

Institutional frameworks for human dimensions: reflections for marine protected areas in Brazil

Marcos institucionais para as dimensões humanas: reflexões para áreas marinhas protegidas brasileiras

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ABSTRACT

Human Dimensions (HDs) have appeared in the scientific literature linked to the application of alternative approaches to natural resource management. National and international institutions (policies, guidelines, and global goals) guided these discussions on Marine Protected Areas (MPAs). The study aimed at relating these frameworks to the components of HDs. In this sense, a literature review was carried out based on criteria established by Barreto et al. (2020), guiding the selection of 92 peer-reviewed articles complemented by documents related to institutional frameworks. The analysis linked the institutional aspects selected to the components of HDs outlined in the literature. The research revealed the theory of the commons as an influencer in creating the concept of HDs, showing that its understanding goes beyond the univocal idea of human dimensions as the control and regulation of human behavior. Furthermore, five challenges for the integration of HDs in management approaches are highlighted from the connection between the institutional frameworks and the components of HDs. There are signs of a management model in transition that considers and emphasizes human dimensions; however, technocratic and centralizing approaches still prevail.

Keywords: components of human dimensions; institutional framework; natural resource management.

RESUMO

Com o aumento da complexidade nas discussões sobre a conservação da natureza, o conceito de dimensões humanas (DH) começou a aparecer na literatura científica com indicativos de aplicação nas abordagens alternativas de gestão dos recursos naturais. Os marcos institucionais nacionais e internacionais (políticas, diretrizes e metas globais) pautaram essas discussões, e aqui interessa especialmente aqueles associados às Áreas Marinhas Protegidas (AMP). O estudo objetivou relacionar esses marcos com os componentes dessas DH. Para isso, foi feita revisão da literatura pautada pelos critérios de busca estabelecidos por Barreto et al. (2020), que orientou a seleção de 92 artigos revisados por pares, complementados por documentos relativos aos marcos institucionais. A análise consistiu na articulação dos marcos institucionais selecionados aos componentes das DH mapeados pela literatura. A pesquisa apontou a teoria dos comuns como influenciadora da criação do conceito, mostrando que seu entendimento vai além da ideia unívoca de dimensões humanas como controle e regulação do comportamento humano. Cinco desafios à incorporação das DH nas práticas de gestão são apresentados, com base na articulação entre os marcos institucionais e os componentes das DH. Há indicativos de um modelo de gestão em transição que considera e enfatiza as dimensões humanas; entretanto, ainda prevalecem elementos de uma gestão que também é tecnocrática e centralizadora.

Palavras-chave: componentes das dimensões humanas; marcos institucionais; gestão dos recursos naturais.

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Introduction

In the growing debate of the global environmental crisis, the role of societies as key players in the deterioration and/or protection of the conditions of ecosystems and biodiversity has countless meanings (MEA, 2005; COP 21, 2015). This discussion also encompasses the context of coastal zones which, under significant socio-environmental and socioeconomic pressures (Rebouças et al., 2006; Neumann et al., 2015), reflect different conservation and planning strategies adopted by the governments (Mascia et al., 2017; Fairbanks et al., 2019) and exert an influence on the traditional peoples and communities livelihoods (Bavinck et al., 2017; Foppa et al., 2018, 2020).

The strategies include Marine Protected Areas (MPAs), recognized for their role in biodiversity conservation (Humphreys and Clark, 2019). Gradually, they also gained importance as a fisheries management tool (Jones, 2007; Voyer et al., 2012; Macedo et al., 2019), also creating conditions for the maintenance of livelihoods associated with small-scale fisheries (Kalikoski, 2007; Charles et al., 2016; Garcia et al., 2017; Campbell and Gray, 2019; Goti-Aralucea, 2019). On the other hand, such expansion of goals has been inconsistent, especially in terms of meeting human dimensions and promoting human rights (Barreto et al., 2020; Rasheed, 2020). The challenge arises from the need to understand that the management of biodiversity and marine protected areas transcends the limits of “managing nature”. Likewise, it exposes the limits of science to the management of natural resources (Holling and Meffe, 1996; Price, 2003; Vieira, 2005), showing the need for interdisciplinary approaches and greater participation of the social sciences and social scientists (Bennett, 2019; Bennett and Roth, 2019; Moon et al., 2019).

Therefore, new challenges to the designation, implementation and management of the MPAs emerge from human dimensions (HDs). Aspects related to the diversity of stakeholders’ interests in creating the MPAs (for example, NGOs, philanthropic organizations, the private sector, foreign states, national governments, political elites, local population) are included; the equitable distribution of costs and benefits of the conservation strategies (Bennett et al., 2016, 2017); among others. In an attempt to integrate conservation and fisheries management objectives, several factors affect MPA management performance, starting with their design and planning (Kalikoski, 2007; Giral-di-Costa et al., 2020). For example, when the MPAs are superimposed on fishing territories, they experience several conflicts related to access to and management of resources (Calegare et al., 2014; Bavinck et al., 2017).

In addition to the definitions and management principles of MPAs advocated in the scientific arenas, there is an important role for the institutional frameworks to promote compliance with the conservation goals. Agenda 21, the Convention on Biological Diversity and the Aichi Goals, among others, have sought to provide conservation targets, commitments and guidelines for governments and rulers to increase their ability to manage biodiversity (Thomas et al., 2014; Rees et al., 2018; Donald et al., 2019). On the other hand, setting up MPAs, motivat-

ed by international conservation models and goals (Campbell and Gray, 2019), leads to management strategies that reflect a dominant know-how (Corson et al., 2014), with little support in HDs, impairing the conservation processes themselves (Christie, 2004; Pomeroy et al., 2007; Charles and Wilson, 2009; Kittinger et al., 2012; Christie and Lewis, 2016). On the other hand, other frameworks, such as the The Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (Jentoft and Bavinck, 2014), henceforth the Voluntary Guidelines for Sustainable Small-Scale Fisheries, advocate promotion of human dimensions as components of ecosystem sustainability and resilience (Jentoft and Bavinck, 2014).

