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Food for Thought

Marine spatial planning and the risk of ocean grabbing in the tropical Atlantic

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Ocean grabbing occurs when traditional users, such as small-scale fishers, are pushed aside by new development activities. This grabbing must be prevented to avoid sea uses that maintain or increase social inequity. In this paper, we show that in tropical Atlantic countries, such as Brazil and Senegal, examples of ocean grabbing already occur. In this context, we analyse if Maritime Spatial Planning (MSP) may be an opportunity to limit ocean grabbing or, to the contrary, poses a risk to increase it. MSP calls for an ecosystem approach that requires integrated coastal and marine management and involves stakeholders in developing a shared vision of the future, where society and environment are preserved. However, recent studies have shown that MSP is a process to be used cautiously to ensure equitable decisions. Meanwhile, the concept is spreading worldwide including in tropical Atlantic countries. We highlight that context matters and the specificities of the tropical Atlantic must be taken into account when deploying MSP processes. In the tropical Atlantic context, there is increased imbalances of stakeholder power, traps from decision support tools, and a need for adaptive management. These specific features must be addressed when deploying MSP in a way to avoid ocean grabbing.

Keywords: Brazil, fisheries, maritime spatial planning, ocean grabbing, Senegal, stakeholders, tropical Atlantic

Introduction

The "worldwide blue", our planet's largest commons, has been facing an unprecedented increase in human activities (tourism, oil and gas exploitation, fisheries, sand exploitation, aquaculture, maritime transport, science). Recently, the expansion of new activities such as deep-sea mining and renewable energy, especially wind farms in the framework of blue growth promotion, has raised new challenges (Maes, 2008; Tolvanen *et al.*, 2019). Marine space and resources are limited, thus, conflicts of use are soaring, as well as the risks of ocean grabbing, i.e. traditional users, such as small-scale fishers, are being pushed aside by new development activities (De Santo, 2011; Psuty *et al.*, 2020).

In particular, Global South countries bordering the tropical Atlantic have legal, political, social–economic, and ecological specificities that make them sensitive to ocean grabbing risks according to the evaluation criteria established by Bennett *et al.* (2015). These criteria include quality of governance, presence of actions that undermine human security and livelihoods, and impacts that negatively affect social–ecological well-being (Bennett *et al.*, 2015).

To better understand the context of ocean grabbing today, it is important to bear in mind historical developments in the Law of the Sea. After World War II, coastal States claimed extended jurisdictions over the sea in a movement referred to as "creeping jurisdiction" (Franckx, 2005). This movement began in 1945, when the United States claimed extended jurisdiction over its contiguous continental shelf through a unilateral declaration: the Truman Proclamation. Thereafter, developing countries followed suit (Mexico in 1945, Argentina and Panama in 1946, Chile and Peru in 1947) and in 1982, the Law of the Sea Convention (UNCLOS) was adopted, integrating this evolution through modification of maritime zones and the creation of the Economic Exclusive Zone (EEZ).

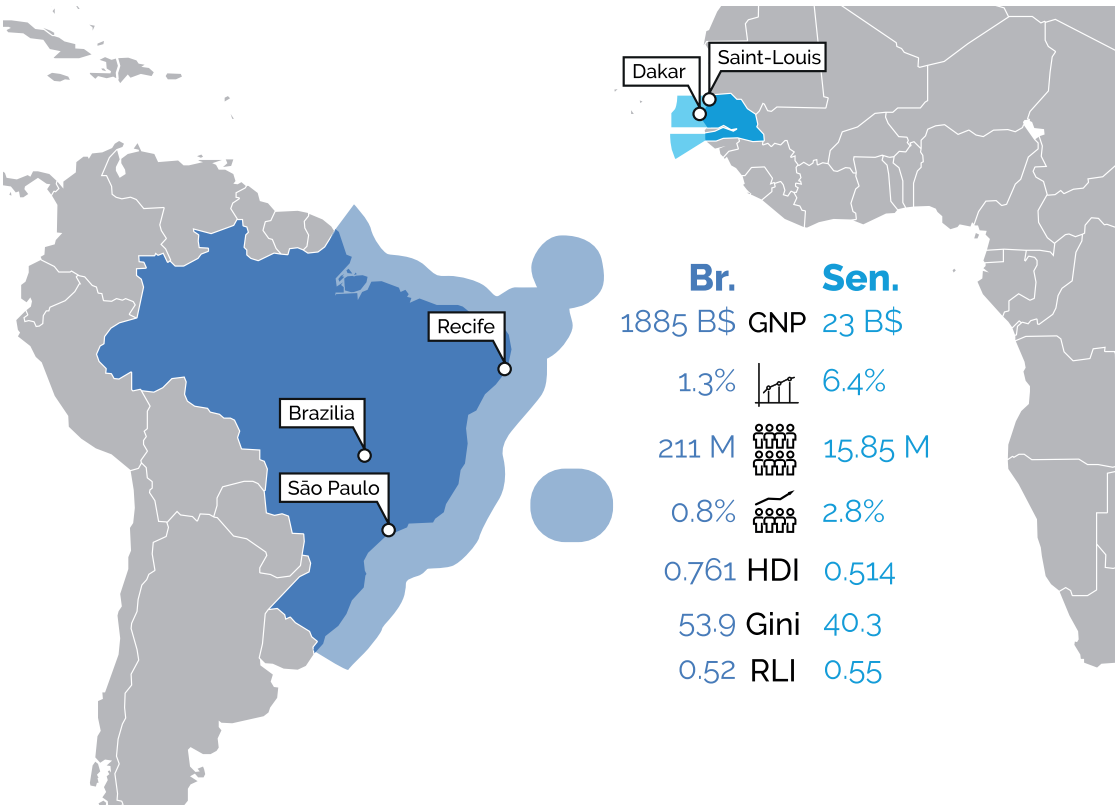
Coastal States gained sovereign rights and jurisdiction over natural resources in large areas of the sea located far from their coasts. Previously, the resources located within these areas were freely accessible, although in practice these resources were exploited by developed countries, which had the technical capacity to exploit them (Vignes, 2000, p. 63–105). By extending their jurisdiction, emerging and developing coastal States took control over the resources and extended their economic sovereignty. This phenomenon appeared to be a reoccurrence of the 17th century controversy between *mare liberum* (Grotius, 1605) and *mare clausum* (Selden, 1619). The expression "creeping jurisdiction" was sometimes termed "ocean enclosure movement" as a reference to the development of property rights of common lands in England from the 16th century (Lewis, 1983).

