results of (up to) R\$ 10.3 billion from 2011-2018 represents approximately 1% of the GDP account of the economy of the sea in the year of 2015 - R\$ 1.1 trillion (Carvalho, 2018). In other words, the fiscal incentives of tax and subsidies is insignificant on a yearly basis of the GDP of the sea.

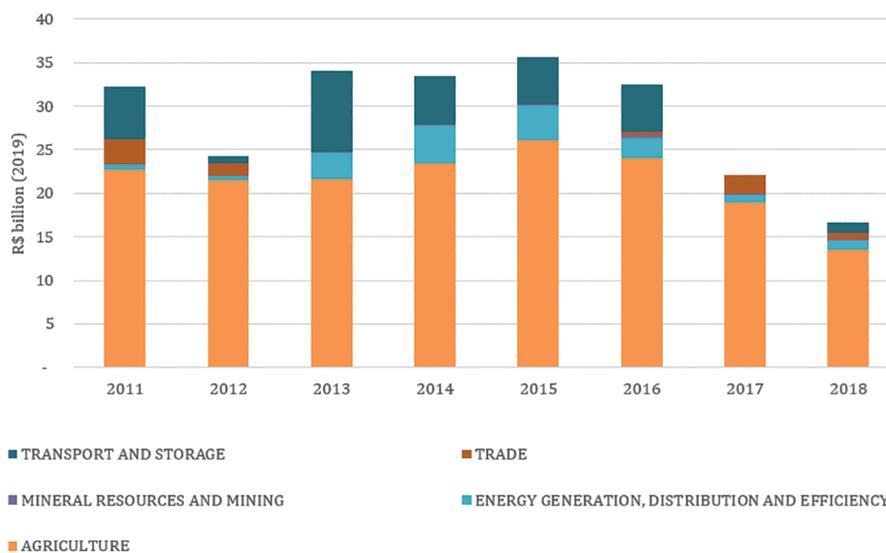
## DISCUSSION

The use of different spending markers for conducting a Public Expedition Review (PER) leads to

**Table 8.** Extra-budgetary subsidies (Tax exemptions and Credit subsidies) per Rio Marker Sector, in thousands of Brazilian Reais, 2017, 2018 and 2011 to 2018.

Rio Marker Sectors	2017	2018	2011 to 2018
Agriculture	30,679,983	27,117,425	229,075,483
Banking and financial services	32,246,147	16,436,024	337,028,543
Business and other services	98,876,059	98,216,982	804,754,164
Education	18,849,150	14,813,071	116,097,140
General budget support	21,450	0	942,934
Other multisector	8,955,683	1,670,090	32,513,187
Trade	2,524,999	1,111,820	12,380,699
Transport and storage	1,525,939	2,960,703	49,307,845
Unallocated	50,931,071	-1,683,553	345,709,775
Energy generation, distribution and efficiency	829,166	1,001,296	16,830,477
Health	35,324,587	33,697,177	216,684,484
Other social infrastructure and services	1,938,789	996,370	22,028,181
Communications	540,351	542,042	6,537,637
Construction	185,516	300,379	2,732,650
Developmental food aid/food security assistance	17,345,334	18,128,880	138,923,551
Government and civil society	30,086,183	29,745,620	215,235,661
Industry	31,596,915	33,117,800	279,837,072
Mineral resources and mining	143,144	146,583	865,359
Population policies/programmes and reproductive health	25,002,467	26,882,043	173,518,447
Tourism	22,036	0	2,069,892
Water and sanitation	6,733	6,757	19,705
Total	387,631,705	305,207,507	3,003,092,886

Source: authors.

**Figure 3.** Blue Economy Significant Objective in Rio Marker sectors Source: OCDE, 2016.

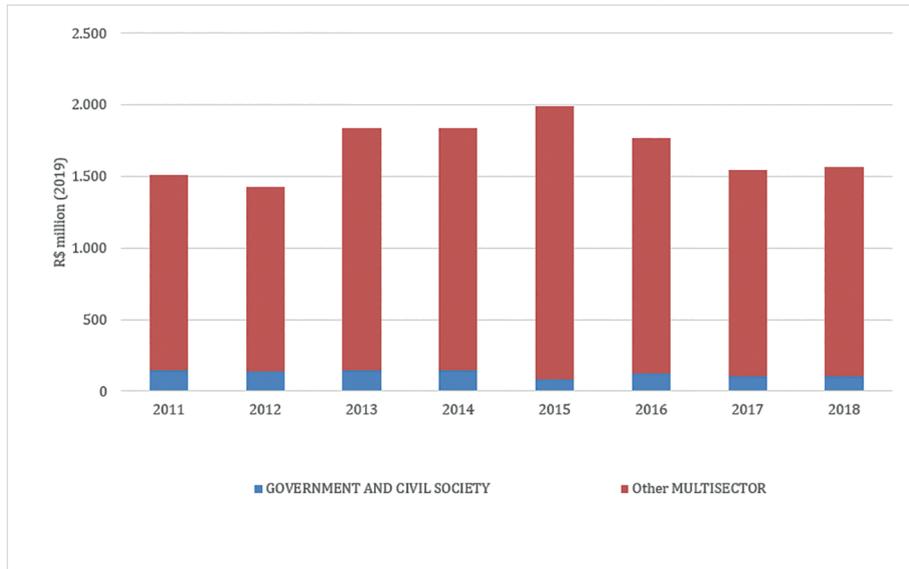


Figure 4. SDG Significant Objective in Rio Marker sectors Source: authors.

