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# Del Compromiso Presencial al Virtual: Adaptaciones de un Proceso Participativo para el Diseño de una Política Pública de Basura Marina en Brasil

## From In-person to Virtual Engagement: Adaptations of a Participative Process for Designing a Marine Litter Public Policy in Brazil

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### Abstract

Marine litter is a transversal issue that affects the environment and society in a multitude of ways. As such, solutions to this problem are complex and demand the engagement of multiple sectors of society. The São Paulo Strategic Plan for Monitoring and Assessment of Marine Litter (PEMALM) is the first public policy of its kind, seeking to establish indicators and build knowledge to move towards a plan to combat marine litter in the most populous state in Brazil. From its inception, PEMALM has sought to establish a participative construction framework, involving key stakeholders at each step. When the Covid-19 pandemic struck, the participative construction process had to be adapted. Here we present and discuss

the strategies applied in the participatory process of PEMALM to guarantee the remote engagement of stakeholders. Three participatory milestones were part of the final policy-making process: a first in-person workshop which gathered stakeholders in a single location, a series of in-person meetings in which the project team travelled to where the stakeholders are located, and, due to the Covid-19 pandemic, an entirely virtual workshop. Sector participation was found to be alike for online and on-site events, with higher participation of the public sector, followed by academia, NGOs and the private sector in both. The adjustments and the adaptive effort placed on the participatory process due to the Covid-19 pandemic, such as being dedicated and attentive to the needs of attendees, expanding the modes of interaction and promoting a flexible and light schedule to reduce online fatigue, guaranteed the quality of stakeholder engagement and participation. The positive accomplishments of the hybrid strategy used in building PEMALM as a public policy exemplifies ways to facilitate and broaden participation in the co-construction under mobility restrictions.

## 1. Introduction

Marine litter is a transversal issue that affects the environment and society in a multitude of ways. Impacts go beyond threats to wildlife and ecosystems, affecting human socioeconomic activities, such as tourism, fisheries and navigation, and human well-being (UNEP, 2016a; GESAMP, 2019, 2020). As such, solutions to this problem are complex and demand the engagement of multiple societal sectors, represented by a diverse range of stakeholders (UNEP, 2016a, 2020; Turra *et al.*, 2020). Global strategies to face the problem need to identify priority sources and locations to direct resources (*e.g.* Alliance to End Plastic Waste, 2020). The United Nations Environment Assembly (UNEA) has established four specific resolutions on the topic of marine litter to guide member states: i) recognizing marine litter as a global emerging threat; ii) designing strategies to address knowledge gaps about the issue; iii) defining a long-term zero vision on plastic entering the ocean due to inefficient governance; and iv) acknowledging the need to strengthen coordination and scientific and technological knowledge (UNEA, 2021).

Still on national and sub-national spatial scales, there are examples of marine litter combat initiatives within the Regional Seas Programs of the United Nations Environment Program (UNEP, 2016b). Some of the Regional Seas conventions and action plans

include marine litter combat programs, such as the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), for countries in the European Union (Marine Strategy Framework Directive), and USA. However, while combat plans mention the importance of monitoring and assessment of marine litter to integrate science and decision-making, as preconized by GESAMP (2019), these initiatives are still incipient.

Brazil is among the top 20 countries worldwide in terms of mismanaged plastic waste and leakage of plastics to the ocean (Jambeck *et al.*, 2015). Plastics are the most common type of material found in marine litter and the inefficient management of solid waste in urban areas (coastal or not) is an essential parameter to consider when identifying sources of marine litter. Moreover, Lebreton *et al.* (2017) evaluated the top plastic-polluted rivers globally and once more Brazil was among the top 20 countries listed. Meanwhile, although a recent global review had not identified a national policy in Brazil addressing the issue (Karasik *et al.*, 2020), in 2019 a National Marine Litter Combat Plan (PNCLM, from the Portuguese acronym) was published by the Brazilian Ministry of the Environment (Brasil, 2019). Besides significant implementation gaps, this national plan does not focus on the construction of an integrated approach

across the federative levels in Brazil (*e.g.* state and municipalities) and, alone, the actions preconized in this policy cannot address the issue holistically and provide solutions at a local level.