Creeping jurisdiction empowers coastal States to oversee the access to their marine natural resources. However, Global South countries do not have the economic or technical capacity to exploit all these resources, so they reach agreements and sign contracts with developed countries and private companies wishing to exploit such resources (especially fish, oil, and gas) (Vignes, 2000, p. 63–105). Yet, the expansion of a country's jurisdiction over marine waters has not solved the problem of power imbalances between stakeholders. This imbalance is one of the paths leading to ocean grabbing.

In the last decades, Maritime Spatial Planning (MSP) has arisen as a popular tool for managing conflicts of uses in these large maritime zones under national jurisdictions (Ehler and Douvere, 2009). Fairgrieve presented MSP as the expression of "common sense" to avoid the "tragedy of the commons" (Fairgrieve, in Flannery *et al.*, 2016, p. 141). This is a reference to Hardin's 1968 paper considering that open access to natural resources leads to their depletion, he advocated for property rights in order to empower landowners to solve this problem. However, his position has been strongly criticized by Ostrom, who shows how user communities can develop governance and access rights to manage commons, whereas property rights involve risks of rights concentration within a few hands (Ostrom *et al.*, 1993; Ostrom, 2015; Trimble and Berkes, 2015). In this context, depending on the way it is developed, MSP can be an instrument to dispossess or to empower and benefit coastal communities (Fairbanks *et al.*, 2018, p. 145 and 149).

In this paper, we focus on ocean grabbing risks associated with MSP in countries bordering the tropical Atlantic (this research is part of the EU RISE PADDLE project), particularly illustrated by Senegal and Brazil (This research is conducted in the framework of the EU PADDLE project (Planning in a liquid world with tropical stakes: solutions from an EU–Africa–Brazil perspective, 2017–2021). Through this project, EU is funding short-term academic and small companies staff exchanges to stimulate international cooperation from Europe and countries bordering the tropical Atlantic (Brazil, Cape Verde, and Senegal). See: https://www-iuem.univ-brest.fr/paddle). We are also following the call by Flannery *et al.* (2016, p. 122–128), who argued for "a broader, more critical understanding of the social and distributive impacts of MSP, advocating a radical turn in MSP away from rationalism of science and neoliberal logic towards more equity-based, democratic decision-making, and a fairer distribution of our ocean wealth." We aim to contribute to this discussion by analysing the potential or expected impacts of "tropicalizing" the MSP concept regarding the risks of ocean grabbing (Lewis, 1983; Connell, 2007; Hallé, 2010; Sale *et al.*, 2014). By conducting this study prior to MSP implementation in tropical Atlantic countries, such as Senegal and Brazil, we aim to help prevent these risks. Figure 1 illustrates the socio-economic context in both countries. The Human Development Index is 0.761 in Brazil, 0.514 in Senegal. To compare it is 0.891 in France and 0.934 in the Netherlands; there are more differences between Brazil and Senegal than between France and Brazil. The Gini index (also known as Gini coefficient) measures income inequality in a country: the higher the score, the more unequal the society is. In comparison, Senegal (40.3) is closest to France (31.6) than to Brazil (53.9). The Rule of Law index measures mainly accountability of government and private actors under the law, application of laws, quality of the processes by which laws are enacted and existence of accessible and impartial dispute resolution (World Justice Project, 2020, p. 10) [There are discussions about the meaning of the rule of law principle since it's a complex notion. Lord Bingham presents the "core of the existing principle" as following "all persons and authorities within the state, whether public or private should be bound by and entitled to the benefit of laws publicly and prospectively promulgated and publicly administrated in the courts" (Bingham, 2007, p. 69)]. Senegal (0.55) and Brazil (0.52) are very close relatively to France (0.73) and the Netherlands (0.84). These indicators show that socio-economic contexts in tropical Atlantic have real similarities, but they are not homogenous.

To this aim, our paper addresses the two following questions: Does MSP risk contributing to ocean grabbing in the tropical Atlantic? And how can this be prevented? Starting by elaborating on the concept of ocean grabbing (Section 1), we follow by



Sources

[1] World Bank, Brazil & Senegal country profiles. World Development Indicators database, consulted on 26/07/2020. https://databank.worldbank.org

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[3] World Bank, GINI index, consulted on 26/07/2020. https://data.worldbank.org/indicator/SI.POV.GINI

[4] World Justice Project, WJP Rule of Law Index, consulted on 26/07/2020. https://www.worldjusticeproject.org/rule-of-law-index/country/2020

Figure 1. Socio-economic indicators in Senegal and Brazil.

describing MSP, and why it could contribute to ocean grabbing in the tropical Atlantic, highlighting the specificities of tropical marine ecosystems, and giving special attention to small-scale fisheries in tropical seas (Section 2). To conclude, we make some recommendations to prevent ocean grabbing when implementing MSP.

Ocean grabbing

Ocean grabbing is a relatively recent concept. It was first used to point out the *de facto* appropriation (through their large catch facilities) of fish resources by large companies (Niasse and Seck, 2011; United Nations, 2012). The World Forum of Fisher Peoples (WFFP) described it as "*the capturing of control by powerful economic actors of crucial decision-making around fisheries, including the power to decide how and for what purposes marine resources are used, conserved and managed now and in the future*" (World Forum of Fisher Peoples, 2014, p. 3). In academia, some other formulations have been used to describe the phenomenon, like sea sparing (Wolff, 2015), or blue grabbing (Benjaminsen and Bryceson, 2012).

Bennett defines it as: "*dispossession or appropriation of use, control, or access to ocean space or resources from prior resource users, rights holders, or inhabitants. Ocean grabbing occurs through*

inappropriate governance processes and might employ acts that undermine human security or livelihoods or produce impacts that impair social–ecological well-being" (Bennett *et al.*, 2015, p. 62). It does not just include the appropriation of resources or space, but also specifies people who are subject to grabbing (resource users, rights holders, and inhabitants) and the mechanism through which it may happen (i.e. inappropriate governance processes), as well as possible negative consequences.

This means that power is inherently part of ocean grabbing. In our conceptualization, power is actionable, relational, and structural. So power is defined here as the ability to act, and specifically refers to the ability to steer or influence others (cf. Dahl, 2007). Power is also co-produced on a structural level for example by dominant discourses that favour specific solutions and interventions or institutionalized roles and positions (Arts and Van Tatenhove, 2004). Following Foucault and others, we define "power play" as a continuous balancing game with real impacts, winners, and losers (Pickett, 1996; Flannery *et al.*, 2016). In its initial notion, ocean grabbing was mainly related to the negative effects for fishers, however, other stakeholders can also be victims of ocean grabbing such as inhabitants excluded from the shoreline (Benjaminsen and Bryceson, 2012; Wolff, 2015, p. 60).