Understanding the influence related to the scientific contributions and institutional frameworks on the MPA management aspects helps to understand the factors affecting management performance at regional and local levels. Due to the recent emergence of the term HDs in the discourses of science and marine conservation management, with emphasis on marine ecosystems and small-scale fisheries systems, its framing as a concept is still incipient and points to the need for a more detailed approach to replace the old concept of restricted nature conservation. Starting from a global scenario, it is also important to locate this debate in Brazil, especially due to the diversity of components related to HDs in the Brazilian MPAs.

In Brazil, the term “protected areas” encompasses broader definitions and legal aspects than the same generic term used in international literature. The generic term is close to the legal definition of Brazilian “conservation units”, as protected areas can also include indigenous lands, *quilombola* territories and “permanent preservation areas”, defined in specific laws (Medeiros, 2006). In turn, marine protected areas include conservation units defined by the National System of Nature Conservation Units (*Sistema Nacional de Unidades de Conservação da Natureza* – Brasil, 2000), and areas excluded from fishing, defined in various instruments of fishing legislation. However, for the purposes of standardizing the nomenclatures, MPAs (Dudley, 2008) this article refers to conservation units as established for the Brazilian marine-coastal biome.

The National System of Nature Conservation Units establishes two groups of protected areas: No-Take and Sustainable Use protected areas. While the former is restricted to indirect uses, such as tourism, education and research, in Sustainable Use, extractive use, such as fishing, is allowed through specific regulations. A total of 12 categories of protected areas are promoted, for example, from the maintenance of ecosystems excluding human presence in Biological Reserves to conservation of the biodiversity associated with protection of the livelihoods and culture of traditional populations in Extractive Reserves (Medeiros, 2006). Although Brazil is a signatory to many of such conventions and institutional frameworks, in both groups, the Brazilian protected areas present numerous failures in the integration of human dimensions into the decision-making processes (Vivacqua et al., 2009;

Dias and Seixas, 2017; Macedo and Medeiros, 2018; Vivacqua, 2018; Macedo et al., 2019).

Therefore, there is a need to understand how it is possible to advance in promoting MPAs human dimensions. Thus, this study aimed at relating the institutional frameworks (policies, guidelines and goals that contain these discourses) adopted to outline the concept of HDs in the context of the MPAs with the components of these HDs. This objective was thought to broaden the understanding of HDs by scholars and managers, as the presence of these components in MPA management is directly related to the creation of alternative management processes already narrated in the literature. This objective unfolded into: Systematization of these institutional frameworks and description of the elements that define HDs; and Analysis of these institutional frameworks from the components of the HDs mapped by the scientific literature. To such end, the article begins by exploring in greater detail the definitions and construction process of the term “Human Dimensions” and its importance for the management of marine protected areas.

Brief synthesis about the human dimensions

The idea of HDs gained evidence from new perspectives on natural resource management, such as the ecosystem approach (Berkes et al., 2001; Young et al., 2008), and the expansion processes for the creation of marine protected areas (Christie et al., 2017). Criticism starts from the perspective of command and control of the natural resources (controlling ecosystem components and State-centered perspective) (Holling and Meffe, 1996) and highlights the importance of human dimensions for the management processes (Charles and Wilson, 2009; Kittinger et al., 2012; Bennett et al., 2017; 2019).

The use of the term HDs in the literature is recent and comprehensive; it sometimes appears as the social aspect of the social-ecological systems, and others as a more participatory management strategy, seeking to balance the human and ecological factors of the social-ecological systems (SES) (Barreto et al., 2020). The SES perspective is aligned with the systemic theory, and emphasizes connections, contexts and feedback mechanisms between *nature-society*, that is, the interdependence of social and ecological systems (Allen et al., 2014). This perspective and its variations — especially the ecosystem approach applied to fishing (CDB, 2004; Young et al., 2008) and adaptive co-management (Armitage et al., 2009) — have emphasized HDs as a fundamental component of these approaches (Pomeroy et al., 2007; Folke et al., 2016; Armitage et al., 2020).

Concrete cases and the literature itself have demonstrated the possibility that the MPAs may come to produce ecological benefits in combination with socioeconomic benefits (Macedo et al., 2019) and, certainly, the recognition of HDs is included in these cases. In order to broaden application of HDs in fisheries management and in the MPAs, it is necessary to elucidate what this concept involves and its relationship with the discourse about national and international nature conservation strategies. For this purpose, the study starts from a crit-

ical conception in the reflection of the fundamentals of the so-called institutions in the management of resources in the SES (Vieira, 2005; Seixas and Kalikoski, 2009; Tebet et al., 2018), and thus assumes that human beings are inserted as a constitutive part of the ecosystems and landscapes (human being in nature or human-in-ecosystem) (Davidson-Hunt and Berkes, 2003; Vieira, 2009; Folke et al., 2016).

Material and methods

In this study, a literature review was performed based on the search criteria established by Barreto et al. (2020), which guided the selection of 92 articles aimed at descriptions and use of the term “Human Dimensions” in the context of marine protected areas. To this end, the following descriptors were used: human dimensions, marine protected areas, small-scale fisheries and ecosystem approach applied to fishing (ecosystem-based fisheries), as well as their related terms and synonyms. The descriptors associated with fishing were included, as a complement to expand the search scope, given the association in the literature between MPAs and fisheries management, especially small-scale fisheries (Hart and Reynold, 2002; Young et al., 2008; Kittinger, 2013; Koehn et al., 2013; Christie et al., 2017; Hornborg et al., 2019). The Scopus and Web of Science (WoS) databases were used due to their representation of journals on environmental management, governance and natural and social sciences, with only peer-reviewed articles, with no time limit being selected.

