

Overview of sea conservation policies in Brazil and social and environmental impacts in the context of the COVID-19 pandemic

Visão geral das políticas de conservação do mar no Brasil e impactos socioambientais no contexto da pandemia da COVID-19

Panorama general de las políticas de conservación del mar en Brasil y los impactos sociales y ambientales en el contexto de la pandemia COVID-19

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Abstract

The ocean and its areas of influence are fundamental environments for life on the planet, harbor ample biodiversity and are the basis of support for many vulnerable families and communities, which justifies the implementation and effectiveness of laws and policies for the conservation of marine resources throughout the world. With the pandemic caused by the new coronavirus, many impacts have intensified in these environments, which emphasizes the importance of research that considers these effects and the political scenario in which the pandemic erupted. The objective of this discussion was to evaluate the social and environmental impacts associated with the resources of the sea, verifying the effectiveness of public policies and highlighting the importance of social inclusion, environmental education and shared responsibility. The study area was the Brazilian coast and the research methodology was based on the analysis of secondary data, analysis of official reports and documents, as well as a qualitative bibliographic review of scientific articles, presenting comparisons and interdisciplinary discussions between Brazil and other countries. in order to build a narrative review on the subject, presenting hypotheses for improvements in the post-pandemic scenario. The study reveals that there is a large gap between theory and practice with regard to sea conservation policies, which is enhanced by the political crisis in Brazil and its social, economic and environmental effects, generating impacts and externalities that affect national interests and international. It is concluded that, in the post-pandemic scenario, there will be a great need for joint actions to mitigate the intensified impacts of the pandemic, and it is up to the government to support the most affected and seek to ensure the practical effectiveness of the sea. conservation policies and effective environmental education actions.

Keywords: Sustainability; Environmental education; COVID-19; Environmental impacts.

Resumo

O oceano e suas áreas de influência são ambientes fundamentais para a vida no planeta, abrigam ampla biodiversidade e são a base de apoio para muitas famílias e comunidades vulneráveis, o que justifica a implementação e eficácia de leis e políticas de conservação dos recursos marinhos em todo o mundo. Com a pandemia provocada pelo novo coronavírus, muitos impactos se intensificaram nesses ambientes, o que enfatiza a importância de pesquisas que considerem esses efeitos e o cenário político em que a pandemia eclodiu. O objetivo desta discussão foi avaliar os impactos socioambientais associados aos recursos do mar, verificando a eficácia das políticas públicas e destacando a importância da inclusão social, da educação ambiental e da responsabilidade compartilhada. A área de estudo foi o litoral brasileiro e a metodologia da pesquisa baseou-se na análise de dados secundários, análise de relatórios e documentos oficiais, bem como revisão bibliográfica qualitativa de artigos científicos, apresentando comparações e discussões interdisciplinares entre o Brasil e outros países a fim de construir uma revisão narrativa sobre o assunto, apresentando hipóteses de melhorias no cenário pós-pandemia. O estudo revela que existe um grande fosso entre teoria e prática no que diz respeito às políticas de conservação do mar, que é potencializado pela crise política no Brasil e seus efeitos sociais, econômicos e ambientais, gerando impactos e externalidades que afetam os interesses nacionais e internacionais. Conclui-se que no cenário pós-pandêmico haverá grande necessidade de ações conjuntas

para mitigar os impactos intensificados da pandemia, cabendo ao poder público apoiar os mais afetados e buscar garantir a eficácia prática do mar. políticas de conservação e ações eficazes de educação ambiental.

Palavras-chave: Sustentabilidade; Educação ambiental; COVID-19; Impactos ambientais.

Resumen

La forma y los requisitos para la comercialización de plaguicidas en Brasil, la liberación de nuevos productos y sus efectos adversos sobre la salud y los ecosistemas han sido objeto de discusión por parte de investigadores y también de controversias internacionales sobre la seguridad alimentaria en Brasil. Estas entradas son a menudo persistentes y difíciles de degradar, e incluso pueden generar metabolitos intermedios más tóxicos. En este escenario, este trabajo tuvo como objetivo identificar qué plaguicidas se vendieron más en Brasil en los últimos 10 años, así como plantear aspectos asociados con la biodegradación de estos compuestos y sus efectos en la salud humana y el medio ambiente. Para ello, se utilizaron datos secundarios del Instituto Brasileño de Medio Ambiente y Recursos Renovables (IBAMA), además de una revisión bibliográfica y método cuali-cuantitativo. Los resultados muestran que los agroquímicos que lideraron el ranking de los más comercializados fueron el glifosato; 2,4D y atrazina. Existía un gran vacío en el conocimiento sobre los procesos de biodegradación de estos productos, aunque existen estudios que muestran la relevancia del tema para mitigar impactos en la salud humana y los ecosistemas. La literatura consultada también reveló una amplia gama de efectos adversos sobre la salud humana derivados de la exposición a estos agroquímicos. Finalmente, se consideró urgente cambiar el patrón de consumo de estos principios activos (i.a.) y la búsqueda de alternativas de menor impacto orientadas al desarrollo sostenible.

Palabras clave: Sustentabilidad; Educación ambiental; COVID-19; Impactos ambientales.

1. Introduction

Throughout history, the ocean has been the scene of disputes, clashes and conflicts of interest that in many cases exclude minorities from the decision-making process that end up losing their representativeness and having their needs suppressed by the predominant model of unsustainable capitalism. (Korpinen et al., 2021; Marques, 2020).

Urban expansion processes, linked to the lack of sustainable development and conservationist practices, have been putting increasing pressure on coastal and marine ecosystems, causing several environmental, social and economic losses that affect mainly the most vulnerable communities. (Grip & Blomqvist, 2021; MacNeill & Wozniak, 2018).