Emphasizing the global grabbing phenomena at sea, the expression ocean grabbing is at the cross-roads of three kinds of appropriation described in the literature: appropriation of resources (World Forum of Fisher Peoples, 2014), land grabbing (Borras *et al.*, 2011; De Schutter, 2011; de Freitas *et al.*, 2020), and "green grabbing" (i.e. ways by which environmental protection instruments exclude people from using their own land or resources) (Fairhead *et al.*, 2012). As we will see, although these three kinds of ocean grabbing can already be observed in both Brazil and Senegal, MSP has not yet been developed in these countries.

Firstly, land grabbing can be defined as "the captur(e) of power to control land and other associated resources like water, minerals or forests, in order to control the benefits of its use" (Transnational Institute, 2013, p. 3). At sea, this phenomenon can be reinforced by inappropriate legal mechanisms that are unable to compensate for losing space for sea uses. Indeed, there is no real estate private property at sea. In Senegal, the *domaine public naturel* is an inalienable public property. It includes the territorial sea, the continental shelf, the inland sea, the seashores, as well as an area one hundred metres wide from the limit reached by the highest tides (art. 5 Law 76-66 2 July 1976 *portant Code du domaine de l'Etat*). Brazil has 5.7 million km^2 of ocean area along the Brazilian coast, an impressive area named the "Blue Amazon" (This name has been consecrated by the Brazilian navy to designate the Brasilia sea as a political and strategic concept to guide national development based on the sustainable sea use. Marinha do Brasil. Comando do 8o Distrito Naval. Amazonia Azul Available at https://www.marinha.mil.br/com8dn/?q=amazonia_azul. To note, the Federal Law no. 13.187, November, 11 2015 has established the national Blue Amazon Day on 16 November to be celebrated annually). Sea space is inalienable in Brazil, too. Seas are public goods for common use by the people (Art. 99, I Civil code) and territorial sea is a good of the Union (art. 20, VI Brazilian constitution).

This inalienability of the sea is a guarantee against grabbing. No private company can buy a piece of a sea, although States can grant licenses to use sea space (aquaculture, energy). Fishers have a territory at sea, but they do not own it. However, a side effect of the inalienability of the sea is that if fishers are dispossessed from this territory, it will be more difficult for them to obtain compensation for their loss. Indeed, compensation for expropriation is part of human rights, but its legal basis lies in private property rights [Universal Declaration of Human Rights (1948) Art. 17. 2 "No one shall be arbitrarily deprived of his property". (General Assembly resolution 217 A)]. Nevertheless, some protections exist for indigenous people. International Labour Organisation 169 Convention stipulates that "The rights of ownership and possession of the peoples concerned over the lands which they [indigenous and tribal people] traditionally occupy shall be recognized. In addition, measures shall be taken in appropriate cases to safeguard the right of the peoples concerned to use lands not exclusively occupied by them, but to which they have traditionally had access for their subsistence and traditional activities" (Article 14) [Indigenous and Tribal Peoples Convention, 1989 (No. 169)]. The non-binding UN Declaration on the rights of indigenous peoples (2007) has a broader approach stating "States shall provide effective mechanisms for prevention of, and redress for: (. . .) (b) Any action which has the aim or effect of dispossessing them of their lands, territories, or resources; (. . .)" (Art. 8) (UNGA Resolution 61/295). Moreover, at national level, a law can be passed to provide such compensation (Nakamura and Hazin, 2020). For example, Petrobras company in Brazil had to adopt a plan to compensate the impact of its activity towards small-scale fishers (Lei no. 9795/99 and Decreto no. 4.281/02; Resoluçao Conama no. 1 de 23 January 1986. See: https://www.comunicabaciadesantos.com.br/programa-ambiental/plano-de-compensacao-da-atividade-pesqueira-pcap.html.

Illustrations of "land" grabbing at sea exist in both Senegal and Brazil. Oil and gas have recently been discovered on the Senegalese continental shelf. Since the very first discoveries in 2014, the new licensing round for oil and gas launched in early November 2019 is for 12 new blocks, corresponding to 69 297 km^2 (ITIE) (Initiative pour la transparence dans les industries extractives (ITIE) SENEGAL: http://itie.sn/apercu-du-secteur-2/), adding to the previous round covering about the same surface area. Considering that the Senegalese Exclusive Economic Zone (EEZ), 200 nm from the baseline, is about 158 000 km^2 (Flanders Marine Institute, 2018), it places a large amount of the Senegalese EEZ at risk to oil and gas exploration, and potentially exploitation. The impact of these activities on all Senegalese fisheries is a concern.

Oil and gas activities are currently regulated by Senegalese authorities (ministry of petroleum and energies), though almost without taking fisheries into account. Beyond a few information meetings, fishers are not consulted. The Petroleum code (Law no. 2019-03, February 1, 2019) lists the regulations oil operations must comply with. The code includes various environmental and health measures, but marine fisheries are not a part of it. Yet, all fishers will be impacted when oil and gas exploitation begin (especially on the border with Mauritania). Fishers who fish offshore, beyond territorial seas, will be directly affected by the loss of fishing grounds, and all fishers including small-scale fisheries, fishing closer to the coast are threatened by the ecological impacts.

Illustrations of "Land" grabbing also exist on the seashore. As observed in many other regions (e.g. in the Mediterranean region, as cited in Hadjichael, 2018; or Canada in Bennett, 2018), fishers are increasingly ousted from waterfronts where they have been settled for significant periods of time. This is due to different pressures, such as the construction of resorts or commercial port

projects. In Dakar, urban pressure is extremely high. A Bill (*projet de loi sur le littoral*) was drafted to protect coastal zones, limiting urbanization. However, it has been waiting to be presented to the Parliament since 2012 (Diallo, 2016). Dispossessions can also happen in areas where coastal erosion leads to people displacement (e.g. in Guet N'Dar). Whilst they represent a very small part of the Senegalese population, Saint-Louis fishers, the Lébous, and the Niominkas, are certainly some of the most exposed to such multi-oriented ocean and coastal grabbing processes, as well as to others (tourism, oil and gas, urban sprawl, etc.) (Seck, 2014).