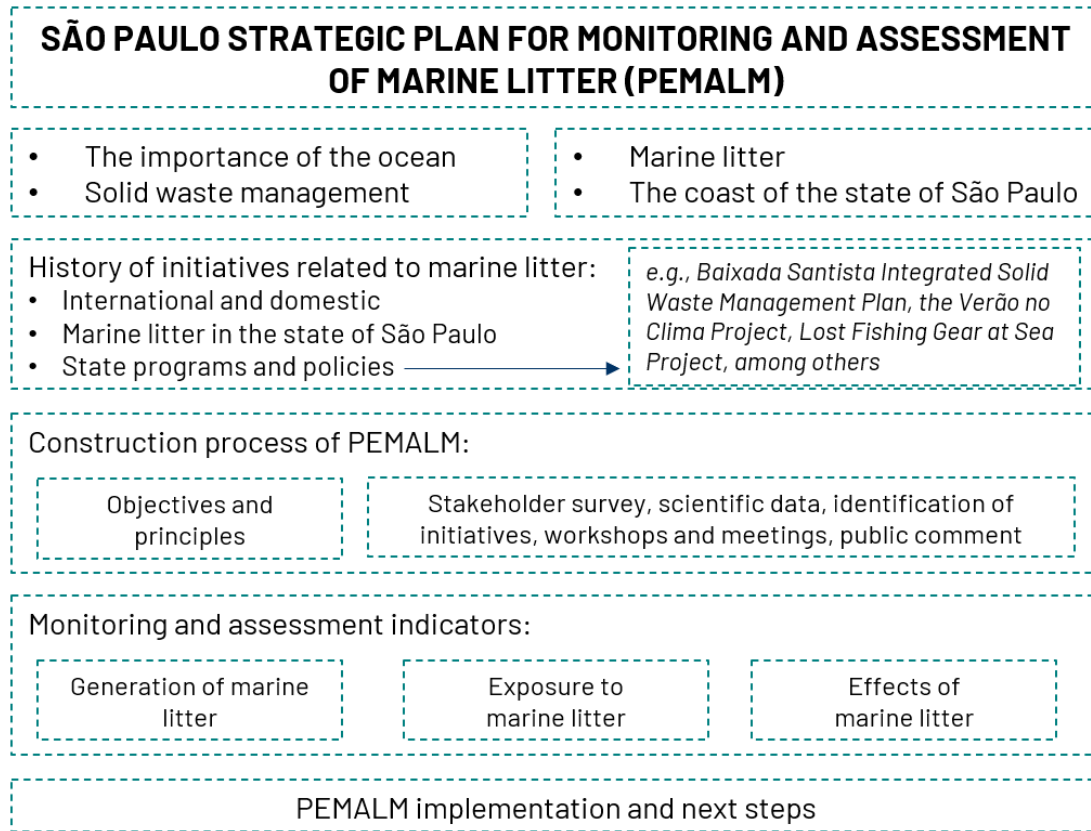
Within this context, the state of São Paulo took the lead and began working towards its own marine litter combat plan in 2019, starting with a monitoring and assessment strategy (*sensu* GESAMP, 2019) to first diagnose and understand this complex reality at a subnational scale. The São Paulo Strategic Plan for Monitoring and Assessment of Marine Litter (PEMALM, from the Portuguese acronym), launched in January 2021 (PEMALM, 2021), is the first public policy of its kind in the country, seeking to collectively establish indicators and build knowledge to move towards a plan to combat marine litter in the most populous state in Brazil.

PEMALM offers a general overview of the importance of the ocean and threats of marine litter; a description of the coastal area of the state of São Paulo, which includes a mosaic of environmental protection areas contrasting with intense urban and infrastructure development; a history of initiatives related to marine litter from a global to a local perspective, emphasizing state programs and policies that have addressed the issue (such as the Baixada Santista Integrated Solid Waste Management Plan, the Verão no Clima Project, and the Lost Fishing Gear at Sea Project); the developmental stages of the plan; suggested indicators to monitor and assess the generation, exposure and effects of marine litter; and, finally, critical aspects for the implementation of PEMALM and next steps (figure 1). Moreover, PEMALM integrates the São Paulo State Solid Waste Management Plan (SIMA, 2020), which provides specific short, medium and long-term goals for the implementation of this public policy within the context of broader marine litter related goals.

From its inception, PEMALM has sought to establish a participative construction framework, involv-

ing a diverse set of key stakeholders during each step of its design. A multi-level mode of construction, promoting collaboration between representants of different sectors of society (*e.g.* government bodies, private institutions, non-governmental organizations and academic researchers) promotes opportunities for social learning, aiding to overcome the challenge of addressing such a complex environmental problem (Pahl-Wostl *et al.*, 2007; Berkes, 2009). Besides, knowledge integration in participatory processes can result in different outcomes than sectoral groups working separately (Xavier *et al.*, 2018), which is essential in building broad public policies. Thus, the bottom-up and multi-sectoral design to build this public policy was intended to promote the development of social capital, *i.e.* a value of trust generated by social networks to facilitate individual and group cooperation (Brondizio *et al.*, 2009), within social learning conditions, among stakeholders involved with the issue of marine litter. Thus, a collaborative design towards the diagnosis of the problem and compilation of data may support and outline a more implementable and efficient strategy for combating marine pollution.

Several in-person activities had been foreseen to contribute to the construction process and launch of PEMALM. However, when the Covid-19 pandemic struck, the ongoing process had to be adapted to keep its purpose as a participative construction and not be mischaracterized as a bureaucratic top-down policy. Social distancing measures restricted the planned activities for knowledge exchange between team members and stakeholders. This was considered a risk to the success of the co-construction process, given that personal activities are seen as essential for knowledge integration and social learning processes (Newig & Fritsch, 2009). Several strategies were used to overcome such limitations. Thus, the aim of this study was to present and discuss the strategies applied in adapting the design process of PEMALM to guar-



**Figure 1.** General structure and content of the São Paulo Strategic Plan for Monitoring and Assessment of Marine Litter (PEMALM).

antee stakeholder engagement and participation in a new virtual scenario. We highlight the obstacles tackled and outcomes achieved in keeping to the timing and quality of the participatory process. To the best of our knowledge, there are no other examples in the literature reflecting on the adaptation of participative

processes for the construction of public policies from in-person to virtual engagement. Thus, the lessons learned from our experience may shed light into ways to broaden and strengthen remote participatory processes.