These environments are essential for maintaining the life and survival of different social groups. They provide ecosystem services, harbor wide biodiversity, contribute to climate regulation and several other important functions for the Earth's dynamic balance, which emphasizes the relevance of maintaining actions that seek its sustainable use (Di Ciommo, 2007; Marceniuk et al., 2013).

These ecosystems have been suffering several impacts associated with anthropogenic intervention, such as marine pollution, with losses for the polluting agents themselves, also causing negative externalities to sectors, social groups and environments in a geographic location very distant from the main polluting sources (Aslan et al., 2017).

Thus, the role of the State is decisive, since it is it that, with its duty to preserve and protect the environment, must regulate, in a sustainable way, the use of natural resources, integrating and strengthening environmental policies based on the precautionary principle, preventive action polluter-pays, seeking to guarantee constitutional rights for all (Moreira, 2020).

In the context of the pandemic for the new coronavirus, marked by weaknesses in the Brazilian political and economic system, by a democracy that has been heavily attacked, a society in crisis and a vulnerable environment (Ferraz, 2020; Matias et al., 2020), it is urgent to find alternatives, innovation and integration to build a competent and inclusive management system.

To overcome, therefore, the presented obstacles, it is necessary to understand how the legislation of protection and conservation of the sea contributes, in practice, to the sustainability and which are the main impacts of the pandemic on the marine and coastal ecosystems, besides identifying how the traditional communities and other vulnerable minorities.

Therefore, the objective of this research is to assess the socio-environmental impacts on the sea, on communities dependent on this natural system and on its ecosystem services, considering the context of worsening social, environmental and

economic damage caused by the COVID-19 pandemic and the political situation Brazilian before other nations. The objective of this work is also to carry out an assessment of the post-pandemic scenario, as well as to carry out proposals, management and environmental education measures to solve the real and potential impacts raised in this research.

2. Methodology

This research analyzes the relevant legislation, official documents and also results from the qualitative bibliographic review, dialectical and functional (Pereira et al., 2018) of scientific articles published in Brazil and in other countries, with relevance for the treatment of the aspects addressed throughout the text. It is a bibliographical review to support the hypotheses raised throughout the text and emphasized in the last chapter.

In Brazil, the documents studied were: the National Environmental Policy (Brazil, 1981), the National Coastal Management Plan (1988), the National Policy for Sea Resources (Brazil, 2005) and the National Solid Waste Policy (Brasil, 2010) due to their relevance for the discussion and for presenting important interdisciplinary aspects.

The main databases used in this research were Scopus, Web of Science and SciELO, using descriptors such as "marine policies", "marine policies and environmental education". Articles that addressed the relationship between sea conservation policies, society and sustainable development in a multidisciplinary way were used. While, very specific articles with little interdisciplinary approach were discarded. Some works considered relevant cited by the articles used in the research were also evaluated.

The research focus surrounds theoretical variants between legal purposes and their practical results, with an emphasis on the approach to ecosystem services that are fundamental to life and most significant for the communities that directly depend on them. For this process, the systemic socio-environmental study, with its national and international economic influences, is considered, looking for multidisciplinary elements to solve complex problems associated or intensified by the COVID-19 pandemic.

This research does not consist in the evaluation of the positive effects of the pandemic on the environment, considering the change in habits such as isolation, vacations of natural areas, noise reduction, air pollution and among others (Zambrano-Monserrate et al., 2020). The research focuses on the search for interdisciplinary solutions to combat the harmful effects of the pandemic and its implications for the current Brazilian political scenario, which remains a constant challenge for the scientific community.

3. Results and Discussion

3.1 Marine and coastal ecosystems: a shared responsibility

Investigations on the role of the State, the effectiveness of proposed measures and the actions that are implemented, within the scope of environmental sciences, must be studied, evaluated and supervised by academia, civil society and all who coexist with the impacts of human actions (Brasil, 1988). These impacts vary according to the undertakings, services and human actions in the environment. In the ocean, there is a wide range of effects caused by industrial, agricultural, commercial and residential activities that damage biota, affect the dynamic balance of marine ecosystems and cause national and international political tensions between different stakeholders in these natural resources (Matias et al., 2018).

With the increase in the use of disposables due to the growth of the delivery system for ready-to-eat foods during the pandemic of the new coronavirus and hygiene measures (Kahlert & Bening, 2020), the risks to marine and coastal ecosystems are heightened, and impacts of this process are already being perceived, such as the increase in plastic and hospital supplies in the ocean and in the organism of marine fauna species (Silva, Prata, Walker, Campos, et al., 2020; Silva, Prata, Walker, Duarte, et al., 2020). This problem, associated with poor management and public planning, incorporating pre-existing serious

issues such as inadequate disposal and the lack of solid waste treatment in several countries, shows the alarming situation that these ecosystems face and those that depend on them, directly or indirectly. (Baia et al., 2020; Franceschi et al., 2017).

In addition, the neoconservative negationist intensified in Brazil and in some other countries in 2019 and 2020, and even propagated by managers and public servants, bring setbacks whose impacts can be very serious on the environment, in addition to being unfavorable to the practices of education environmental that value social awareness before the worrying scenarios of conservation units, areas of permanent preservation and all the environmental, biotic and abiotic complexity in which human beings are inserted as protagonists in the generation of environmental impacts (Azevedo & Lima, 2020; Guenther, 2020).

With an emphasis on marine environments, it is necessary to investigate the historical evolution and effectiveness of conservation and coastal planning policies, seeking studies, experiences and comparing legal aspects between countries that are references in marine management with the situation in countries whose management model is still needs improvement (Vianna et al., 2012).

It is important to note that the verification of the effectiveness of management models and public policies is not a simple process. In addition to the detailed analysis of the specific legislation, it is necessary to seek quantitative and qualitative data and information that provide greater robustness for the assessment, which is not always the case in a transparent and accessible to all. This process also requires interdisciplinary attention on all aspects involved in marine management, considering the political, social and economic divergences between the countries and regions that surround a defined object of study.