Complementary documents on the institutional frameworks mentioned in the articles were added to the initial portfolio (reports from conferences and conservation goals). From this set of information, the particularities about the institutional frameworks that structure the HDs were extracted, with each framework selected being briefly described to show its connection with the concept of HDs and with MPA management. These frameworks were then organized in chronological order, indicating the reference source (Table 1).

Considering that these institutional frameworks also guided debates in the scientific literature, Figure 1 was prepared, which explores the occurrence relationships between the components of the HDs found in the literature and the institutional frameworks selected. To assess these components, the systematization made by Barreto et al. (2020) was considered, which described 35 components of the HDs, ordered into five analytical categories: governance (G), economics (E), social (S), cultural (C) and political (P). According to the authors, the components of the HDs organized in this way can be considered as indicators or results for the robust management and governance of small-scale fisheries and marine protected areas, and that is why they were brought to the current discussion.

For presenting the syntheses described herein, the sets of information (institutional frameworks, scientific articles and components of the HDs) were organized in the Atlas TI Software and guided data triangulation (Weyers et al., 2008). This proposal accompanied the analysis effort that had already been initiated on the components of

Table 1 – Description of the Human Dimensions’ aspects present in the frameworks of the international environmental debate in the context of the management of marine protected areas, small-scale fisheries and ecosystem approach (alternative management).

Institutional Frameworks	Date	Description	References
Stockholm Conference	1972	Creation of the United Nations Environment Programme (UNEP). It includes the ecological, ethical and moral dimensions in the debate on economic growth.	(PNUMA, 1972)
UN Convention on the Law of the Sea	1982	It provides the legal framework for the conservation and sustainable use of ocean resources.	(MMA, 1982)
Convention 169 - The International Labor Organization on Indigenous and Tribal Peoples	1989	It protects the rights of these peoples, defends their territorial autonomy and establishes self-definition or self-determination as a criterion for identifying these groups.	(ILO, 1989)
International Human Dimensions Program (IHDP) of the International Social Science Council	1990	It establishes a scientific agenda for research on the HDs of global environmental change. In 1996, it becomes the International Human Dimensions Programme on Global Environmental Change.	(Hogan, 2007)
Eco-92 Conference	1992	Elaboration of Agenda 21 (chapter 26) and Rio Declaration (principle 22), which recognize the vital role of indigenous peoples and local communities in environmental management and recognize traditional knowledge and practices.	(UN, 1992, 1995)
19 th IUCN General Assembly	1994	It mentions the importance of community-based approaches (recommendation 19.23), emphasizing the construction of partnerships with local organizations to establish Community-Based Conservation (CBC).	(IUCN, 1994)
Code of Conduct for Responsible Fisheries (FAO)	1995	It recommends that responsible fishing takes into account not only the biological aspects, but also technological, social and socio-environmental aspects and traditional knowledge.	(FAO, 1995)
Ecosystem Approach (CBD)	2000	Official adoption of the principles and guidelines that advocate a holistic and participative management approach, seeking to reconcile human uses and environmental conservation.	(MMA, 2000)
Millennium Development Goals (MDGs)	2000	They address, among others, goals to ensure poverty reduction and environmental sustainability.	(UN, 2000)
World Summit on Sustainable Development (WSSD, Johannesburg)	2002	It encourages the application by 2010 of the ecosystem approach and the promotion of integrated and multi-sector coastal and marine development through the creation of a global MPA network by 2012.	(Prates, 2014)
5 th World Congress on Parks (IUCN)	2003	A debate on collaborative management and governance, recognizing the conservation practices of local communities (Community Conserved Areas).	(Borrini-Feyerabend et al., 2004)
Millennium Ecosystem Assessment	2005	The largest assessment ever carried out on the health of ecosystems and their connections to human well-being.	(MEA, 2005)
Strategic Biodiversity Plan (CDB)	2010	Elaboration of the Aichi goals (2011-2020) aiming to reduce planetary biodiversity loss. Goal 18 mentions the full and effective participation of the indigenous and local communities in conservation management. Goal 11 establishes that, by 2020, at least 10% of the marine and coastal areas must be preserved.	(CDB, 2010)
Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (FAO)	2015	It emphasizes aspects such as food security, poverty eradication, employment, gender equality and participation as fundamental to ensuring the sustainable management of small-scale fisheries.	(FAO, 2015)
Sustainable Development Goals (SDGs)	2015	It maintains and extends the MDGs and includes conservation and sustainable use of the oceans (Goal 14).	(UN, 2015)
Think Tank on Human Dimensions (TTHD)	2016	First broad initiative to formally debate the MPA HDs on a large scale. The meeting brought together 17 countries.	(Christie and Lewis, 2016)

Source: own elaboration.