## 2. Materials and methods

PEMALM took on a participatory action research approach (Chevalier & Buckles, 2019) and was developed by partners at the São Paulo Secretariat for Infrastructure and the Environment (SIMA) and the Oceanographic Institute of the University of São Paulo (IOUSP), within the context of the UNESCO Chair for Ocean Sustainability. This public sector-academia partnership has promoted important dialogues between policy and science regarding solid waste management and its connection to coastal and marine environments in the state of São Paulo.

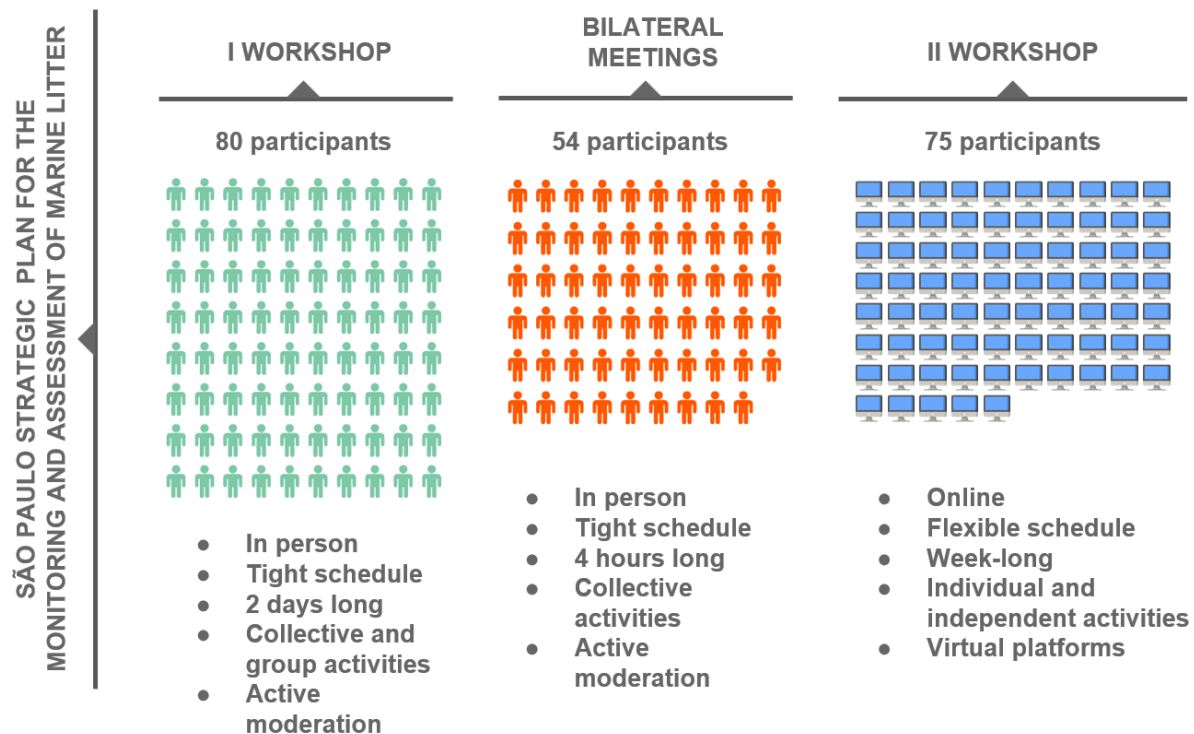
In 2018, a five-year cooperation agreement was established between SIMA and the UNESCO Chair for Ocean Sustainability. The aim is that the two organizations support each other combining technical, operational, academic, and scientific efforts in areas of common interest. This included collaborating in the development of a chapter entirely dedicated to marine litter in the most recent update of the São Paulo State Solid Waste Management Plan (SIMA, 2020), and reaching a state-wide marine litter combat plan, after defining monitoring and assessment strategies to diagnose this issue in the region. This agreement therefore strengthens and supports the development of evidence-based policy (Pinheiro, 2020).

Thus, a working group was established to meet these demands, providing the necessary institutional framework for state employees to dedicate work hours towards the goals. This marine litter working group congregates 25 people from SIMA, IOUSP, the Environmental Company of the State of São Paulo (CETESB) and the Basic Sanitation Company of the State of São Paulo (SABESP), of which 11 members (five from SIMA, five from IOUSP and one from CETESB) formed a focus group to lead the project. Funding was provided by the Norwegian Embassy

through the Norwegian Development Programme to Combat Marine Litter and Microplastics (Project No. BRA-18/0034) and mediated by the Brazilian Biodiversity Fund (FUNBIO) for the maintenance of human resources at the UNESCO Chair for Ocean Sustainability and to finance materials, services and events during the 18 months that it took to complete the construction process of PEMALM.

During the initial phases of constructing the plan, it was important to: i) survey the scientific knowledge produced about marine litter in the state of São Paulo, in every approach available; and ii) identify stakeholders related to marine litter in the state of São Paulo. Meetings were held with the marine litter working group to catalog and engage all relevant stakeholders involved with this subject in the state of São Paulo. These stakeholders were then contacted and requested to provide new names to the list, following the snowball methodology. From the pool of over 400 stakeholders mapped, 100 were initially prioritized based on their potential to produce, host and/or evaluate data on marine litter in the state. These actors were distributed across the public sector, private sector, third sector, academia and associations of the civil society.