In Brazil, loss of access or rights of small-scale fishers with respect to other uses has also occurred. Fishers have lost access to privileged beach front sites due to competition with tourism (Diegues and Arruda, 2001; Vasconcellos *et al.*, 2011), they have lost marine areas due to competition with aquaculture (especially shrimp farming in the 1990s and aquaculture parks in the 2000s) (da Rocha *et al.*, 2018), with port infrastructures (Gerhardinger *et al.*, 2018a) and conflicts with energy industry developments (including wind) (Brannstrom *et al.*, 2017, p. 67). All these expressions of grabbing at sea have prompted the movement for the *Territorios pesqueiros* for the defence of small-scale fishery interests (Coordenação Geral da Campanha: http://peloterritoriopesqueiro.blogspot.com/).

Secondly, there has been appropriation of ocean resources in Senegal such as in the competition between foreign and national fisheries. Fisheries agreements can be adopted between two States or between a State and the European Union. A State whose national fishers do not exploit all fish stocks in the waters under its jurisdiction exchanges, through these agreements, access to its surplus fish stocks in return for financial compensation. However, these surpluses are often measured by estimates tainted by uncertainties and misreporting (Belhabib *et al.*, 2014). As a result, fishing agreements have been depriving Senegalese fishers of vital resources that are needed to feed the local population, provide employment, and support other aspects of their lives (including cultural identity) (Gagern and van den Bergh, 2013). Consequently, the Senegal-EU fisheries agreement was suspended between 2006 and 2014 (Souleye and Bonnin, 2016). Taking this problem into account, a new agreement on a Sustainable Fisheries Partnership between the European Union and the Republic of Senegal was signed. Part of the financial contribution of UE is dedicated to support implementation of the Senegalese sectoral fisheries policy and fisheries control has been improved (Art. 4 and 5 of the Protocol on the implementation of the Agreement on a Sustainable Fisheries Partnership between the European Union and the Republic of Senegal, OJEU L299/13 20 November 2019). But even so, this fisheries agreement has been criticized by Senegalese fishers arguing the lack of consultation.

Two other phenomena are more concerning. The first is the proliferation of joint ventures that allow foreign companies to invest in Senegalese fisheries: foreign companies can invest up to 49% of the joint venture capital. Such ventures can be fully controlled by the foreign partner with the aim to "Senegalise" ships in order to access Senegalese fisheries outside of international fishery agreements (Niasse and Seck, 2011; Jégou, 2020). The second is the substantial amount of illegal, unreported and unregulated (IUU) fishing, fostered by the lack of fishery vigilance and control, in Senegal (Interpol, 2014; Diouf, 2016).

Thirdly, illustrations of green grabbing have been observed in Brazil and Senegal too. Dispossessions can happen in coastal margin areas, such as mangroves, where huge reforestation programmes have dispossessed local communities of spaces and resources (Cormier-Salem and Panfili, 2016). Moreover, such dispossession have also occurred in some marine protected areas (MPAs), where there are restricted uses of these spaces. Indeed, MPAs are expanding under the influence of the Aichï targets [Decision X/2 of the 10th COP of the Convention on Biological Diversity, "Strategic Plan for Biodiversity" (2010)]. One of these targets is to achieve the protection of 10% of marine and coastal areas. The growing exclusion of fisheries in MPAs is becoming a concern (Benjaminsen and Bryceson, 2012; Corson and MacDonald, 2012; Bonnin *et al.*, 2015). In Brazil, similar cases have been reported. The Marine National Park of Currais Islands was established without consultation with small-scale fishers, despite their strong dependence on this area (de Oliveira Leis *et al.*, 2019). However, legislation in Brazil has been reinforced to better integrate small-scale fishers into MPAs. The National Protected Areas System (*Sistema Nacional de Conservação—SNUC*, 2000) has established different categories of marine and coastal protected areas, ranging from fully protected areas, which exclude all extractive uses, such as national marine parks and biological reserves, to multiple use MPAs such as *Area de Proteção Ambiental* (APA) and coastal and marine extractive reserves (RESEX) (See https://www.iucn.org/sites/dev/files/participation_principle_in_mpas_in_brazil.pdf). The latter is a category based on community-based biodiversity protection approaches and co-management processes (Diegues and Arruda, 2001; Silva *et al.*, 2016; Seixas *et al.*, 2019). This "policy instrument [is] used (. . .) for decentralizing managerial responsibility for natural resources to communities that have a proven history of sustainable use" (Da Silva, 2004, p. 421). In fact, coastal and marine RESEX avoid green grabbing, since traditional populations are at the base of their constitution and management (Nakamura and Hazin, 2020).

This first section shows that ocean grabbing already occurs in tropical Atlantic areas. Thus, MSP has been presented as a way of avoiding ocean grabbing caused by sectoral, fragmented, and unfair approaches from which private lobbies can benefit (Gerhardinger *et al.*, 2018). However, it appears that MSP has to be implemented carefully, as despite being intended to avoid ocean grabbing, it also has the potential to contribute to it too.

MSP has the potential to contribute to ocean grabbing

Despite the idealistic picture of a standardized, globally applicable MSP (2.1), we argue that if MSP does not adapt to the context, and especially the tropical context, it can end up reinforcing ocean grabbing processes (2.2).

MSP and its dissemination worldwide

MSP offers an attractive way to combine different uses of marine resources within a particular area, Agardy (2010) reported palpable excitement about MSP unlocking "Blue Growth" potential, i.e. the economic development potential of the sea. In this respect, the work of Ehler and Douvere has been influential. They developed an authoritative definition of MSP: "a practical way to create and establish a more rational use of marine space and the interactions among its uses to balance demands for development with the need to protect the environment, and to deliver social and economic outcomes in an open and planned way" (Ehler and

Douvere, 2009, p. 18). The concept resonated well in both academic and policy domains.

The idea of MSP originated from spatial planning and zoning in management strategies of Marine Protected Areas including human activities, for example the Great Barrier Reef Marine Park in Australia from 1981 (Douvere, 2008). With a similar purpose of systematic conservation, the Impact Reduction Plans project (PRIMS) has been created in Brazil, according to the Chico Mendes Institute for the Conservation of Biodiversity (ICMBio). Its purpose is to evaluate the level of sensitivity of areas in order to locate the best places to carry out activities that have environmental impacts. It is part of an effort to analyse the potential impacts of the main threats to biodiversity in order to propose alternatives for reconciliation between environmental protection and socioeconomic development (ICMBio/MMA, 2018). For the marine and coastal region, the plan for impact reduction of oil and gas exploitation is the only one under way so far.