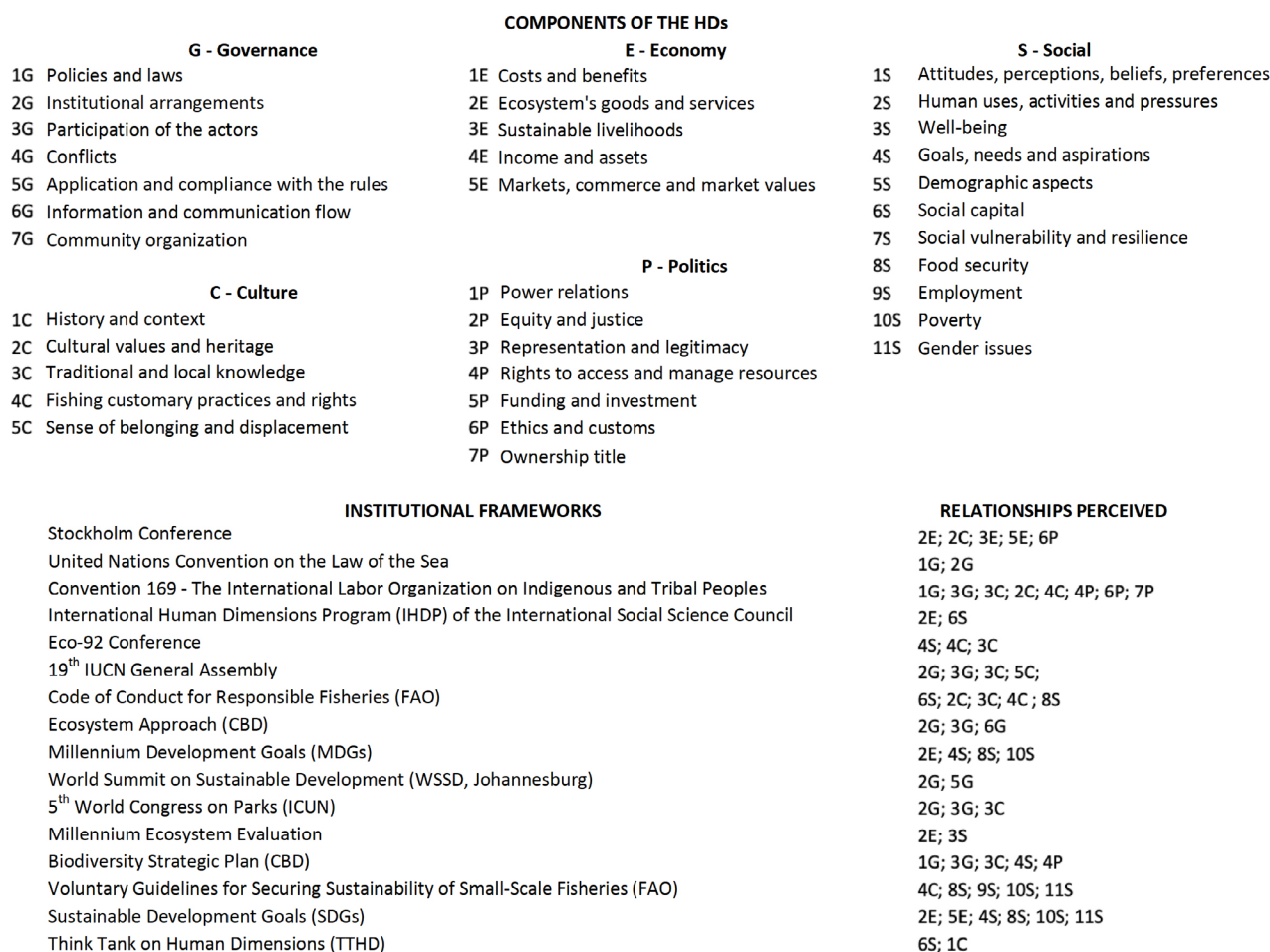


Figure 1 – Perceived relationships between components of Human Dimensions as described by Barreto et al. (2020) and the institutional frameworks mapped.

Source: own elaboration.

HDs in nature conservation and natural resource management (Kittinger et al., 2012; Gruby et al., 2016; Heck et al., 2016; Christie and Lewis, 2016; Barreto et al., 2020).

Results and Discussion

International institutional frameworks and the path for the construction of human dimensions

Setting up protected areas has been the political practice adopted worldwide to minimize biodiversity loss. However, this practice alone is not sufficient and, in many cases, has failed to meet the conservation goals (Brito, 2000; Berkes et al., 2001; Kalikoski, 2006; Rebouças et al., 2006). As already shown, incorporation of HDs in discussions about the management of these areas and the adjustments between the institutions created (formal and informal

rules) can minimize the impact of policies that prioritize certain dimensions (ecological or economic) over others (human and social) (Pomeroy et al., 2007; Voyer et al., 2012; Loring and Harrison, 2013; Bennett et al., 2016, 2017).

Thus, the influence of the institutional frameworks in this context and in the construction of the concept of HDs is assumed. Results of the institutional frameworks identified in this study and some information about them are presented (Table 1). It is noteworthy that the institutional frameworks described are not unique, and those considered for this study support the definition of a concept of HDs.

The Stockholm Conference (1972) is generally considered a framework on the construction of another development because it incorporated nature conservation aspects into the productive process. This framework highlighted the conflict of interests between short-term development and the limits of material growth (Mead-

ows et al., 1972), pointing out the need to devise a global ethic of development that “mutually recognizes and promotes social and ecological values” (Engel, 1990, p. 19).

The systemic concept of ecodevelopment emerged in the same decade (1970s), emphasizing the need to include the ecological, ethical and moral dimensions in the debate on economic growth (Sachs, 1986; Vieira, 2009). In this context, the integrated view of the social and natural systems, as social-ecological systems, mobilized the resumption of the human-in-nature perspective linked to the theoretical-methodological elaborations of the scientific community (Davidson-Hunt and Berkes, 2003). This resumption checkmated the theoretical, scientific and also political paradigm of protected areas interpreted as biodiversity islands supported by management models that exclude human populations from these areas (Ferreira, 2004).