Stakeholders were then invited to attend the activities planned to co-construct the public policy. These activities included two workshops and bilateral meetings (figure 2), all originally planned to be held in person. With the Covid-19 pandemic, this format of activity was suspended, leading to the adaptation of the second workshop to an online format that could still allow successful interactions among stakeholders. The following sections detail the framework of each participatory milestone/activity within the strategy of PEMALM.



**Figure 2.** Macrostructure of activities and number of participants in which stakeholders of the São Paulo Strategic Plan for the Monitoring and Assessment of Marine Litter were involved during the development of the project. Number of participants in the in-person activities are represented by human icons, while participants in the online workshop are represented by computer screens.

### I Workshop

The first participatory interaction took place at the I Workshop of the project, held in December 2019 at the Oceanographic Institute of the University of São Paulo, located in the state capital of São Paulo. Only prioritized stakeholders were invited to attend the workshop, due to restrictions in room size and financial costs. Stipends were made available for those who required financial assistance to attend (*i.e.* cost of travelling to São Paulo and accommodation) and thereby, a broader and more representative participation was assured.

The objectives of this workshop were to: i) exchange knowledge and experiences among participants and foster discussions and reflections about

marine litter; ii) understand and debate the main public policy concerns (*sensu* GESAMP, 2019) involved in the issue; iii) develop conceptual maps regarding information about impacts, environmental compartments and pressures related to marine litter; iv) identify data and information that are relevant, connecting stakeholders and institutions that could produce them.

During this two-day event (total of 15 hours of activities scheduled during mornings and afternoons), keynote talks took place presenting the global, regional and local context of marine litter, strategies and initiatives currently underway in São Paulo, and the proposed structure of the plan. Stakeholders were divided into small working groups (10 to 12 people



randomized by the sector they represented) based on the following policy concerns listed in GESAMP (2019): tourism, food security, human health and well-being, navigation, fisheries and aquaculture, animal welfare, and biodiversity.

In each working group, a moderator stimulated discussions to capture participants' perceptions (figure 3) regarding the policy concern, how the subject can be affected by marine litter in the state of São Paulo (considering the size of litter, the environmental compartment it occupies - shoreline, seafloor, surface and water column, and biota - and different pathways of impacts - ingestion, entanglement, deposition/floating, dispersion of exotic species, leaching of substances (*sensu* GESAMP, 2020)), and what activities and processes can potentially generate

marine litter in the area, based on a list provided by DOALOS/UN (2021).

These discussions demanded active engagement from attendees. Inputs from the groups were collected in a standardized way for all working groups and the discussion continued the next day. An important aspect of this in-person workshop was the extra time given for networking among stakeholders - most of whom would have few opportunities to meet otherwise. Before leaving, participants were asked to fill out a satisfaction survey in which they indicated positive and negative aspects of their experience in the workshop and gave suggestions for the next events.

To register this step and inform the stakeholders that did not attend the event, videos covering the workshop and presenting the project were produced



**Figure 3.** Structured blackboard designed for the I Workshop of the São Paulo Strategic Plan for Monitoring and Assessment of Marine Litter. Orange cards represent activities that can potentially generate marine litter; green cards refer to the size of litter (macro or microlitter); blue cards to the environmental compartments occupied by the material (coastline, water surface/column, seafloor, biota); yellow cards to the impact pathways of marine litter (ingestion, entanglement, deposition/floating, leaching, dispersion of species); and white cards are perceptions about marine litter and the policy concern of the working group. All persons portrayed in this photograph were consulted and granted the right to use the image for this purpose.

(PEMALM, 2020a) and shared with the network afterwards, along with an executive summary of the workshop (PEMALM, 2020b) and the results obtained from all working groups.

### Bilateral meetings

Two months after the I Workshop, in February 2020, stakeholders were gathered again for a series of in-person bilateral meetings, involving the project team and network. Using a different strategy from the I Workshop, the meetings were now decentralized, scheduled in four different locations, covering the southern, central and northern coasts and the capital of the state of São Paulo. This decision was made to decrease the distance faced by many participants in the first gathering (more than 300 km in some cases) and facilitate a broad participation from all stakeholders, since they are spread along the different regions of the state.

The invitation to this second interaction moment was extended to the wider network of stakeholders

that had not been initially prioritized. The main objective of the bilateral meetings was to assess the expectations and demands from the network of stakeholders towards the structure of the plan. The meeting was planned for three hours of group discussions and activities. An overview of the construction process until that moment was presented, followed by an ice-breaker activity in which each participant informed what core value should be considered into the plan, completing the schedule with the main brainstorming activity of the meeting. During the brainstorm, participants were encouraged to think of inputs for the structure of the plan, according to four categories: i) what the plan must have; ii) what content would be desirable to have in the plan; iii) what could be done regarding the strategies of the plan; and iv) what is beyond the scope of the plan or that cannot be done at the moment (figure 4).