In Brazil, integrating the National Policy for the Resources of the Sea - PNRM and National Environment Policy - PNM (Brasil, 1981), the National Coastal Management Plan - PNGC is fundamental to raise the quality of life of the population and protect their natural, historical, ethnic and cultural heritage (Brasil, 1988). This instrument makes clear the role of sectoral and local bodies of the National Environment System (SISNAMA), as well as universities and other cultural, scientific and technological institutions in forwarding data to the subsystem, relating to natural, historical, ethnic and cultural heritage, the quality of the environment and environmental impact studies of the coastal zone.

The update of the National Policy for the Resources of the Sea (decree nº 5.377 of February 23, 2005), carried out in 2005, was another important milestone in the search for improvements in marine management, which aims at the effective use, exploration and use of marine resources, in line with national interests, in a rational and sustainable manner aiming at the country's socioeconomic development, generating employment and income and contributing to social inclusion (Brasil, 2005).

However, would legislation alone be sufficient to protect vulnerable ecosystems and populations? In a country full of unconstitutional acts by the executive branch (Calil, 2021; Piaia & Alves, 2020), the answer is clear, which emphasizes the urgency of social and institutional mobilization in the search for the guarantee of constitutional rights, such as health, environment and work, which are directly and indirectly interconnected in the great terrestrial biome.

Abroad, the International Maritime Organization (IMO) and the United Nations Convention on Law at Sea, in addition to other Conventions and international agreements aimed at environmental conservation and sustainable development, were and are important for the improvement of global marine management and meeting of promising paths to be followed.

However, in 2021 Brazil faces serious health, economic, human rights and natural systems problems. The neglect of environmental issues, such as loss of biodiversity and pollution, highlights the urgency of sustainability and the guarantee of fundamental rights to life, as a healthy biosphere for the present and for future generations, which not only promotes the propagation of life, but also the quality and well-being of the way of life among the species that coexist on the planet and that also has this ecological and moral right.

Therefore, the role of science is of great relevance for facing emerging problems, combating fake news (Viscardi, 2020), promotion of environmental education, and influence in the search for sustainable planning in the post-pandemic context, looking for interdisciplinary solutions in the short, medium and long term, contemplating local, regional and global scales, unifying forces between different institutions so that sustainability goes from utopia to reality (Matias et al., 2020).

Thus, the moment is one of effort to guarantee rights and the fulfillment of collective duties by all. For this, it is important that society, as well as public and private authorities, recognize itself as an integral and fundamental part of the environment and become aware of the importance of shared responsibility in facing the socio-environmental problems aggravated by the coronavirus pandemic.

3.2 The Brazilian coast and the impacts of national unsustainability

Brazilian environmental legislation, its respective policies and instruments aimed at the preservation, conservation, monitoring and proper management of natural resources and defense of national interests, represent important legacies towards sustainability (Brasil, 1981). However, in reality, outside of the legal attributes, many challenges still remain and express concerns that have not yet been controlled with the creation of laws alone. (Acacio & Passos, 2020).

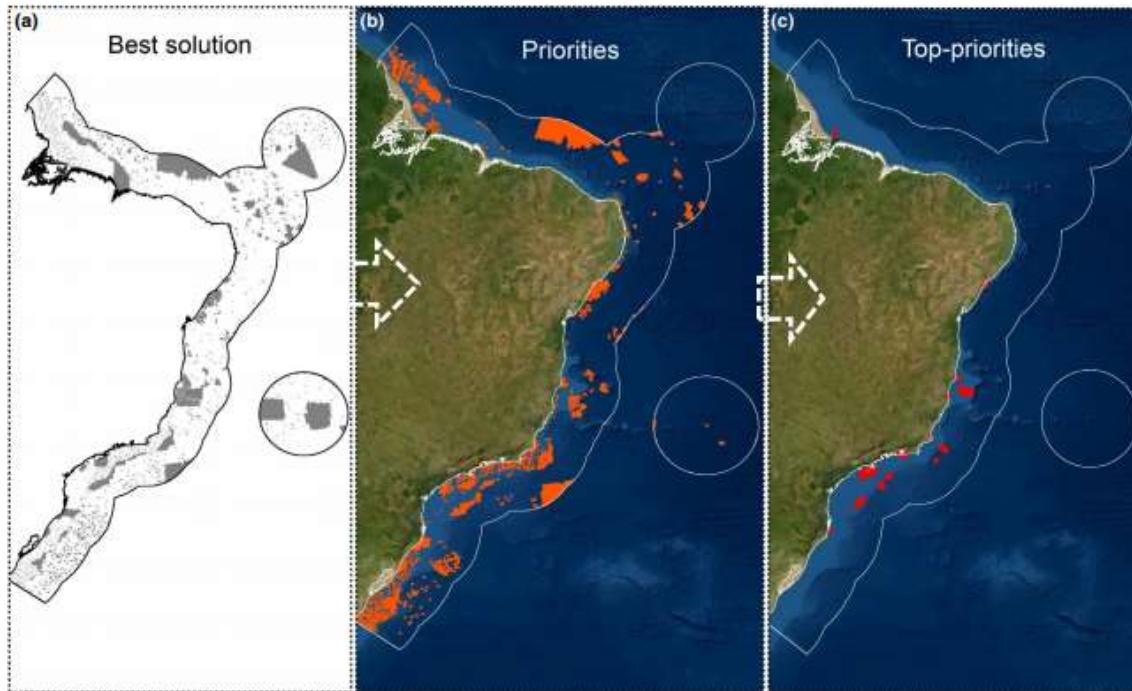
Considering the dynamics of solid waste propagation to the sea, there is a need for consonance between the National Solid Waste Policy (PNRS), which brings together the set of principles, objectives, instruments, guidelines, goals and actions adopted by the federal government, in isolation or in cooperation with states, the Federal District, municipalities or individuals, with a view to integrated management and the environmentally sound management of solid waste (Brasil, 2010) and other coastal management policies.