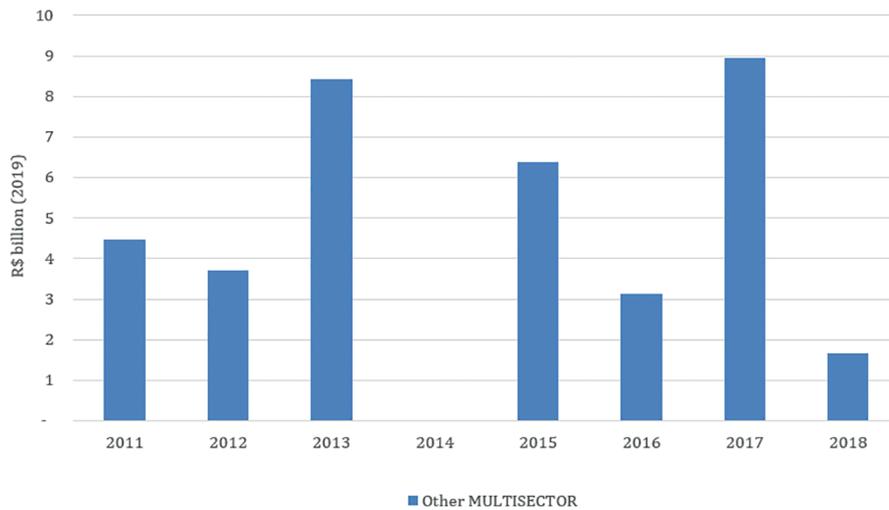
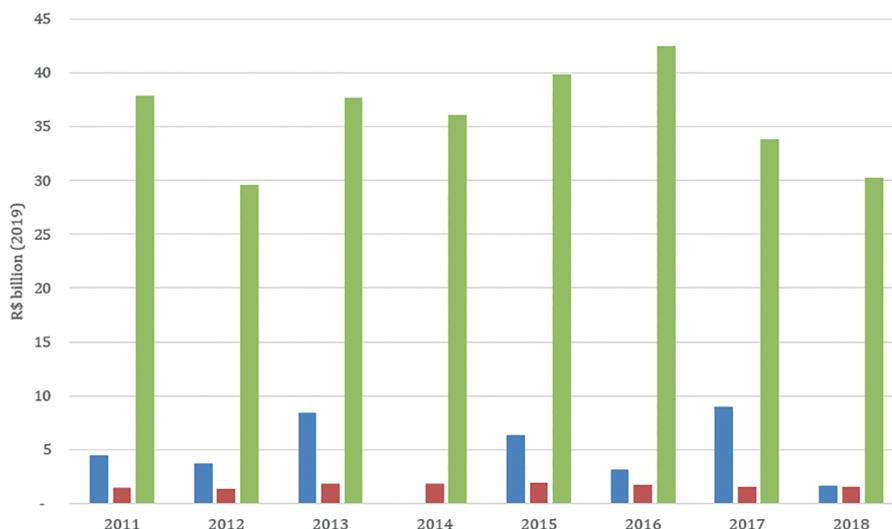


Figure 5. Ocean Decade Significant Objective in Rio Marker sectors Source: authors.

quite different results, even though the markers have the same theme: the sustainable use of the oceans (Figure 6). The application of established procedures results in very different financial volumes for each marker. We found that there are no credit subsidies and tax exemptions established with the main objective adhering to the Ocean Decade, SDG 14 and Blue Economy agendas. As for the significant category, meaning that it is indirectly related, the results obtained are quite different.

In terms of the method, it is not possible to determine the positive or negative impact on sustainability of each ocean-related expenditure due to two factors - the aggregated granularity of the official financial data and the limitation of the classification key. Therefore, the tax and subsidies were screened to assess association with the criteria; however, it is not possible to distinguish a clear picture of where the economy is heading in terms of demanding ocean-related natural assets.



**Figure 6.** Significant Objective per proposed markers Source: authors.

The World Bank categorization of sectors is broad and comprehensive for the realities in Brazilian. However, this classification does not offer information on how to classify if a case is sustainable or not. For this understanding, it was better to apply the SDG goals and the Ocean Decade Results as classification criteria. Therefore, a more detailed classification of the potential impacts of economic activities is needed to advance the debate on what is the blue economy. For instance, on climate change issues, the OECD has developed a classification that enables researchers to categorize case by case in terms of its impact on carbon mitigation or adaptation to climate change.