Following a similar dynamic input system used in the I Workshop, all ideas were written on paper cards and placed within their respective categories on



**Figure 4.** Contributions received during one of the bilateral meetings carried out regarding the structure of the São Paulo Strategic Plan for Monitoring and Assessment of Marine Litter. Each card (regardless of colors) represents one idea or input from participants, which were organized in four categories: i) what the plan must have; ii) what content would be desirable to have in the plan; iii) what could be done regarding the strategies of the plan; and iv) what is beyond the scope of the plan or that cannot be done at the moment, while the words written directly on the board (right) represent core values.



a board, creating a landscape of contributions. Likewise, a short video was produced to showcase the format of the meeting (PEMALM, 2020a) and an executive summary was made available online (PEMALM, 2020c).

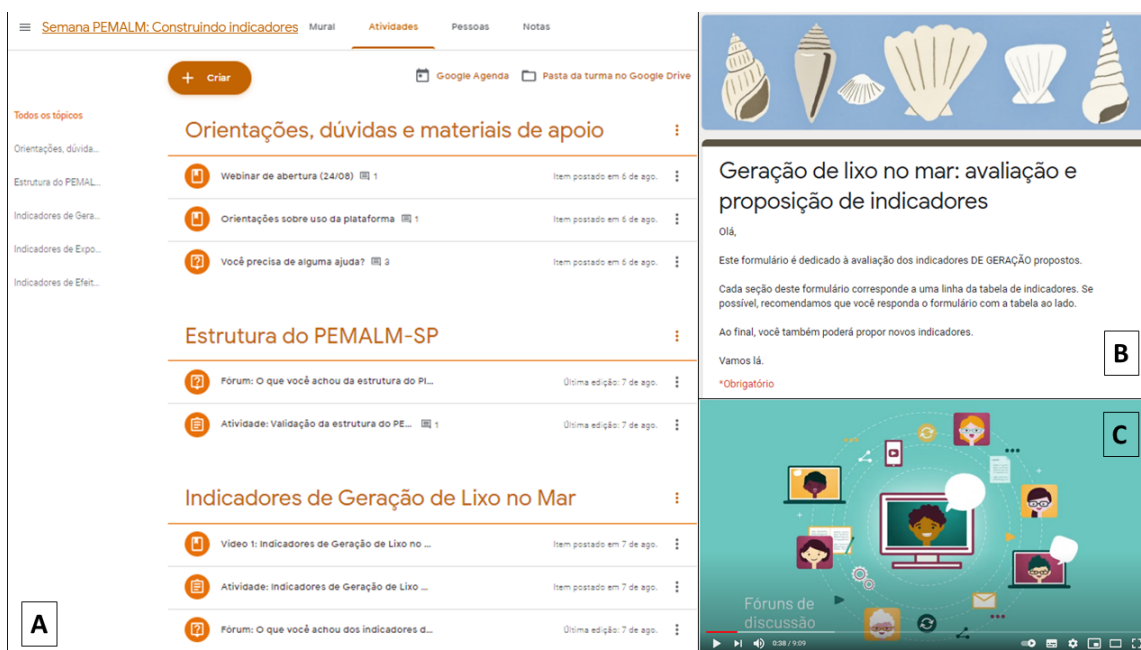
## II Workshop

A second and final workshop had been planned to take place in April 2020. However, with the pandemic and consequent social distancing measures adopted in the state of São Paulo, the strategies initially proposed for this moment had to be completely restructured. Before moving forward in the planning stage, the stakeholder network was consulted via email regarding their interest and availability in taking part in a potential virtual event. Ongoing online communication strategies (email, project website and YouTube channel) became more central in the project's efforts to guarantee the flow of information and stakehold-

er engagement. Weekly newsletters were sent out to keep the network informed about changes and adaptations underway, as well as other topics relevant to the group. The website (PEMALM, 2020b,c,d) and YouTube channel (PEMALM, 2020a) were kept updated.

The II Workshop was postponed to August 2020 and was held entirely through online platforms (figure 5). The objectives of the workshop were to: i) validate the set of monitoring and assessment indicators jointly developed for the strategic plan; and ii) validate the structure proposed for a draft of the final plan.

All stakeholders (approximately 400 individuals and institutions) were invited to participate. Seeking to increase engagement, an animated video was sent as an invitation by email (PEMALM 2020a). The schedule for the workshop included two live webinars, held via the videoconferencing platform



**Figure 5.** Screenshot of the Google Classroom platform used for the II Workshop of the São Paulo Strategic Plan for Monitoring and Assessment of Marine Litter (A); example of one of the validation forms used for the indicators proposed (B); screenshot of a scene of the first video, explaining the use of the online tools (C).

Zoom, on the first and last days (only synchronous activities of the workshop). These live moments of interaction were recorded and planned to welcome and acknowledge participants, explaining the activities planned, and to show preliminary results at the end of the week. Google Classroom was the main platform used to receive participant input regarding the asynchronous activities proposed. To avoid exclusively simultaneous interactions during the workshop, which could hinder participation, a series of four short, animated videos (less than 10 minutes each) were prepared to explain the validation process of the indicators proposed and the structure of the plan (PEMALM, 2020a).

The first video introduced the participants to the schedule and objectives of the workshop, explaining the importance of participatory monitoring and assessment of marine litter and presenting the groups of indicators defined for the strategic plan (i.e. namely indicators regarding the generation of marine litter, exposure to marine litter, and effects of marine litter). Each subsequent video detailed a specific group of indicators. The narrative for each of these videos included a short introduction to the workshop, an explanation of what the given group of

indicators represents, an example using a common item of marine litter (*e.g.* single-use plastic items, cigarette butts, fishing gear), and orientation on how to contribute to the validation activity.