Although it is estimated that 80% of the waste at sea originates on the continent, along 8500 km of coastline, of the 274 Brazilian coastal cities, only 153 (55.8%) prepared the Municipal Plan for Integrated Solid Waste Management by 2017, while in relation to selective collection, only 61 (22.3%) municipalities declared to have these services. In these conditions, Brazil contributes up to 190 tons of the total volume of waste at sea (Brasil, 2019).

In 2018, among the materials found on the Brazilian coast, the most abundant items were: bottle caps and caps in general; bottles; food packaging; plastic bags; cigarettes, filters or butts; derivatives of ropes and cables; ropes and cables (less than 1 meter); flexible rods; unidentified fragments; sponges, foams, satin vinyl foams - EVAs; Styrofoam cups and packaging; buoys and pieces of Styrofoam. These residues are a serious threat to marine fauna and pose problems for navigation, tourism and fishing and bathing activities.(Brasil, 2019).

A recent study by Magris et al. (2021) in Brazil revealed priority areas for marine conservation (Figure 1). The authors reveal that industrial fishing, climate change and terrestrial activities, linked to the production of waste, were the greatest threats to biodiversity, and stress the importance of a comprehensive ecological approach when identifying strategic conservation priorities.

Figure 1. Identification of priority areas for conservation. (a) information on irreplaceable values and cumulative impact scores (gray colored planning units). In (b), the planning units colored in orange represent the priorities. In (c), the planning units in red represent the main priorities.



Source: Magris et al. (2021).

Data also show that, in 2018, 79 million tons of solid urban waste were generated in Brazil, of which only 92% was collected. Of what was collected, landfills received around 59.5%, leaving 40.5% of waste that was disposed of in inappropriate places by 3001 municipalities (ABRELPE, 2019).

Also, according to the Brazilian Association of Public Cleaning and Special Waste Companies (ABRELPE) (2019), the consumption and generation of waste per capita of the population has been increasing. In 2020, with the pandemic caused by COVID-19 this consumption increased even more, in even more serious circumstances, because in addition to the country's health crisis, the increase in consumption and generation of waste is associated with the incorrect disposal of these materials impacting laws and bringing more serious environmental risks (ABRELPE, 2021).

Another information worth mentioning for this discussion is that 26.6% of the Brazilian population lives in areas close to the coast, which is equivalent to about 50.7 million people, which justifies the organization of socioeconomic information in these regions, and evaluation environmental impacts on marine and coastal ecosystems (CNT, 2021).

The ecosystem resources and services provided by marine ecosystems, mangroves, restingas, and other environments suffer from impacts resulting from the lack of human sustainability, resulting in losses for society itself, especially the most vulnerable (Angelelli & Saffache, 2013).

Seagrass grasslands and submerged aquatic vegetation (VAS) are among the most threatened ecosystems on the planet. In Brazil, unsustainable exploitation and occupation of the coastal zone during the last 100 years has led to the rapid degradation and loss of many of the marine and coastal benthic habitats, which highlights the country's critical situation in these areas (Copertino et al., 2016).

Thus, considering the situation of solid waste generated in Brazil and its impacts on the marine environment, also in view of the worsening of this case resulting from the pandemic, it is urgent to build multidisciplinary plans and projects with

scientific dissemination and the use of environmental education practices to reduce impacts in the future and promote sustainable development.

3.3 Conjecture and political influence on marine resources

At the international level, the concept of marine security encompasses a matrix of relationships with other concepts, such as maritime energy, blue economy and resilience. The term was the subject of discussion in the North Atlantic Treaty Organization (NATO) and of divergent political interests and ideologies, which demands a great diplomatic framework on the conservation of sea resources in international relations (Bueger, 2015). Most nations in the world have adopted conservation goals including the protection of at least 10% of their coastal and marine areas by 2020. However, reconciling biodiversity conservation goals with socioeconomic demands remains a challenge for the implementation of conservation policies (Vilar et al., 2020).

Marine plastic pollution is an example of a global challenge, since these wastes affect biodiversity, compromise tourist and economic activities and can also harm vulnerable populations (Prata et al., 2020). Public policy instruments such as payment for ecosystem services are alternatives that attract entrepreneurs and can contribute to reducing environmental impacts and improving quality of life (Mäntymaa et al., 2019).

The effects of neoliberalism, the lack of investment and the effectiveness of legal structures in guaranteeing human rights around the world, as well as the neglect of the situation of fishing and traditional communities, has been a problem that needs attention. This situation should not be restricted to legislation only, it is necessary to be effective in promoting human dignity and international cooperation (Song, 2015).

With the entry into force of the United Nations Convention on the Law of the Sea, concluded in Montego Bay, Jamaica, on December 10, 1982, by Decree No. 1,530, of June 22, 1995, Brazil adheres to a series of terms and articles aimed at cooperation on all matters relating to the law of the sea and awareness of the historic significance of the Convention as an important contribution to the maintenance of peace, justice and progress for all the peoples of the world (Brasil, 1995).

The general considerations of the Convention are in line with the National Environment Policy (Brasil, 1981) emphasize the importance of ecosystem services provided by marine ecosystems and the participation of different stakeholders in these services, which emphasizes the relevance of systemic assessment of environmental impacts in these environments.

Although social participation is of paramount importance in matters related to marine and coastal management, the law No. 7,661, of May 16, 1988, which institutes the National Coastal Management Plan and provides other measures, does not mention, at any time, in isolation, the socio-environmental participation of vulnerable communities.