Highlighting the visibility of this human-nature interaction, other global socio-environmental events gave visibility to human and social aspects in the context of MPA management and the use of natural resources, covering a period of six decades (1970-2020). Between the 1980s and 1990s, the Brundtland Report or Our Common Future (1991) stands out, which introduced the human dimension of “solidarity” with the future generations through the concept of “sustainable development”, stating that nature needs to be preserved for development to be sustained. The notion of intergenerational solidarity added social, political, cultural and technological dimensions to the idea of sustainability. Reinforcing this understanding, Katona et al. (2017) recognize the Brundtland Report as the turning point of ecological thinking symbolizing yet another theoretical break in the artificial separation between human beings and nature. At the same time, the concept of sustainable development was also criticized for neglecting the predecessor concept of “ecodevelopment” and also for fostering a discourse of ecological sustainability at the expense of the commodification of nature (Vieira, 2005, 2009; Leff, 2006).

During this same period (1980-1999), the 19th General Assembly of the IUCN and Convention 169 of the International Labor Organization (ILO) on Indigenous and Tribal Peoples established, respectively, the implementation of shared management processes and legal frameworks with a view to guaranteeing the human and social rights of the traditional and local communities. Convention 169 guaranteed the peoples’ right to self-determination, thus safeguarding their territorial autonomy, primarily in the legal context (ILO, 1989). However, many of the decisions regarding nature conservation end up devaluing the identity of the populations that live in these territories (Calegare et al., 2014; Evans and Reid, 2016; Vivacqua, 2018).

The scientific community devoted to the study of Global Environmental Change (GEC) started talking about HDs in the late 1980s (NRC, 1999). In 1996, the International Human Dimensions Program (IHDP) was created, which included “human activities” in the conceptual model that explains the functioning of the Earth system (Bretherton Diagram), scientifically recognizing that analyzing

human actions is extremely important for nature conservation and understanding its biophysical effects (Mooney et al., 2013).

The following decades (2000-2015) reinforced aspects that have been raised since the Stockholm Conference, such as the fight against poverty, and included and highlighted other relevant aspects such as gender, human rights and social well-being. Two frameworks can be highlighted in this period: the ecosystem approach that seeks to reconcile human uses and nature conservation, and the Sustainable Development Goals (SDGs) proposed by the United Nations (UN). With roots in the traditional models of community management (Garcia and Cochrane, 2005), the principles and guidelines of the ecosystem approach started to be systematically adopted by the Convention on Biological Diversity (CBD) in 2000, during the 5th Conference of the Parties decision number 6 - COP V/6 (CBD, 2000). Despite being included as a precept in the regulation of the fisheries management instruments (Brasil, 2009), incorporation of the ecosystem approach is hampered by the scarcity of fishing monitoring data and continuity of the participatory processes (fishermen’s engagement in decision-making) (Dias and Seixas, 2019).

In relation to the Millennium Development Goals (UN, 2000) and the Sustainable Development Goals (UN, 2015), the goals proposed by the UN emphasized aspects related to the eradication of poverty, gender issues and the integral development of human beings associated with a healthy environment. Goal 14 of the SDGs seeks to consolidate specific strategies for the conservation and sustainable use of the oceans, seas and marine resources. However, the very title of this SDG (“Life Below Water”) still emphasizes the biological aspects of conservation at the expense of living beings under water (Jentoft, 2020).

With regard to the marine ecosystems and small-scale fisheries systems, the United Nations’ Food and Agriculture Organization (FAO) provides a wide range of guidelines for the conceptual management models in the operational contexts. These include the International Code of Conduct for Responsible Fisheries (FAO, 1995) and the Voluntary Guidelines for Sustainable Small-Scale Fisheries (FAO, 2015). They advocate for participation rights, also covering issues such as customary tenure rights, gender equality, employment and health. These Guidelines were developed through a process that has been presented by the literature as effectively participatory (Pedrosa and Lessa, 2017). According to Pedrosa and Lessa (2017), by placing human rights at the center of fisheries management, the Guidelines brought to the management discussions aspects of collective law, gender issues, culture, contribution to global food safety, nutrition and poverty eradication (Goti-Aralucea, 2019). On the other hand, the Code of Conduct established the ecosystem approach applied to fisheries (EAF) as an analytical and operational perspective, offering concepts and tools for its implementation (Garcia and Cochrane, 2005; Young et al., 2008; FAO, 2013).

The idea of HDs perceived in these institutional frameworks analyzed can be summarized in the following key terms: integrated and decentralized management, participation in decision-making processes, different

uses of resources, human and social rights, equity (including gender) and justice. In a way, these terms appear among the guiding principles of the alternative approaches to management. Their presence indicates that the conservation goals, guidelines and agendas have progressively taken on broader, interdisciplinary and participatory management perspectives, emphasizing the notion of HDs as an essential element to improve the conservation outcomes (Charles and Wilson, 2009; Voyer et al., 2012; Bennett et al., 2017; Moon et al., 2019; Barreto et al., 2020).

Perceived relationships of the institutional frameworks in Brazil

Much of the Brazilian environmental policy has developed in response to the demands of the international environmental movement (Vieira, 2009; Peccatiello, 2011). The legal contours related to environmental protection gained greater consistency after the enactment of the 1988 Brazilian Constitution (Brasil, 1988), which integrated the actions of the public power that were isolated and fragmented into new legal regulation instruments (Vieira, 2009; Lima, 2011).

CF 88 represented a milestone and advance in the legal protection not only of biodiversity (ecological system) but also of sociodiversity (Santilli, 2005). Preceding Eco-92, the creation of the Brazilian Forum of Non-Governmental Organizations (NGOs) and Social Movements for the Environment and Development, promoted the articulation of networks of NGOs and social movements that organized the participation of civil society in this conference (Santilli, 2005). However, in practice, the governmental actions remained “fragmented and contradictory, occupying a peripheral space in the dynamics of the political system’s functioning and in the daily life of the majority of the Brazilian people” (Vieira, 2009, p. 29).