During each day of the week, from Monday to Thursday, a new video accompanied by its respective validation activity was released on Google Classroom at 9 am. This way, participants had autonomy to choose to dedicate a couple of hours a day to the workshop or access previously released materials in a single day. This allowed a friendly and flexible interface for general explanations that could be accessed at the most convenient time for each participant.

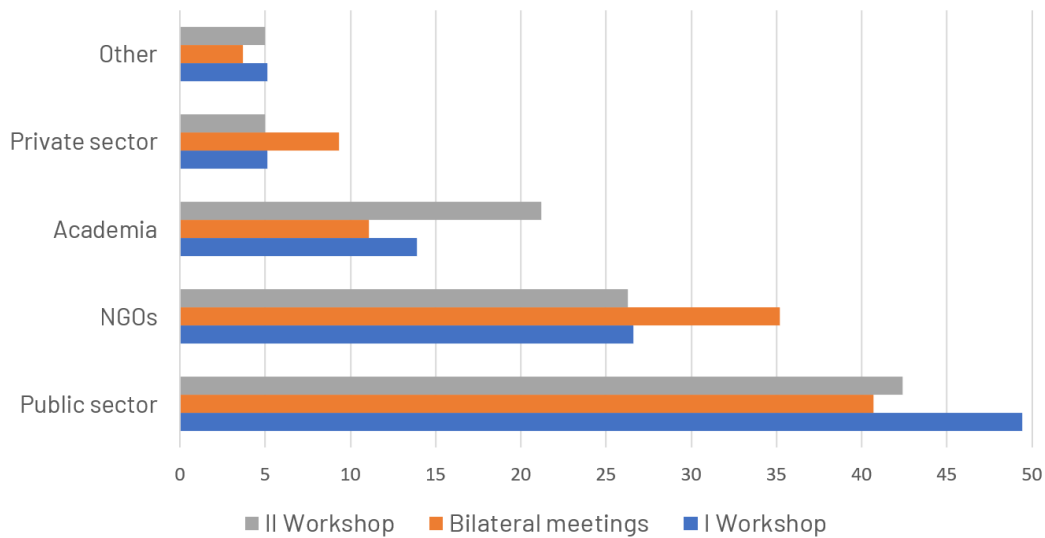
The workshop organizers took turns on call to respond to questions from participants through the Google Classroom forums and by email. Moreover, a WhatsApp messaging group was set up with the purpose of informing participants about new activities and other important information. A satisfaction survey was delivered after the event ended and included questions about the accessibility of the materials used in the workshop and, similar to the I Workshop, what participants thought was positive about the event, what was negative and suggestions for future interactions.

### 3. Results

All stakeholder interaction activities successfully reached the goals set, providing the necessary input to advance in the development of PEMALM. Figure 6 summarizes participation in all three moments, showing the representativity of each sector. The following subitems further explore these and other results obtained during the I Workshop, bilateral meetings and II Workshop.

#### I Workshop

Eighty stakeholders registered for the event, which represented the full capacity of the venue chosen. In total, 79 participants attended the workshop, of which 49.4% represented the public sector, 26.6% were from Non-Governmental Organizations (NGOs), 13.9% were from academia, 5.1% represented the private sector and another 5.1% identified



**Figure 6.** Percentual participation of different sectors (public sector, non-governmental organizations (NGOs), academia, private sector and other) in each interaction moment (I Workshop, bilateral meetings, II Workshop) during the participative constructive process of the São Paulo Strategic Plan for Monitoring and Assessment of Marine Litter.

as being part of other categories of stakeholders (*e.g.* public-private associations, independent stakeholders). A full list of participants is available in the technical report of the workshop (PEMALM, 2020b).

Despite the orientation of full two-day participation in the workshop, some participants were unable to do so because of work commitments, mostly in other cities. Even with some absences, all working groups were productive in their discussions.

In the satisfaction survey, participants indicated having enjoyed the organization and kind reception ( $n = 35$ ); the exchange of experience with peers and networking ( $n = 32$ ); the promoted engagement ( $n = 32$ ); the diversity of sectors and perspectives in the workshop ( $n = 27$ ); and the dynamic methodology used ( $n = 14$ ). On the downside, participants felt there could have been more stakeholders from the legislative and judiciary sectors ( $n = 5$ ); the event could have been longer ( $n = 5$ ); and that lack of specific personal knowledge (*i.e.* deeper understanding

of the impacts of different types of litter on various policy concerns, such as microlitter on navigation) hindered the support on some subjects ( $n = 4$ ). Several suggestions for future events included increasing the use of digital tools ( $n = 6$ ); keeping the network connected ( $n = 5$ ); and sharing the results of all working groups ( $n = 4$ ).

### Bilateral meetings

A total of 54 stakeholders participated in the bilateral meetings, of which 40.7% were from the public sector, 35.2% were from NGOs, 11.1% from academia, 9.3% represented the private sector and 3.7% identified as other categories of sectors (*e.g.* public-private associations, independent stakeholders). Fifty-five percent of these participants were also present at the I Workshop, demonstrating continuous engagement and contributions towards the construction of this public policy, at the same time also revealing the willingness of new participants to join the process. A full

list of participants is available in the technical report of these meetings (PEMALM, 2020c).