From the beginning of the 21st century, MSP has evolved to address more broadly marine zones to foster economic growth in China and Europe (Douvere, 2008; Jay, 2012; Ruoyan, 2016; Fang *et al.*, 2019). For instance, in Belgium, a Master Plan for the implementation of MSP has been underway since 2003 and is supported by the Gaufre interdisciplinary research project (2003–2005). Initially, it was informal (Plasman, 2008), but it was consolidated in 2014 by a Royal Decree, thereby creating a legal framework for MSP in Belgian law (Queffelec and Maes, 2013), and was renewed in 2020 for a new 6-year period (2020–2026) (Maes, 2020). Other examples of MSP in laws are the United Kingdom (Marine and Coastal Access Act, 2009), Portugal (Law No. 17/2014 on "marine spatial planning and management"), the Netherlands (Revised Land Use Planning Act, 2009), and France (where the MSP legal basis was introduced into the environment code art. L219-1 by the Law no. 2010-788 12 July 2010 about national engagement for environment art. 123). The expansion of MSP by its member states led the EU to produce the specific Directive 2014/89/EU of 23rd July 2014 establishing a framework for maritime spatial planning. It requires coastal EU Member States to establish maritime spatial plans by 2021 (Art. 15).

The EU is also encouraging experience sharing on MSP through the European MSP platform (European MSP Platform, funded by European Commission, is "A service for Member States to share relevant knowledge and experiences on Maritime Spatial Planning" http://www.msp-platform.eu/). In March 2017, following the second international conference about Marine/Maritime Spatial Planning (Paris, Unesco), the EU established, together with IOC-UNESCO, a joint roadmap to accelerate Marine/Maritime Spatial Planning processes worldwide (Available at: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/Joint_Roadmap_MSP_v5.pdf). It is supported by the dedicated MSP Global initiative (MSPglobal created to contribute to developing MSP in the world in the framework of the March 2017 IOC-UNESO/UE Joint Roadmap to accelerate Maritime/Marine Spatial Planning processes worldwide http://www.mspglobal2030.org/). However, this is based on existing analyses of MSP, which mainly focus on countries where it has been already developed, broadly speaking the Global North (Dominguez-Tejo *et al.*, 2016; Jones *et al.*, 2016) and Asia (Jay, 2012). Studies about MSP in Africa and Latin America are scarce, partly because little implementation has been carried out yet (e.g. Gerhardinger *et al.*, 2018).

Nevertheless, MSP is spreading to tropical environments as part of wider processes in which public authorities and private companies are aiming to organize the exploitation of marine resources. However, no formal MSP process has been conducted in Senegal yet. Though, the Mami Wata project about integrated ocean management, involving MSP capacity building, is supported by the Abidjan Convention Secretariat. Moreover, the CSE Senegal (*Centre de Suivi Ecologique*) is participating as "centre of expertise" though Senegal is not one of the three selected pilot-projects (Ghana, Benin, and Côte d'Ivoire) (See the project webpage: http://mamiwataproject.org/). Brazil started its discussions in 2011, yet MSP is, after several phases, still in the "articulation and framing phase" (Gerhardinger *et al.*, 2018; Fotso, 2019).

The recognition of the need to discuss MSP in Brazil at governmental levels dates back to the 2012 Rio +20 conference. In 2014, the Ministry of the Environment, with the support of UNESCO, promoted the International Seminar on Integrated Marine Planning in order to broaden the understanding of the subject, as well as to promote the exchange of international experiences. The event was opened with lectures given by the Intergovernmental Oceanographic Commission (IOC) and the Brazilian Inter-ministerial Commission for the Resources of the Sea (SECIRM) to clarify understanding and concepts of Marine Spatial Planning. A report was generated as a first step towards understanding MSP challenges, highlighting the need to elaborate a participatory process that considers the Brazilian reality (De Freitas *et al.*, 2015)). Advances at national level so far have been linked to integrated coastal zone management (ICZM) or are mainly sectorial (de Freitas et al., 2014). For example, the 10th Sectorial Plan for Sea Resources (2020–2023) addresses "research activities, oceanographic monitoring, and climate studies, as well as the exploitation and conservation of natural resources" (X Sectorial Plan for Sea Resources—CIRM Resolution no. 1, 30 July 2020—https://www.in.gov.br/web/dou/-/resolucao-n-1-de-30-de-julho-de-2020-270783100).

At the legislative level, a Law of the Sea Bill (Lei do Mar—A Federal Law Project no. 6.969/2013 the National Policy for Brazilian Marine Biome Conservation and Sustainable Use plan to establish MSP as a specific policy tool) was put forward to the Brazilian National Congress in 2013. However, it is still under discussion as the process has been hindered by a lack of political momentum (Gerhardinger *et al.*, 2018). Since June 2019, this bill has been on the agenda for consideration by the National Congress Plenary.

Based on an ecosystem approach, MSP offers a chance to fight against ocean grabbing through a holistic vision encompassing environment, social issues and addressing all economic activities involved; offering a participative framework to develop together a consensus on oceans' future. However, MSP could end up being developed far from this ideal picture if the tropical context is neglected.

MSP and the absence of attention for tropical contexts

Specificities of the tropical Atlantic must be taken into account in elaborating MSP. Table 1 shows the economic importance of human activities in the coastal and maritime area, including fishing, tourism, and nature conservation in Brazil and Senegal. These figures show similarities and discrepancies between the two countries. For example, the percentage of Gross Domestic Product

Table 1. Contextual data on sea uses in Senegal and Brazil.

Sea uses informations	Brazil	Senegal
Protected areas		
Terrestrial and marine protected areas (% of total territorial area) in 2018	28.6[a]	14.6[a]
Marine protected areas coverage (% of total marine area)	26.8[e]	1.11[e]
Marine fishing in 2019		
Fishing in the economy (% of GDP)	0.5[f] (including. Aquaculture)	1.5[g]
Estimated economic weight (current US$, in billions)	9.43[h]	0.349[h]
Employment (direct; indirect jobs)	850 000; est. 3 500 000	2015: 53 100 direct; est. 540 000
Employment (% of total employment)	4.64[h]	14.65[h]
Artisanal fishing (% of landings of fish)	60[f]	81.6[g]
Tourism in 2019*		
Tourism in the economy (% of GDP)	7.7[i]	8.8[i]
Estimated economic weight (current US$, in billions)	145.2[h]	2.05[h]
Employment (direct and indirect jobs)	7 406 900[i]	368 500[i]
Employment (% of total employment)	7.9[i]	9.1[i]

*Including both terrestrial and coastal tourism.