The same can be said for Decree No. 5,377 of February 23, 2005, which approves the National Policy for the Resources of the Sea (PNRM). Nothing is said or indicated about traditional and vulnerable communities that depend on the resources of the sea, which can be understood as:

...todos os recursos vivos e não-vivos existentes nas águas sobrejacentes ao leito do mar, no leito do mar e seu subsolo, bem como nas áreas costeiras adjacentes, cujo aproveitamento sustentável é relevante sob os pontos de vista econômico, social e ecológico (Brasil, 2005).

Decree No. 1,265, of October 11, 1994, which approves the National Maritime Policy (PMN) also does not bring this approach in an effective way, although it brings significant contributions to marine conservation and incentives for research in these environments.

As with the other decrees already mentioned, PMN faces difficulties in practical implementation, since the lack of resources has proved to be a contemporary obstacle to compliance with environmental laws. (Koeller, 2020).

Investment in science and technology in Brazil has been reduced since 2013. In 2013, R\$ 15.401 billion were allocated, while in 2019 the settled values did not exceed R\$ 6.721 billion, which shows a reduction of 56.36%. The National Council for Scientific and Technological Development (CNPq) is one of the agencies that suffered the most dismantling in six years, from 2013 to 2019, there was a 52.39% reduction in the budget (Macário & Reis, 2020).

The aforementioned context shows a practical impossibility to comply with the legislation due to the lack of resources. Furthermore, the appearance of the pandemic in a country whose president and his followers who promote denialism, neoliberal reason and still show contempt for vulnerable communities, science and all those who question government decisions, does not favor a promising scenario in any way. for the preservation of natural resources and sustainable development (Caponi, 2020).

3.4 What is expected of the future?

Encouraging the protection of forests and sustainable management of river basins (Bremer et al., 2021), as well as the development of circular economy (Awasthi et al., 2019), urban, economic planning, seafront reconstruction (Chen, 2020), transdisciplinary practices of environmental education and the strengthening of ecological policies (Meek & Lloro-Bidart, 2017) are urgent alternatives to be adopted to promote sustainable development.

In different regions around the Earth, the participation of indigenous communities in the decisions of public authorities and also of other traditional communities signals a promising path to be followed by the rest of the world for the adoption of conservationist, participatory and inclusive measures (Welch & Coimbra Jr., 2019).

The fight against dictator, centralizing and denialist powers must also be done by everyone who is affected by measures coming from these governments, especially in the context of the COVID-19 pandemic (Morel, 2021). The control of militarization, the valorization of science, the dissemination of knowledge in a safe and accessible way, reforms in public policies, inspection and respect for human rights will also be fundamental ways in improving the near future (Acacio & Passos, 2020).

Although they face difficulties due to the lack of resources and public support, actions such as those carried out by Fundação Projeto Tamar, which fight for the preservation and conservation of environmental reserves in coastal and marine environments (Brasil, 2021), must be strengthened, as are other institutions and civil society groups.

In addition, legal support (Galdamez Zelada, 2020) and the development of active methodologies and environmental education linked to an ecopolitical thinking aimed at the formation of a citizen consciousness (Layrargues, 2020), focusing on the problem of the ocean and its socioeconomic implications, as well as integrated environmental management measures (Layrargues, 2020), must be on the rise to mitigate the economic, social and environmental impacts of the pandemic.

It is also expected that there will be greater effectiveness in the application of laws and respect for the constitution. Although Brazil faces an unstable political context that threatens the economy, health and the environment (Lima et al., 2020), it is up to the people, civil society and institutions to defend by guaranteeing fundamental rights and fulfilling elementary duties for the recovery of the nation in the post-pandemic scenario.

Taking into account that the political performance of young people contributes to the constitution of critical and participative subjects in the process of social transformation, with the exercise of citizenship, commitment to the collective (I. R. Silva et al., 2018) the participation of youth in synergy with science and leadership of the State will be fundamental.

A state that is out of alignment with science means that the population does not respect security measures and socio-environmental balance (Duarte & César, 2020). The negationism associated with the climate and spread on Twitter is a factor

that threatens marine ecosystems (Andrade et al., 2020) and it must be worked through environmental education practices and alignment between State and universities, aiming to combat misinformation, denial and skepticism (Abellán López, 2021).

In this way, it is expected to find results that support new decisions and serve as an auxiliary instrument in the decision-making process by public managers and also paths to be followed by educators and scientists in contributing to a better, more just and coherent society in the future, noting that the need for change, the construction of knowledge and participatory actions must begin in the present, with historical facts and phenomena as lessons to be overcome and learned.

4. Conclusions

It appears that interests in ecosystem services provided by the ocean generate global interest and diplomatic negotiation is necessary to conserve natural resources and resolve conflicts of interest around the world. International measures, such as Conventions, Forums and other types of events, have had an impact on Brazilian decisions, bringing contributions to the country's legal and political scenario.

With the conclusion of this research, it is verified that there are still many challenges to be overcome for the effectiveness of marine conservation policies in Brazil, that the role of the State is fundamental and that the omission of actions on the part of it can potentiate the social and environmental impacts, especially for the most vulnerable communities.

With the pandemic caused by the new coronavirus, on the management of an authoritarian far-right government, Brazil faces severe impacts on health, environment, economy and society, which invariably has repercussions on damage to marine ecosystems and coastal environments, such as the increase of solid waste at sea due to the pandemic, linked to the lack of effective solid waste management.

Considering the distance between theory and practice observed in compliance with legislation, it appears that, against the grain of sustainability, human actions have repercussions on environmental damage that, in many cases, return to the agents themselves, in addition to causing externalities of global impact, as the increase in ocean pollution.

In the post-pandemic context, it is expected that learning from the mistakes of the present will not be repeated, that there will be collective engagement and participation in decision-making, including fishermen, traditional communities and vulnerable and marginalized groups in society, that the valorization of the resources of the State and the conservation of ecosystems are highlighted by the State, that environmental education projects are strengthened by public policies, with investment and incentives in teaching, research and technology for sustainable development.