Since the creation of the Special Secretariat for the Environment (*Secretaria Especial de Meio Ambiente* — SEMA, 1973), in the post-Stockholm-72 period, through the creation of environmental agencies such as the Brazilian Institute for the Environment and Renewable Natural Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* — IBAMA, 1989), of the Ministry of the Environment (*Ministério do Meio Ambiente* — MMA, 1993), and the Chico Mendes Institute for Biodiversity Conservation (*Instituto Chico Mendes de Conservação da Biodiversidade* — ICMBio, 2007), there has been a growing effort to develop an environmental apparatus in the country (Lima, 2011), which also had repercussions on the establishment of organizational charts responsible for the implementation of protected areas (Brito, 2000). This agenda has been accompanied by discussions on social participation, and the National Environmental Policy (*Política Nacional de Meio Ambiente* — PNMA, 1981) is cited as the starting point for this debate.

Therefore, it was in the 1980s that the country began to consolidate a more integrated environmental policy system, culminating in the creation of the National System of Nature Conservation Units (Brasil, 2000). Although considered as an advance for the creation of

protected areas in the country (Peccatiello, 2011), the first bill of law to create the SNUC pointed to the human presence as a threat to biodiversity conservation (Calegare et al., 2014).

A complex subject matter by itself, although not the focus of this paper, the different typologies of protected areas reflect the set of political, social, economic and environmental interests that were found in the process of creating the SNUC. The most controversial points included popular participation in the process of creation and management of protected areas, as well as the role given to the traditional communities (Medeiros, 2006; Peccatiello, 2011). In any case, the creation of protected areas of the Sustainable Use group, such as Extractive Reserves (*Reservas Extrativistas* — RESEX) and Sustainable Development Reserves (*Reservas de Desenvolvimento Sustentável* — RDS), represented an important step forward by also incorporating into the conservation objectives the cultural values associated with the traditional practices (Medeiros, 2006). These two categories of protected areas emerged in the context of the institutional struggles of social movements and NGOs, representing a change in the perspective of nature conservation management, now more aligned with the SES. This notion of integrated systems has acquired important status in the discussions about protected areas in the coastal and marine zones, creating other institutional arrangements for MPA management (Prado and Seixas, 2018), and fostered debates about the legal rights of the Brazilian traditional populations, mainly since the 1990s (Diegues, 2008).

In 2006, the National Plan for Protected Areas (*Plano Nacional de Áreas Protegidas* — PNAP) was established (Brasil, 2006), in line with decisions taken within the scope of the Convention on Biological Diversity (CBD). This Plan sought to integrate the policies of the protected areas managed under the SNUC framework with those for the conservation of indigenous lands and *quilombola* territories (MMA, 2006). Even at a theoretical level, incorporation of these territories into the PNAP recognizes the role of these communities in biodiversity conservation.

The National Coastal Management Plan (*Plano Nacional de Gerenciamento Costeiro* — PNGC) and the Bill of Law for the National Policy for Conservation and Sustainable Use of the Brazilian Marine Biome (*Política Nacional para a Conservação e o Uso Sustentável do Bioma Marinho* — PNCMar) are specific national frameworks for coastal and marine areas, the latter still in progress as a bill of law (Brasil, 2004, 2013). Presupposing integrated, participatory, proactive and ecologically prudent management processes, the PNGC aimed, for example, at implementing zoning for uses and activities along the Brazilian coast. However, it is criticized for establishing participatory mechanisms that are not very expressive, technocratic and notably budgetary (Vivacqua et al., 2009). According to Moura (2017), the PNGC is a technical and disciplinary environmental planning instrument for the use and occupation of the coastal and marine areas, with little openness to the incorporation of ways of life and uses of natural resources by traditional communities in the management instruments. In addition, it lacks the implementation of a good part of its manage-

ment instruments foreseen for over 30 years. PNCMar (LB No. 6,969), also known as the Law of the Sea, intends to adopt marine spatial planning as one of its main management instruments and a governance system that is adaptive and ecosystemic, in line with the international treaties which Brazil is a party to. Elaboration and implementation of a formal marine spatial planning policy in the country must be carefully made so as not to be also guided by a technocratic, centralizing perspective and aligned with major economic interests, disregarding other interests and needs, such as small-scale fisheries (Gerhardinger et al., 2007). Thus, what seems to be the discussion focus is the context for managing areas in this complex social-ecological system, the participation modalities and quality and its limits when considering the structuring institutional frameworks of the MPAs.

In relation to Brazilian fisheries management, its path has been marked by constant political instabilities through displacements and extinction of secretariats and ministries, which exert an impact on its normative legal framework. Among the latest changes is the temporary suspension of closed-end insurance with the justification of re-registration to correct the illegalities in granting the benefit (MAPA/MMA Interministerial Ordinance No. 192, of October 5, 2015). Closed-end insurance is known in Brazil as *seguro-defeso*, a resource equivalent to a minimum wage paid by the government to professional artisanal fisherwomen and fishermen during periods of prohibition of capture for the reproduction of the species. Suspension was followed by the extinction of the Fisheries and Aquaculture Ministry (*Ministério da Pesca e Aquicultura*, Law No. 13,266/2016). Once the Ministry was terminated, the Aquaculture and Fisheries Secretariat (*Secretaria de Aquicultura e Pesca* — SAP) housed in 2015 in the Ministry of Agriculture was transferred to the Ministry of Industry, Trade and Services (*Ministério da Indústria, Comércio e Serviços* — MDIC) in early 2017 (decrees No. 9,004 and No. 9,067, dated 2017). Then, Law No. 13,502, dated November 2017, determined the re-creation of the Aquaculture and Fisheries Special Secretariat, linking it again to the Presidency of the Republic (*Secretaria Especial da Aquicultura e da Pesca/Presidência da República* — SEAP/PR). As a result, Law No. 13,844 of 2019 returned the administrative competence of the fisheries exclusively to the Ministry of Agriculture, Livestock and Supply (*Ministério da Agricultura, Pecuária e Abastecimento* — MAPA).