Sources:

[a]World Bank, Brazil and Senegal country profiles. World Development Indicators database, consulted on 26 July 2020. https://databank.worldbank.org.

[b]United Nations Development Programme, Human Development Data (1990–2018), consulted on 26 July 2020. http://hdr.undp.org/en/data.

[c]World Bank, GINI index, consulted on 26 July 2020. https://data.worldbank.org/indicator/SI.POV.GINI.

[d]World Justice Project, WJP Rule of Law Index, consulted on 26 July 2020. https://www.worldjusticeproject.org/rule-of-law-index/country/2020.

[e]Protected Planet, Brazil, Latin America and Caribbean; Senegal, Africa, consulted on 26 July 2020. https://www.protectedplanet.net/country/BRA https://www.protectedplanet.net/country/SEN.

[f]Food and Agriculture Organization of the United Nations, Fishery and Aquaculture Country Profiles: The Federative Republic of Brazil and the Republic of Senegal, consulted on 26 July 2020. http://www.fao.org/fishery/facp/BRA/en & http://www.fao.org/fishery/facp/SEN/en.

[g]Agence Nationale de la Statistique et de la Démographie, 2016, Situation Economique et Sociale du Sénégal en 2016, 19p.

[h]Calculated.

[i]World Travel and Tourism Council, 2020, Brazil and Senegal 2020 Annual Research: Key Highlights, 1p. https://wttc.org.

(GDP) of marine fishing is close in Brazil and Senegal. This similarity can hide important discrepancies, be it in value, number of jobs, percentage of total employment or type of fishing.

We argue that if this context is neglected, MSP, as a governance process, can lead to or exacerbate ocean grabbing as described above, by underestimating imbalanced stakeholder power (2.2.1), by over-confidence in decision support tools (2.2.2), and by limiting adaptive approaches (2.2.3).

The business as usual of imbalanced stakeholder power

While MSP has been, and still is, welcomed and promoted as a governance tool that can help to reconcile different spatial demands, needs, and interests, we now also observe a critical turn to MSP in academic literature (Flannery *et al.*, 2016; Jentoft, 2017; Tafon, 2018) (re)state that context matters. The current dominant discourse does not recognize the diversity of actors, interests and institutions, and the different objectives to be achieved through MSP (Knol and Jentoft, in Flannery *et al.*, 2016). Participatory process struggles to involve all stakeholders some can not make their voices heard, others act outside the frameworks set up for public participation (Smith and Jentoft, 2017; Flannery, 2018). Countries bordering the tropical Atlantic have legal, political social–economic, and ecological specificities, which can be particularly sensitive to ocean grabbing. Political instability in some countries, associated with institutional and enforcement weaknesses, creates a high degree of uncertainty in tropical coastal and marine social ecological systems (CM-SES) (Ferrol-Schulte *et al.*, 2013). Legal frameworks applying to marine and coastal environments exist but regulations for their implementation are not often issued. In Senegal, eight national marine protected areas have been created (At local level, a natural reserve has been created too. See: http://www.damcp.gouv.sn/les-amp), five in 2004 (Decree no. 2004-1408 November 4, 2004) [Cayar protected area (17 100 ha); Abéné protected Area (11 900 ha); Bamboung protected area (7000 ha); Joal-Fadiouth protected area (17 400 ha); Saint-Louis protected area (49 600 ha)], three were added later, in 2014 (Decree 2014-338 March 25, 2014 and Decree 2014-416 March 31, 2014) [Sangomar protected area (87 437 ha) and Gandoule protected area (15 732 ha)] and 2015 (Decree no. 2015-1724 November 4, 2015) [Niamone-Kalounayes protected area (63 894 ha)] but only a few have a management plan. In Brazil, 90 federal marine and coastal protected areas exist, although some still lack or have non-functioning management plans (Silva *et al.*, 2016; Lima et al., 2020) .

Secondly, critics argue that the extent to which MSP, as a power-laden process, is underestimated or even ignored (Van Tatenhove in Flannery *et al.*, 2016; Jentoft, 2017). If power dynamics are not explicitly recognized and addressed as an issue of concern, MSP may only reinforce the dominant power relations in policy-making and broader society (Flannery *et al.*, 2016). Consequently, MSP might not be able to live up to its promise of bringing about fair environmental and social outcomes in an open way (Trouillet, 2020). Imbalances in stakeholder power is particularly problematic. Who is involved in the MSP process? When, how, and who decides on this, are crucial questions to be answered. Academics have shown that participatory processes in MSP can fail in fairly integrate all stakeholders (Flannery *et al.*, 2018; Morf *et al.*, 2019). Although small-scale fishers are not automatically victims and can be quite influential stakeholders too, as shown by Norway and Canada (Foley and Mather, 2019), in the tropical Atlantic, access, to decision-making will not be easily granted to small-scale fishers and their communities.

Nonetheless, successful community-based management experiences do exist in the Global South: common property inland fisheries in Nigeria (e.g. Olomola, 1993), community-based marine resource management in the Pacific islands (e.g. Johannes, 2002), territorial users fishery rights for benthic resources and community fishery quotas for the small-scale pelagic fisheries in Chile (e.g. Fernández and Castilla, 2005; Castilla, 2010). Yet, as underlined by Pomeroy *et al.* (2010), there is a real challenge in scaling-up such local scale management arrangements to a national or even regional maritime spatial planning framework (embracing an entire EEZ for instance, from inshore to offshore ecosystems, from local benthic resources to transboundary migrating pelagic resources). The Philippines provides a very interesting example of a bottom-up approach to scaling up where local communities have been kept involved in the governance at all scales (community-based coastal resource management in the 1980s, co-management in the 1990s, and integrated fisheries management and governance in the 2000s, Pomeroy *et al.*, 2010). Nonetheless, natural resource management at sea is traditionally centralized even in developing and emerging states of the tropical Atlantic region. In such a context, there is a risk that a top-down driven MSP would exclude local communities from governance arrangements. New activities and the reordering of existing uses are also likely to affect people's lives more directly and substantially. However, access to formal decision-making structures is often considered problematic reflecting political disempowerment (Nayak *et al.*, 2014).

Thirdly, MSP runs a risk of being institutionally mismatched. MSP can attract much attention because it is new and promising, yet it might fall behind the business-as-usual approach in sectoral policies. Stakeholders involved in MSP, but not included in sectoral processes, can thus be confronted with changed *de facto* and *de jura* realities. This was the case for instance in France with wind turbine development at sea. Offshore renewable energy programming has been developed in the framework of energy transition to fight climate change. As it meets its own sectoral purposes, this sectoral planning process has been planned just before the integrated French MSP process (Boillet, 2020). These difficulties are likely to be intensified in a tropical context where integrated approaches are less developed.