It also emphasizes the importance of multi and interdisciplinarity for the sustainable planning of the future, which will have the consequences of a neglected present by the Brazilian State and the results of a worn out and abandoned people by the government itself. This scenario shows the importance of the performance of teaching and research institutions in Brazil and the world, for the promotion of scientific dissemination.

Finally, we suggest that researches identifying the transforming potential of social values, such as environmental education, be carried out within the scope of marine sciences, seeking interdisciplinary solutions for anthropogenic impacts on the sea and protection of ecosystem services. In addition, we also highlight the importance of studies and research to assess environmental and socio-environmental impacts on coastal ecosystems and vulnerable environments such as islands at a local scale, seeking to support public policies for decision-making and conservation of natural environments, seeking to promote development sustainable. Furthermore, we emphasize the importance of scientific communication and dissemination about the results obtained with these surveys, aiming at inclusion and social participation.

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References

- Abellán López, M. Á. (2021). El cambio climático: negacionismo, escepticismo y desinformación. *Tabula Rasa*, 37, 283–301. <https://doi.org/10.25058/20112742.n37.13>
- ABRELPE. (2019). Panorama Dos Resíduos Sólidos no Brasil. *Panorama Dos No Brasil Sólidos Resíduos 2018/2019*, 68. www.abrelpe.org.br
- ABRELPE. (2021). *Notícias: Descarte incorreto de lixo aumenta durante a pandemia e impacta leis ambientais*. <https://abrelpe.org.br/noticias/>
- Acacio, I., & Passos, A. (2020). The militarization of responses to COVID-19 in Democratic Latin America. *Brazilian Journal of Public Administration*, 55(1), 261–271. <https://doi.org/http://dx.doi.org/10.1590/0034-761220200475>
- Andrade, F. M. R. de, Barreto, T. B., & Henriques, A. B. (2020). Rio de Janeiro e crise climática: governança, interatividade e construção discursiva no Twitter. *Ambiente & Sociedade*, 23(Tema em destaque: Urbanização, Planejamento e Mudanças Climáticas), 1–19. <https://doi.org/DOI: http://dx.doi.org/10.1590/1809-4422asoc20190202r2vu2020L6TD All>
- Angelelli, P., & Saffache, P. (2013). Some remarks on Mangroves in the Lesser Antilles. *Revista de Gestão Costeira Integrada*, 13(4), 473–489. <https://doi.org/10.5894/rgci407>
- Aslan, J. F., Pinto, A. E. M., & Oliveira, M. M. (2017). Poluição do meio ambiente marinho: um breve panorama dos princípios, instrumentos jurídicos e legislação brasileira. *Planeta Amazônia: Revista Internacional de Direito Ambiental e Políticas Públicas*, 9, 175–186. <https://doi.org/10.18468/planetaamazonia.2017n9.p175-186>
- Awasthi, A. K., Li, J., Koh, L., & Ogunseitan, O. A. (2019). Circular economy and electronic waste. *Nature Electronics*, 2(3), 86–89. <https://doi.org/10.1038/s41928-019-0225-2>
- Azevedo, M. de C., & Lima, M. A. A. (2020). Fake news e pós-verdade na construção do Neoconservadorismo no Brasil pós-2013 e os efeitos nas eleições de 2018. *Letrônica*, 13(2), e35546. <https://doi.org/10.15448/1984-4301.2020.2.35546>
- Baia, B. G. F., Fontanez, C. F., Silva, G. G., Almeida, L. R. de, Assis, M. P. de, Cinezi, G. R., & Dias, L. (2020). Plásticos e seus impactos ambientais. *International Studies on Law & Education*, 3(4), 167–176. http://www.hottopos.com/isle34_35/167-176JVernePlasticosF.pdf
- Brasil. (1981). *Política Nacional de Meio Ambiente*. Diário Oficial Da União. http://www.planalto.gov.br/ccivil_03/leis/16938.htm
- Brasil. (1988). *Plano Nacional de Gerenciamento Costeiro*. Diário Oficial Da União. http://www.planalto.gov.br/ccivil_03/leis/l7661.htm
- Brasil. (1995). *Decreto Nº 1530, de 22 de junho de 1995*. Diário Oficial Da União. http://www.planalto.gov.br/ccivil_03/decreto/1995/D1530.htm#:~:text=DECRETO Nº 1.530%2C DE 22,10 de dezembro de 1982.
- Brasil. (2005). *Política Nacional para os Recursos do Mar*. Diário Oficial Da União. http://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2005/Decreto/D5377.htm
- Brasil. (2010). *Política Nacional de Resíduos Sólidos*. Diário Oficial Da União. <http://www2.mma.gov.br/port/conama/legiabre.cfm?codlegi=636>
- Brasil. (2019). *AGENDA NACIONAL DE QUALIDADE AMBIENTAL URBANA: plano de combate ao lixo no mar*. Ministério Do Meio Ambiente (MMA). <http://www.mma.gov.br/agenda-ambiental-urbana/lixo-no-mar.html>
- Brasil. (2021). *CENTRO TAMAR: Instituto Chico Mendes de Conservação da Biodiversidade*. Ministério Do Meio Ambiente (MMA). <https://www.icmbio.gov.br/centrotamar/ucs-marinhas>
- Bremer, L. L., DeMaagd, N., Wada, C. A., & Burnett, K. M. (2021). Priority watershed management areas for groundwater recharge and drinking water protection: A case study from Hawai‘i Island. *Journal of Environmental Management*, Januuary, 111622. <https://doi.org/10.1016/j.jenvman.2020.111622>
- Bueger, C. (2015). What is maritime security? *Marine Policy*, 53, 159–164. <https://doi.org/10.1016/j.marpol.2014.12.005>
- Calil, G. G. (2021). The pandemic denial: reflections about bolsonarist Strategy. *Ser.Soc. Soc.*, 140, 30–47. <http://dx.doi.org/10.1590/0101-6628.236>
- Caponi, S. (2020). Covid-19 no Brasil: Entre o negacionismo e a razão neoliberal. *Estudos Avancados*, 34(99), 209–224. <https://doi.org/10.1590/S0103-4014.2020.3499.013>
- Chen, Y. (2020). Financialising urban redevelopment: Transforming Shanghai’s waterfront. *Land Use Policy*, February, 105126. <https://doi.org/10.1016/j.landusepol.2020.105126>
- CNT. (2021). *IBGE e Marinha lançam atlas sobre a região costeira do Brasil*. <https://cnt.org.br/agencia-cnt/ibge-e-marinha-lancam-atlas-sobre-a-regiao-costeira-do-brasil>
- Copertino, M. S., Creed, J. C., Lanari, M. O., Magalhães, K., Barros, K., Lana, P. C., Sordo, L., & Horta, P. A. (2016). Seagrass and submerged aquatic vegetation (VAS) habitats off the coast of Brazil: State of knowledge, conservation and main threats. *Brazilian Journal of Oceanography*, 64(Special Issue 2), 53–80. <https://doi.org/10.1590/S1679-875920161036064sp2>