Regarding the description of values mentioned by participants, the most common words used were: effectiveness, participatory, transparency, representativeness, responsibility, applicability, accessibility, and citizenship. As for the most relevant topics to be addressed in PEMALM, participants showed great interest in clear objectives, simple indicators and a unified and reliable database. Other important aspects mentioned were the need for efficient communication, commitments from institutions to participate in monitoring programs, and guaranteeing constant updating of the plan. Participants also agreed that this was not the moment to consider marine litter combat actions or elements that are already present in the São Paulo State Solid Waste Plan (SIMA, 2020). Unlike with the workshop approach, satisfaction surveys were not applied for participants at these meetings.

## II Workshop

During the period between the original date for the II Workshop (April 2020) and the week in which it was in fact carried out (August 2020), the team designed a new virtual experience for the participatory process, taking into account the feedback from stakeholders in the previous events, which valued networking opportunities, materials to support discussions and a more diverse set of participants. All responses received (n = 55) in the stakeholder consultation were positive towards the online format for the event. A full list of participants is available in the technical report of the workshop (PEMALM, 2020d).

A total of 101 stakeholders registered for the II Workshop, of which 42.4% were from the public sector, 26.3% from NGOs, 21.2% from academia,

5% from the private sector and 5% identified themselves as being from other categories (*e.g.* public-private associations, independent stakeholders). However, only 75 registered participants accessed the Google Classroom platform and just over half of these contributed actively in all workshop activities (*i.e.* validation of the plan's structure and monitoring indicators).

A forum platform within Google Classroom was used consistently by participants throughout the week, primarily to comment on the videos provided, express general opinions on the subject, address technical issues with the platform, and to interact with organizers and other participants.

Regarding the satisfaction survey, 12.5% of respondents reported they were not able to access all materials posted to the platform and almost all comments received about the event were positive. More specifically, attendees were pleased with the format of the event (n = 17); including the audiovisual material and guidelines provided for activities (n = 11); the flexibility of the program (n = 5); the equality in treatment and opportunity for all participants to present their opinions (n = 4); the fact that the event was not cancelled (n = 4); and the objectivity and agility in responses from the organizers (n = 2). Participants were displeased that the group could not be together in person for the event (n = 8), thus decreasing the level of interactions including the opportunity to discuss the activities and learn with peers (n = 2). As suggestions, attendees indicated that more group activities would be beneficial (n = 3); that future events could also run over a week-long period (n = 2) and could have a hybrid format (online and in-person) (n = 2); that the discussion forums become a continuous structure for sharing results (n = 2); and that the materials produced could be made available for educational purposes (n = 2).

## 4. Discussion

Integrated coastal management requires a broad and holistic approach to the issues that affect the coastal zone. Initiatives to combat marine litter have struggled with fragmented governance in the source-to-sea continuum (Granit *et al.*, 2017). Working towards surpassing this obstacle, the topic has been increasingly internalized in policies in the state of São Paulo regarding public planning, environmental conservation, and citizen education. For example, the São Paulo State Coastal Zone Management Plan (PEGC) includes a Coastal Ecological Economic Zoning (ZEEC) instrument, which is responsible for monitoring and information systems and integrating sectors and institutions in search of solutions for coastal issues including marine litter (PEMALM, 2021). Moreover, the São Paulo State Solid Waste Management Plan describes intended actions to develop a São Paulo State Marine Litter Combat Plan, which should be aligned with eventual municipal solid waste management plans, municipal marine litter combat plans, the São Paulo State Sanitation Policy, the São Paulo State Water Resources Policy, including Watershed Plans, the PEGC, municipal master plans, among others (SIMA, 2020). As preconized in PEMALM, it is essential that the tendency for sectorizing policies be interrupted and that we recognize the co-responsibility of institutions and policies to face the problems at hand (PEMALM, 2021).

Within this context, and recognizing the value of a participative construction process, maintaining the level of quality required to develop PEMALM under a setting that did not allow face-to-face interactions was a sizable challenge. However, the current format of in-person workshops, meetings and conferences has been under scrutiny over recent years, though with slow advances in terms of use of technology to improve remote participation (Sarabipour *et al.*, 2020). The Covid-19 pandemic forced an accelera-

tion in finding alternatives, which can now be treated as lessons-learned for future event formats and, specifically, participatory processes.

Conferences are important events for professional growth, where new information is gained, new contacts are made and a wide range of skills are honed (Oester *et al.*, 2017). However, while this much is also true for participatory processes, the objective of this type of interaction goes beyond that of a conference. These processes are a fundamental step when breaking the traditional top-down mode of governing and building public policies or programs (Newig & Fritsch, 2009). These interactions must be designed so that attendees have room for knowledge exchange and for realizing the importance of participating in the co-construction process of policies (Kim *et al.*, 2018) and to be protagonists in changing their local realities (Grilli *et al.*, 2021), which brings specific challenges. Workshops have been a preferred approach to discuss policy, as the face-to-face interaction in a group sets a favorable scenario for deliberation (Robert, 2004), especially when facilitators provide a welcoming environment and equalize power imbalances among participants (Grilli *et al.*, 2021). This poses the question: what is the impact to a participatory process if traditional face-to-face interactions are not possible?