Moreover, until now, there is little experience with integrated approaches in tropical Atlantic countries, and public policies remain mostly sectoral. In Senegal, some Integrated Coastal Zone Management (ICZM) initiatives exist, the integrated management plan of Saloum Delta for instance (Dia, 2003). In Brazil, Federal Law no. 7.661/1988 establishes the formulation of a National Coastal Management Plan (NCMP), as an integrated plan to promote rational use of resources in the coastal zone. The NCMP, which was approved in 1990 (RESOLUÇÃO CIRM no. 01, de 21 de novembro de 1990), provides objectives and guidelines for coastal zone management. It established the structural organization of coastal management. Nevertheless, at the federal level, it was only in 1996 that the first macro diagnostic of the coastal zone was made identifying: (i) Trends in Occupation of the Coastal Zone of Brazil; (ii) Physical-Natural Characterization of the Coastal Zone of Brazil; (iii) Potential for Environmental Risk in the Coastal Zone; (iv) Conservation Units and Incident Legislation in the Coastal Zone; and (v) Critical Levels of Environmental Management of the Brazilian Coast (Ministério do Meio Ambiente, 2015; page 22). Revised in 1997, the NCMP adopted general standards for environmental management of the coastal zone and created seven tools for the ICZM: i) State Coastal Plan, ii) Municipal Coastal Plan, iii) Information System for the ICZM—SIGERCO, iv) System for the Environmental Monitoring of the Coastal Zone; v) Report on the Environmental Quality of the Coastal Zone; vi) Coastal Ecological Economic Zoning—ZEEC; vii) Plan for Management of the coastal zone, stipulating more participation by society in its formulation and implementation. The NCMP, which is based on a decentralized strategy, encourages member states and municipalities to implement their State Coastal Plans (SCP)and Municipal Coastal Plans (MCP)in accordance with the NCMP. But, of the seventeen coastal states in Brazil, only eight have a State Coastal Plan, and only a few municipalities have a Municipal Coastal Plan (Fotso, 2019). As a result, we can say that the ambitious NCMP faces significant obstacles in its implementation, which remains very limited.

Imbalanced stakeholder power can also be reinforced if the MSP process involves Decision Support Tools, which can turn into black boxes.

Keeping a critical eye on decision support tools results

MSP is a complex process as it relies on spatially explicit cross-disciplinary knowledge and data (ecological, legal, social, economic) (Fotso, 2019; Trouillet, 2019; Said and Trouillet, 2020). Before the emergence of MSP, decision support tools (DSTs) were first developed to help establish zoning plans for MPAs, such as the Australian Great Barrier Reef Marine Park. MPA design (shape, size, and location) based on systematic reserve site selection tools (Pressey, 1994; Pressey and Tully, 1994), which can be considered as a specific class of Decision Support Tool, have become a major and strategic part of MSP.

Since Cocks and Baird (1989), reserve site selection is widely understood mathematically as an optimization problem under constraints. Major developments followed (e.g. Possingham, 1993; Ball and Possingham, 2000; Margules and Pressey, 2000; Possingham *et al.*, 2000; Magris, 2017) leading to optimization solvers with user-friendly features, like the well-known and widely used Marxan (e.g. Ball and Possingham, 2000; Game and Grantham, 2008; Ball *et al.*, 2009; Ardron *et al.*, 2010) or the newcomer prioritizR (Hanson *et al.*, 2020). These optimization solvers are highly appealing as they "always provide a solution" whatever the information available. However, and despite being free and open-source, their formal complexity may turn them into a kind of black-box for most users. Indeed, these solvers, and the reserve solutions they provide, are extremely sensitive to several aspects which should be transparent to all MSP stakeholders to ensure a balanced and fair negotiation.

First, the way the problem is formulated to enter the mathematical optimization problem may have a great impact. Two main optimization formulations are possible: whether to maximize the coverage of conservation features under an *a priori* defined budget of human activity impact (maximum coverage paradigm) or minimize the impacts on human uses while ensuring *a priori* established conservation features coverage (minimum set paradigm). This dichotomy on formulating the optimization problem sets the "burden of proof" between nature conservation and human uses. While the maximum coverage paradigm was initially mainstream, the development and worldwide use of Marxan (strongly supported by some NGOs like The Nature Conservancy or World Wide Fund for Nature) imposed the minimum set paradigm formulation as canonical.

Second, the numerical strategy for solving the optimization problem also has great importance. Owing to large computational costs, the first optimization solvers, as does Marxan, implement an approximate resolution of the problem by estimating suboptimal but numerically less-demanding solutions. The suboptimality is to some extent counterbalanced by considering the average output of a series of suboptimal solutions. However, recent emergence of efficient exact optimization solvers (e.g. prioritizeR) makes it possible to see that methods that were reasonable in the past (Church *et al.*, 1996; Beyer *et al.*, 2016) produce approximate numerical resolution that may not converge with an exact optimal solution (Schuster *et al.*, 2020).

Third, on top of these modelling and numerical paradigms, using these optimization solvers requires a significant "scientific cuisine" from the users on input data and solver parametrization. What data are available or absent? What are the measured data surrogates for? (e.g. bathymetry as a surrogate for habitat, GPS tracks as a surrogate of fishing pressure, etc.) What spatial resolution are the data available at? Do they need to be interpolated in space, or transformed (e.g. log-transformed to reduce their range of variation)? Do we impose a constraint of compactness on the reserve design? (to avoid reserve solutions with scattered points in space as they would be too challenging to enforce.) All these questions may be answered in an infinity of ways, leading to an infinite set of solutions. The process at this step needs to be absolutely transparent (through sensitivity analysis for instance, illustrating the impact of a slight change in one parameter on the output solution), in order to avoid the "ugly" trap of giving more negotiating power to advanced-users of DSTs.

Consequently, DSTs support the decision but should not be used as a totally authoritative argument. Their purpose is to increase knowledge on conservation problem and enlighten policy makers regarding potential conflicts and solutions. In order to avoid, even involuntarily, the pitfall of ocean grabbing, a critical eye has to be kept when dealing with reserve site selection tools.

Moreover, once a marine spatial plan is adopted, it is not the end of the process, since it will have to evolve following effective adaptive management.