- Di Ciommo, R. C. (2007). Pescadoras e pescadores: A questão da eqüidade de gênero em uma reserva extrativista marinha. *Ambiente e Sociedade*, 10(1), 151–163. <https://doi.org/10.1590/s1414-753x2007000100010>
- Duarte, A. de M., & César, M. R. de A. (2020). Negação da Política e Negacionismo como Política: pandemia e democracia. *Educação & Realidade*, 45(4), 1–22. <https://doi.org/10.1590/2175-6236109146>
- Ferraz, L. M. R. (2020). Saúde e política na crise da Covid-19: apontamentos sobre a pandemia na imprensa brasileira. *Revista Eletrônica de Comunicação, Informação e Inovação Em Saúde*, 14(2), 273–278. <https://doi.org/10.29397/reciis.v14i2.2128>
- Franceschi, F. R. A. De, Santiago, C. D., Lima, T. Q. de, & Pugliesi, É. (2017). Panorama dos resíduos sólidos no Brasil: uma discussão sobre a evolução dos dados no período 2003-2014. *Revista DAE*, 65(206), 62–68. <https://doi.org/10.4322/dae.2016.028>
- Galdamez Zelada, L. A. (2020). El Medio ambiente en la jurisprudencia del Tribunal Constitucional de Chile. *Revista de La Facultad de Derecho*, 48(1), 1–34. <https://doi.org/10.22187/rfd2020n48a7>
- Grip, K., & Blomqvist, S. (2021). Marine spatial planning: Coordinating divergent marine interests. *Ambio, Eu 2011*. <https://doi.org/10.1007/s13280-020-01471-0>
- Guenther, M. (2020). Como Será O Amanhã? O Mundo Pós-Pandemia. *Revista Brasileira de Educação Ambiental (RevBEA)*, 15(4), 31–44. <https://doi.org/10.34024/revbea.2020.v15.10766>
- Kahlert, S., & Bening, C. R. (2020). Plastics recycling after the global pandemic: resurgence or regression? *Resources, Conservation and Recycling*, 160(May), 104948. <https://doi.org/10.1016/j.resconrec.2020.104948>
- Koeller, P. (2020). Investimentos Federais em P&D: estimativas para o período 2000-2010. *IPEA - Nota Técnica*, 56, 18. http://repositorio.ipea.gov.br/bitstream/11058/9656/1/NT_56_Diset_Investimentos_federais_em_pesquisa_e_desenvolvimento.pdf
- Korpinen, S., Laamanen, L., Bergström, L., Nurmi, M., Andersen, J. H., Haapaniemi, J., Harvey, E. T., Murray, C. J., Peterlin, M., Kallenbach, E., Klančnik, K., Stein, U., Tunisi, L., Vaughan, D., & Reker, J. (2021). Combined effects of human pressures on Europe's marine ecosystems. *Ambio*. <https://doi.org/10.1007/s13280-020-01482-x>
- Layrargues, P. P. (2020). Pandemias, colapso climático, antiecologismo: Educação Ambiental entre as emergências de um ecocídio apocalíptico. *Revista Brasileira de Educação Ambiental (RevBEA)*, 15(4), 1–30. <https://doi.org/10.34024/revbea.2020.v15.10861>
- Lima, L. D., Pereira, A. M. M., & Machado, C. V. (2020). Crisis, conditioning factors, and challenges in the coordination of Brazil's federative State in the context of COVID-19. *Cadernos de Saúde Pública*, 36(7), 36(7):e00185220. <https://doi.org/10.1590/0102-311X00185220>
- Macário, E., & Reis, L. F. (2020). *COVID-19, dívida pública e crise de financiamento de ciência e tecnologia no Brasil*. <Https://Auditoriacidada.Org.Br/Conteudo/Covid-19-Divida-Publica-E-Crise-De-Financiamento-De-Ciencia-E-Tecnologia-No-Brasil/>.
- MacNeill, T., & Wozniak, D. (2018). The economic, social, and environmental impacts of cruise tourism. *Tourism Management*, 66, 387–404. <https://doi.org/10.1016/j.tourman.2017.11.002>
- Magris, R. A., Costa, M. D. P., Ferreira, C. E. L., Vilar, C. C., Joyeux, J. C., Creed, J. C., Copertino, M. S., Horta, P. A., Sumida, P. Y. G., Francini-Filho, R. B., & Floeter, S. R. (2021). A blueprint for securing Brazil's marine biodiversity and supporting the achievement of global conservation goals. *Diversity and Distributions*, 27(2), 198–215. <https://doi.org/10.1111/ddi.13183>
- Mäntymäa, E., Tyrväinen, L., Juutinen, A., & Kurtila, M. (2019). Importance of forest landscape quality for companies operating in nature tourism areas. *Land Use Policy*, July, 104095. <https://doi.org/10.1016/j.landusepol.2019.104095>
- Marceniuk, A. P., Caires, R. A., Wosiacki, W. B., & Di Dario, F. (2013). Knowledge and conservation of the marine and estuarine fishes (Chondrichthyes and Teleostei) of the north coast of Brazil. *Biota Neotrop*, 13(4), 251–259. <https://doi.org/10.1590/S1676-06032013000400022>
- Marques, M. (2020). Economia, motor da interação humana com o Oceano. *Relações Internacionais*, 66, 79–95. <https://doi.org/10.23906/ri2020.66a05>
- Matias, T. P., Maesteghin, L. T., & Imperador, A. M. (2020). A sustentabilidade Ambiental: da utopia à emergência. *Revista Brasileira de Educação Ambiental (RevBEA)*, 15(4), 160–174. <https://doi.org/10.34024/revbea.2020.v15.10830>
- Matias, T. P., Prata, T. V. M., & Imperador, A. M. (2018). Survey of environmental aspects and impacts applied to island and ocean ecosystems. *Brazilian Applied Science Review*, 2(2), 839–856.
- Meek, D., & Lloro-Bidart, T. (2017). Introduction: Synthesizing a political ecology of education. *Journal of Environmental Education*, 48(4), 213–225. <https://doi.org/10.1080/00958964.2017.1340054>
- Moreira, F. C. (2020). Políticas Públicas Para o Ambiente Marinho e Seus Recursos. *E-Pública: Revista Eletrônica de Direito Público*, 7(2), 27–54.
- Morel, A. P. M. (2021). Negacionismo da Covid-19 e educação popular em saúde: para além da necropolítica. *Trabalho, Educação e Saúde*, 19(e00315147), 1–14. <https://doi.org/10.1590/1981-7746-sol00315>
- Pereira, A. S., Shitsuka, D. M., Parreira, F. J., & Shitsuka, R. (2018). Método Qualitativo, Quantitativo ou Quali-Quanti. In *Metodologia da Pesquisa Científica* (1st ed.). UFSM, NTE. https://repositorio.ufsm.br/bitstream/handle/1/15824/Lic_Computacao_Metodologia-Pesquisa-Cientifica.pdf?sequence=1. Acesso em: 28 março 2020.
- Piaia, V., & Alves, M. (2020). Abrindo a caixa preta: análise exploratória da rede bolsonarista no WhatsApp. *Intercom: Revista Brasileira de Ciências Da Comunicação*, 43(3), 135–154. <https://doi.org/10.1590/1809-5844202037>