In conclusion, we did not find evidence that Brazil's inflow of subsidies and tax expenditure from 2011 to 2018 fostered the blue economy to reach sustainable development frameworks from the Ocean Decade or SDGs. In fact, the current fiscal incentives were proposed prior to the SDGs policy agenda. In the matrix of subsidies and tax exemption, there is no fiscal incentive designed with the purpose of sustainability. Thus, it is fair to say, from an aggregated analysis, that Brazil is not offering fiscal incentives to change business as usual practices and is not actively fostering a blue economy.

There are possible sustainable fiscal incentives if we consider indirect benefits, even though they sum less than 1% of the total of subsidies and tax

expenditure granted in the period. Ocean related economic activities were allotted up to R\$ 42.4 billion annually (all sectors of the Blue Economy classification) of indirectly related fiscal incentives. Indirectly, the SDGs and the Ocean Decades Results have accumulated (up to) R\$ 1.9 billion and R\$ 8.4 billion of indirect fiscal incentives, respectively. A precise classification of their impact requires individual assessments of each fiscal incentive.

Comparing sectors, Agriculture represents 74% of the share of accumulated fiscal incentives, followed by the transport and storage sector, 14%, and energy, 7%. A research agenda on the sustainability impact of the fiscal incentives in these sectors would be a step forward in assessing the country's fiscal sustainability performance. It is worth noting that fiscal incentives to fishing are encompassed within the Agriculture sector. It is interesting to note that tourism is a major part of the economy of the sea (Carvalho, 2018), however it has no relevant subsidy, nor tax expenditure relative to other sectors.

Considering the high level of fiscal incentives to Agriculture we may rely on studies that assessed the impact of business-as-usual agriculture on the ocean. The excessive use of fertilizers, pesticides, and chemical correction of soil is directly linked to soil and air pollution, biodiversity loss, pollution of coastal marine waters and watersheds. Also, Campbell et al. (2017, page 6) demonstrate that:

“The agriculture sector directly contributes to ocean acidification because it is a major source of CO<sub>2</sub> emissions. There are also indirect effects, for example through acidification of water catchment areas on arable land, as well as via nutrient input from fertilizers to the seas and oceans. Production of reactive nitrogen for fertilizers for agriculture is one of the hall-marks of the Anthropocene; nitrate inputs to coastal waters stimulate algal growth, which lowers dissolved oxygen levels as it rots.”

A limitation of this public expenditure review at an aggregate level is that we were able to identify tendencies, but unable to assess the precise impact of each fiscal incentive for sustainability. We therefore encourage future research to dig into those fiscal incentives to explain at the project level their positive and negative impact on sustainability.

To enable countries to assess and change their fiscal incentives matrix towards sustainability we argue that it is necessary to have a common framework for expenditure review that is more adapted to tagging purposes than SDG targets and the Ocean Decade results. We believe this is a call for international bodies to develop a common public expenditure review key so that we have a thorough understanding of how public investments are really shaping the economies. The Rio Markers from the OECD are good examples of how to promote useful classification of financial flows to guide experts and managers on the debate of economic changes.

The framework developed by the World Bank (2017) of the blue economy was corroborated by this research as it fits the Brazilian case as proposed by Carvalho (2018). Nevertheless, the World Bank's blue economy is a comprehensive look at the ocean economy with no prescriptive value of selecting sustainable practices. We suggest the development of a more detailed classification with further instructions on how to count it or cut off figures in a PER for the blue economy.

To Brazil, we suggest a tributary reform to create balanced and flexible incentives for the sustainable economy as well as a better alignment between

budgetary spending and sustainable policy priorities. Brazil may benefit from embedding budget tagging across the budget cycle for future and more granular analysis. An outdated tributary system, perverse subsidies and the lack of sustainable oriented expenditure is hindering the chances to accomplish the SDGs, or the Ocean Decade results by 2030.

We believe further research is needed to define the content and scope of the blue economy using a comparable perspective to enable countries to promote a positive selection of sustainable practices and incentives. Still lacking is sufficient knowledge about what would be the best incentives for sustainability, their trade-offs, and successful cases.

## AUTHOR CONTRIBUTIONS

KSC: Conceptualization, Methodology, Validation, Writing - original draft, Writing - review & editing.

ML: Formal analysis, Methodology, Writing - original draft.

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## Erratum

In the Case Report “Discussing the blue economy: considerations from a public expenditure review on tax exemption and subsidies”, with DOI code number: <https://doi.org/10.1590/2675-2824069.21009ksc>, published at Ocean and Coastal Research 2021, v69(suppl):e21025:

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