Barriers to effective adaptive management

Marine tropical ecosystems, bounded by parallels at 23.5° latitude, are characterized by increased sea surface temperatures (typically >23°C), smooth seasonality, low productivity (oligotrophy), and high species richness (e.g. Gaston, 2000). More acutely than other ecosystems in the Global North, resilience relies on the maintenance of their structural and functional biodiversity (e.g. Soliveres *et al.*, 2016). Since marine tropical ecosystems are less resilient, the introduction of new activities could jeopardize their health more acutely (Trisos *et al.*, 2020).

Traditional polyvalent smaller-scale fisheries are possibly the key to ensuring the resilience to exploitation of living resources in these marine socio-ecosystems (De Melo Alves Damasio *et al.*, 2016) because they are more adapted to "balanced harvesting". The concept of balanced harvesting proposes to distribute a moderate fishing pressure across the widest possible range of species, stocks, and sizes of an ecosystem, in proportion to their natural productivity, so that the relative size and species composition is maintained (Garcia *et al.*, 2016). It has been proposed as a way for fisheries management to achieve the requirements of both the Law of the Sea Convention (1982 UNCLOS)—to maintain stocks at the level at which they could produce maximum sustainable yield (MSY)—and the Convention on Biological Diversity (1992 CBD)—to maintain ecosystem structure and functioning. This concept is particularly relevant in tropical areas as their resilience may be particularly challenged by the impacts of climate change (e.g. Trisos *et al.*, 2020). In contrast to temperate regions, which are expected to increase their species abundance richness, tropical ecosystems are expected to suffer from a decline and even extinction of local species and communities (e.g. Cheung *et al.*, 2009). Therefore, the marine environment in the tropical Atlantic requires an especially adaptive and holistic management (Ferrol-Schulte *et al.*, 2013).

However, from a political and economic point of view, adaptive management is difficult to implement in the light of MSP objectives to secure maritime investment for ensuring blue growth. As mentioned above, even in sea spaces under national jurisdiction, there is no real estate private property at sea. States can rule the spaces under their jurisdiction or sovereignty, but private companies cannot buy a piece of submarine land with the water column above it. They can only ask the State to allow them to use a specified zone for their activities, with a licence for instance. MSP is seen as a way to reduce this legal insecurity by organizing activities prior to operational projects and by allowing negotiations with stakeholders on a large scale. Through a spatial plan, countries make choices between uses, allocating spaces to specific activities. Yet, in the context of systematic conservation in Brazil, the PRIMS project (see above) is to support and secure the decision-making processes and environmental management of potential threats. From an industry point of view, PRIMS works as an early indication of potential conflicts in licensing processes. Its construction is based on available information and specialists' opinion, using systematic conservation planning tools to indicate spatially sensitive areas for biodiversity, with a focus on sensitive species, particularly ones considered as threatened.

Even if MSP plans regular reviews, the spatial plans can become difficult to modify. It is politically and economically difficult to reallocate a zone where substantial investments have been made (energy industries for instance). Moreover, an MSP process allocating a space to a specific activity has reinforced its legitimacy.

Avoid ocean grabbing traps

Four main combinations can be deduced schematically when mixing more or less good and bad motivations and solutions for MSP (Figure 2):

If good intentions materialize in fair, transparent, and participative MSP solutions (green arrow);

If good intentions rather take shape of biased practices of MSP, due to a poor grasp of the marine issues or to manipulative practices (orange arrow, from top left to bottom right);

If bad intentions (and obviously hidden) simply lead to inappropriate forms of MSP (red narrow);

If (in theory, since this configuration is unlikely to exist) when bad intentions transform in virtuous MSP practices (orange arrow, from bottom left to top right).

Between naivety (green) and cynicism (red), one should rather pay attention to the orange variations and shades: fine discourses can always be rerouted and take shape of, especially in tropical countries.

From our study, we have shown that serious risks of ocean grabbing are arising from MSP in the tropical Atlantic. However,

Figure 2. The good, the bad, and the ugly—synthesis diagram.

we also observe that ocean grabbing presently occurs without MSP. So, rejecting MSP is not a solution to avoid ocean grabbing. In order to reverse this potential yet contradictory phenomenon, and develop MSP to become an instrument that helps to prevent ocean grabbing, some recommendations based on our study can be proposed.

First, it is key to recognize the objectives and motivations of all stakeholders in developing MSP through an inclusive participative process. Business as usual of imbalanced stakeholder power could be reinforced in the tropical Atlantic through MSP. Hence, we propose tailor-made MSP. It is specificity would be to built it from local level up to national, focusing on context specific objectives. Capacity-building should focus on enhancing capabilities needed to lead and support goal formulations, negotiations, and reflection. MSP must ensure that objectives of the more vulnerable stakeholders have been fairly taken into account and that the means required to achieve them are secured. We have shown that local communities in Senegal and Brazil are people at risk of ocean grabbing. A bottom up process to develop MSP can integrate more effectively specific needs of local communities while a national driven process can invisibilize them under global blue growth benefits.

Risks associated with DSTs (optimization framework and parameters used) are especially strong in the tropical Atlantic where data are missing, and advanced DSTs users are rare. This lack of data can turn these tools into black boxes. Although such traps are inevitable, they can at least be mitigated (clear explanation of the process to all stakeholders, large data collection campaigns, including socio-economic data, sensitivity analyses, and further research work) and must be kept in mind by anyone working with such DSTs. Indeed, in order to avoid, even involuntarily, the pitfalls of ocean grabbing, a critical eye has to be kept on DSTs results.

The dynamic nature of ecosystems requires due consideration when discussing spatial allocations that are linked to large investments or long-term commitment. But, barriers to adaptive management exist, due to the willingness to secure economic investments. Though it is essential to consider the special sensitivity of tropical ecosystems. MSP process shall provide effective legal mechanisms that allow the marine spatial plan to evolve as often as necessary.

Imbalanced stakeholder power, risks associated with DSTs, need for adaptive management must all be taken into account worldwide in developing MSP. Specificity of the tropical Atlantic context can intensify these problems. Our conclusions are broadly applicable to the Global South countries and our recommendations worldwide. However, it would be highly risky to underestimate the impact of this intensification of ocean grabbing. The intensification of problems in tropical Atlantic will multiply exponentially negative impacts on society and the environment, especially where social and environmental safety nets are weak. Context matters and only tailor-made MSP processes, designed with people from local level to develop plans answering the specific needs of tropical Atlantic countries, can achieve the goal of ensuring that MSP avoids the risks of ocean grabbing.

Data availability statement

"There are no new data associated with this article. No new data were generated or analysed in support of this research".

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