There is a reading that all these changes in the competence of fisheries management are being made to the detriment of small-scale fisheries, as there is not enough institutional structure and human resources to meet the demands and interests of this category (Azevedo and Pierre, 2017). The same authors argue that, in addition to these changes, in Brazil there is a very diverse and broad legal framework with regard to small-scale fisheries, based on development and conservation policies that aggravate inequalities resulting from the unequal distribution of benefits, costs and risks in fishing territories. The interface of this context in the management of MPAs is often controversial, permeated by conflicts of competences and uncertainties in the authority to implement the management

demands (Tebet et al., 2018; Macedo et al., 2019). Even the National Policy for the Sustainable Development of Traditional Peoples and Populations in Brazil (Law No. 6,040 of 2007) (Brazil, 2007), which supports alternative activities in the fishing territories (Moura, 2017) by guaranteeing recognition and respect for livelihoods and traditional territories, collides with the fragility of participation formats and access to resources in the MPAs (Voyer et al., 2012; Goti-Aralucea, 2019). Locating the HDs in this context can, therefore, aid visibility of these rights and improve the management of these areas, aspects which are dealt with below.

Locating the human dimensions and the challenges for their application in Brazil

Different national and international institutional frameworks contributed to delineate the concept of HDs in the context of the management of marine protected areas. In the international political arena, it is clearer that the frameworks, management guidelines and global conservation goals are increasingly taking on approaches that seek to associate the ecological and human dimensions, including the ecosystem approach applied to fishing (Young et al., 2008; FAO, 2013) and the think tank on MPA HDs in 2016 (Christie and Lewis, 2016).

In the environmental sciences, although human activities were officially included in the conceptual model that explains the functioning of the Earth system only in 1996, studies such as the one by Olson (1971) already dealt with the collective action related to decision-making in the use of natural resources. The theory of the commons (or common pool-resources), whose studies intensified in the 1990s, also contributed to this area with important aspects about the ways in which individuals define the patterns of access, use and reproduction of natural resources (Ostrom, 1990). These studies highlighted the local mechanisms for controlling the use of resources, such as communication and bonds of trust, with an emphasis on natural resource community management. In other words, they emphasized some HD related to nature conservation. It is noteworthy that this study pointed to the theory of the commons as a great mobilizer of the concept of HDs in this MPA context, superimposed on fishing territories, and that its understanding can (and should) go beyond the univocal idea of human dimensions as control and management of human behavior (Shove, 2010; Castree et al., 2014; Barreto et al., 2020).

In this context, studies on sociocultural characteristics, power dynamics and their institutions, and shared, participatory and adaptive management (co-management) somehow became part of this analysis. However, it is necessary to locate HDs in this discussion, as there are many meanings attributed to this concept (undoubtedly a polysemic term). And, despite the interpretations coming from different knowledge areas and relating the concept to components such as “attitude, perception, beliefs and preferences”, there are approaches that still relate them exclusively to “human uses, activities and pressure” (Barreto et al., 2020), supporting command and control management processes (Shove, 2010; Castree et al., 2014).

Also, on the definition and use of the term, Barreto et al. (2020) identified that few articles using the concept of HDs were published in social and human science journals (most were published in environmental and natural science journals). When mobilized especially by natural and environmental scientists, the concept of HDs related to MPA management also carries with it natural science paradigms in resource management. Due to this bias, the debate on HDs has still been dominated by behavioral perspectives arising from interpretations of currents linked to methodological individualism and functionalism, with little opening for the so-called “more critical” readings (Castree et al., 2014; Moon et al., 2019). In a simplified manner, it can be asserted that the functionalism theory found in the social sciences explains the institutions from their specific functions in society and their effects. The greater emphasis on the management components, with emphasis on the institutional aspects and parameters associated with the regulation of the use of natural resources, points to the already mentioned influence of the theory of commons school on the genesis of the concept of HDs (Ostrom, 1990). This emphasis also indicates a widespread (and often imposed) acceptance of the requirement to adapt specific human behaviors and controls especially applied to local populations in areas that are rich in biodiversity and resources (Evans and Reid, 2016).

By integrating other sciences, such as the social sciences, there is a growing expansion in the discussions about HDs, with questioning of these exclusive paradigms and incorporation of themes related to the social impacts of the MPAs, to the divergent interests in the creation of the ‘institutions’ and to the management processes of these areas. However, components, such as gender, employment, poverty, ethics and property rights, which have been gradually incorporated into global institutional frameworks such as the MDGs and SDGs, are less noticeable in the current literature when compared to the governance HDs, for example.

In general, in the literature reviewed, the HDs appeared defined by the *actor-institutions-nature* interaction, interpreted as a mutual influence relationship. Its essence lies in the process of interaction (and conflict) between diverse interests and needs, which in this study are considered through the 35 components mapped by Barreto et al. (2020). They consider that the minimum human living conditions must be guaranteed (see, for example, FAO’s Voluntary Guidelines for Securing Sustainability Small-Scale Fisheries, Table 1) and point out to the construction of multi-interest processes, with the influence of science in the elaboration of policies, and with relationships with other agents, such as NGOs and social movements. According to this reading, the articulation between HDs and the institutional frameworks becomes evident. Figure 1 was structured to show this relationship.