Prata, J. C., Castro, J. L., da Costa, J. P., Duarte, A. C., Rocha-Santos, T., & Cerqueira, M. (2020). The importance of contamination control in airborne fibers and microplastic sampling: Experiences from indoor and outdoor air sampling in Aveiro, Portugal. *Marine Pollution Bulletin*, 159(XXXX), 111888. <https://doi.org/10.1016/j.marpolbul.2020.111522>

Silva, A. L. P., Prata, J. C., Walker, T. R., Campos, D., Duarte, A. C., Soares, A. M. V. M., Barceló, D., & Rocha-Santos, T. (2020). Rethinking and optimising plastic waste management under COVID-19 pandemic: Policy solutions based on redesign and reduction of single-use plastics and personal protective equipment. *Science of the Total Environment*, 742, 140565. <https://doi.org/10.1016/j.scitotenv.2020.140565>

Silva, A. L. P., Prata, J. C., Walker, T. R., Duarte, A. C., Ouyang, W., Barceló, D., & Rocha-santos, T. (2020). Increased plastic pollution due to COVID-19 pandemic: Challenges and recommendations. *Chemical Engineering Journal*, 405(2021), 126683. <https://doi.org/https://doi.org/10.1016/j.cej.2020.126683>

Silva, I. R., Neves, A. L. M., Callegare, F. P. P., Higuchi, M. I. G., & Pereira, E. C. F. F. (2018). Vivências de protagonismo socioambiental por jovens: implicações na constituição do sujeito ético-político. *Temas Em Psicologia*, 26(2), 617–630. <https://doi.org/10.9788/tp2018.2-04pt>

Song, A. M. (2015). Human dignity: A fundamental guiding value for a human rights approach to fisheries? *Marine Policy*, 61, 164–170. <https://doi.org/10.1016/j.marpol.2015.08.013>

Vianna, L. F. de N., Bonetti, J., & Polette, M. (2012). Integrated coastal zone management: a compatibility review between a public policy for the mariculture development and a coastal zone management plan in Brazil. *Journal of Integrated Coastal Zone Management*, 12(3), 357–372. <https://doi.org/10.5894/rgci335>

Vilar, C. C., Magris, R. A., Loyola, R., & Joyeux, J. C. (2020). Strengthening the synergies among global biodiversity targets to reconcile conservation and socio-economic demands. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 30(3), 497–513. <https://doi.org/10.1002/aqc.3269>

Viscardi, J. M. (2020). True and Lie According To Jair Bolsonaro' S Twitter Account. *Trabalhos Em Linguística Aplicada*, 59(2), 1134–1157. <http://dx.doi.org/10.1590/01031813715891620200520>

Welch, J. R., & Coimbra Jr., C. E. A. (2019). Indigenous fire ecologies, restoration, and territorial sovereignty in the Brazilian Cerrado: The case of two Xavante reserves. *Land Use Policy*, xxxx, 104055. <https://doi.org/10.1016/j.landusepol.2019.104055>

Zambrano-Monserrate, M. A., Ruano, M. A., & Sanchez-Alcalde, L. (2020). Indirect effects of COVID-19 on the environment. *Science of the Total Environment*, 728, 138813. <https://doi.org/10.1016/j.scitotenv.2020.138813>