These already established relationships reveal the complexity in the application and elaboration of new socio-political agendas related to the theme, by showing the challenges of working on the 35 components of HDs in an integrated way. Figure 1 shows that the “institutional arrangements”, “participation of the actors”, “traditional and local knowledge”, “food security”, “poverty” and “gender” components were

more frequently mentioned in institutional frameworks. This shows the need to incorporate the other components of HDs, both in the political field as well as in the daily management of the MPAs, in order to achieve more equitable and fair processes. In this context, it is also necessary to visualize the political strategies and funding mechanisms to deal with all this multiplicity of dimensions in the management of natural resources (Jentoft et al., 2007; Thomas et al., 2014).

Complexity also refers to the fact that the political, scientific and management elements are interactive and interdependent. Integrating the components of the HDs related to small-scale fisheries to these elements requires monitoring of these processes and mutual learning. As an example, there was a mention to the difficulty connecting the different scientific and political languages (Caveen et al., 2013). Literature points out that information exchange between researchers and managers is one of the bottlenecks cited for improvement in the decision-making systems, and contemplating HDs in these processes seems to be a possibility to build a more robust management (Voyer et al., 2012; Cvitanovic et al., 2015; Dias and Seixas, 2017; Ranzani and Serafini, 2020).

Therefore, literature reports that integrating HDs into biophysical and ecological dimensions creates space for the adoption of broader (and effective) approaches to natural resource management. This integration structures more participative management policies and processes, aiming to improve the conservation outcomes. However, it is noted that the focus on aspects that establish reference points on the regulation and forms of use of the natural resources (i.e., on human behavior), ends up resulting in a low prioritization of essential parameters for evaluating the social impacts arising from these regulations.

In this context, the analyses carried out in the current study allow pointing out important challenges faced in Brazil with regard to the effective implementation of more integrated approaches that consider HDs, namely:

- Recognition in the scientific and legal-normative field of the role of local communities in the maintenance of the ecosystems finds little support in the executive and decision-making fields (*de jure and de facto*);
- Conditioning to a world view and rationality unique to the scientific community and to a reductionist conception of management and development, based on the use of strictly economic parameters (*positivism in environmental sciences and command and control type management*);
- The distance between the studies, proposals and global goals and the different national and local realities (*scale problem*);
- Integrated research on the social-ecological systems is still primary and much of the contemporary literature does not fully achieve the necessary interdisciplinarity (inter- and trans-disciplinary projects, involving social and natural scientists, are incipient). See Sowman et al. (2013) and Hidalgo et al. (2015);
- Guidelines and legal frameworks play a dual role: they both influence public policies and can hinder certain types of adjustments and

adaptations necessary to respond to new sets of problems in the current context of accelerated transformations (e.g., adversities at different scales, such as climate change and the COVID-19 pandemic).

These challenges corroborate the argument that, despite the advances made by the institutional frameworks (especially regarding the recognition of human populations as subjects of law that have their livelihoods overlapped with protected areas), these spaces continue to be the scene for conflicts, social exclusions and disputes between uses and conservation. In a way, the management of natural resources shows indications of a model in transition; however, especially in the fishing activity, elements of technocratic and centralizing management still prevail, objectives regulated by market laws and command and control mechanisms (Vivacqua et al., 2009; Corson et al., 2014; Medeiros et al., 2014; Seixas et al., 2011, 2020).

On the other hand, the incorporation of the concept of HDs into policies and in the daily management routine, even in an incipient way, built space for innovative management experiences, which can provide opportunities for practices involving different actors in open and deliberative arenas that value sociobiodiversity and the debate on social beliefs, norms and values (e.g., deliberative councils). In relation to Brazil, despite institutional weaknesses, successful local experiences of fisheries management and marine protected areas can constitute possibilities for integrating HDs, as already noticed in some realities (Macedo and Medeiros, 2018; Seixas et al., 2020).

Conclusions

Even though there is still a need to improve the incorporation of human dimensions into the management of natural resources in MPAs, the current study made it possible to perceive, in a promising way, that

the understanding of HDs goes beyond the univocal idea of control and management of human behavior. To collaborate in the understanding of these issues, the national and international institutional frameworks associated with the discussions on MPAs were revisited and articulated to the components of the HDs presented by Barreto et al. (2020). The components and relationships established with the frameworks selected show indications of a management model in transition in Brazil. At the same time, this transition imposes several challenges related to the integration of HDs into the current practices of MPA management, with emphasis on overcoming institutional arrangements that are still centralizing and technocratic.

The study also allowed to understand that several authors use the term “HDs” with different connotations or conceptualizations, although it is perceived that this conceptual abundance is more of an understanding effort than a point to focus on the scientific field. This multiplicity of interpretations highlights the characteristic of the systemic, transdisciplinary and multi-scale aspects in the discussion about MPAs. If the reductionist approaches to management usually fail, the five challenges summarized in this article showed that the simple adoption of goals and agreements does not guarantee adequate resource management in Brazil. If they are fundamental to achieving conservation objectives, it is necessary to look more deeply at human dimensions.

As this is not a comprehensive review (research limitation), it is assumed that some relevant documents may have been left out from the synthesis presented. However, the articulation between institutional frameworks and the components described by the literature indicates how the term “HDs” has been translated from an academic concept to a set of policies and normative management practices, and how this process models social, political and environmental changes both inside and outside the protected areas (policy influence & science nurturing).

Contribution of authors:

Barreto, G.C.B.: Funding Acquisition, Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing — original draft, Writing — review & editing. Silva, M.D.: Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing — original draft, Writing — review & editing. Nascimento, D.E.: Writing — Review & editing. Serafini, T.Z.: Writing — Review & editing. Medeiros, R.P.: Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing — original draft, Writing — review & editing, Supervision.

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