In the present case study, we presented three strategies to engage stakeholders in different gatherings with the purpose of building a public policy for marine litter: first, congregating stakeholders in one location for an intensive two-day workshop; second, conducting a series of bilateral meetings in which the organizers travelled to where the stakeholders were based; and third, organizing an online workshop held over the course of one week. Each event provided essential input that has been incorporated into PEMALM, such as an understanding on the most



relevant impact pathways caused by marine litter in São Paulo (PEMALM, 2020b), what values should be reflected in the final document (PEMALM, 2020c), and which would be the suggested generation, exposure and effects indicators listed in the plan (PEMALM, 2020d), in addition to the overall trust-building exercise they all represented. Based on the feedback received from participants and the results obtained from each interaction, we consider all events successful regarding their proposed objectives and in maintaining the desired level of quality. Regarding stakeholder participation, the results show that the proportions of sectors present were similar among all three events. Representatives from the public sector had the highest participation in all events, followed by NGOs and academia.

Having a diverse group collaborating towards solutions for marine litter is essential. As stated by Vince and Hardesty (2016), to reduce the global problem of plastic pollution in the ocean, holistic and integrated approaches must be implemented, combining scientific expertise, community participation and market-based strategies. However, guaranteeing stakeholder engagement is a challenge, especially regarding the uncertainties in bridging community inputs and management decisions (Dichmont *et al.*, 2016). These were major concerns when having to restructure the strategy designed for the development of PEMALM. Moreover, the process of co-construction can be considered as important - if not more important - than the outcome itself. Multisector knowledge exchange in its many forms of interaction (*i.e.* translation, transfer, exchange or co-production) has been shown to promote social learning in coastal management (Xavier *et al.*, 2018) and is certainly a key missing piece when trying to tackle marine litter.

The present study is, to the best of our knowledge, the first to present and reflect upon the adaptations and quality of a public policy participatory action research process to an online format. Many participa-

tory processes have been interrupted and postponed for long periods due to the pandemic, such as the elaboration and/or revision of the integrated coastal management plans of the Orla Project in Brazil (DOU, 2020), with yet unknown consequences. Another public policy regarding marine litter that is under development in Brazil is the Action Plan to Combat Marine Litter in the State of Pernambuco. This construction process is being held in an entirely virtual format, with webinars transmitted in the official YouTube channel of the Secretariat of Environment and Sustainability of Pernambuco, and support from the TerraMar Project of the Brazilian Ministry for the Environment and German Corporation for International Cooperation GmbH (GIZ) (SEMAS, 2021).

While not equivalent, there are some parallels that can be made regarding the pros and cons of adapting conferences. For example, Counsell *et al.* (2020) discuss important advantages in holding an online conference: reduced CO<sub>2</sub> emissions, lower cost to organizers and participants, reduced health risks, increased accessibility (considering a variety of reasons that can make travel unfeasible for attendees), flexibility in conference program and, in the case of recorded sessions, possibility to access talks and presentations with auto-translation subtitles or taking pauses. In the present case study, which goes beyond promoting an online conference but turns to a policy-making process, the main limitations of the in-person events regarded the capacity of the venues and exclusive dedication to the event needed for full-time participation. These limitations were greatly overcome with the online workshop and a flexible schedule. However, only about half of participants registered in the II Workshop actively engaged in the activities proposed. Thus, online participatory process events must take into consideration the risk of lower adhesion of attendees due to other demands and distractions, particularly in a home-office set-

ting, and that participation stems significantly from personal interests.

Having to travel to attend the I Workshop was a setback for some stakeholders, even with the option of a small stipend for expenses. The coastline of the state of São Paulo extends over roughly 880 km (CETESB, 2018), making day trips to attend a workshop unfeasible to many. This problem was surpassed with the bilateral meetings and even more so with the online event, for some groups. Here, we can point out that participatory processes over large territories or involving different countries can benefit from including an online aspect to their engagement strategies. However, vulnerable groups, such as traditional communities, and independent stakeholders may have important limitations regarding access to virtual resources, infrastructure for good quality participation and familiarity with online tools. This was a major constraint that could not be overcome when adapting to virtual processes, in our case represented by traditional fisheries interest groups.

Another important difference in organizing the online workshop was the way stakeholders were invited to participate. With several team members and stakeholders changing to a home-office setting, it was not possible to call key-stakeholders (since people did not have access to their work telephones) to guarantee that they received their invitation to the II Workshop and to emphasize the importance of their presence. While email is a generally accepted form of professional communication, talking directly over the telephone was considered more suited for time-sensitive issues and allowed particular emphasis over the message delivered.

Considering the PEMALM construction as an ongoing process, the online event was held at a moment when stakeholders were already aware and active within the project. Therefore, the level of success of the II Workshop cannot be dissociated from the previous in-person activities held. While none of the

events were conducted in a hybrid online/in-person format, we can consider that the participatory process as a whole was hybrid, which allowed exploring different opportunities.

It is important to note that changing the planned format of the event also represented an additional and important effort for the organizers. Investigating which online platforms would suit our needs and learning how to operate them was also time-consuming, similar to what was experienced by Counsell *et al.* (2020) for a conference. Despite the challenge, it was paramount that we try to concentrate our activities in only a few platforms to guarantee that participants would not feel overwhelmed and be demotivated to participate. Moreover, “zoom fatigue” (Wiederhold, 2020) was another concern, especially considering the multiple demands the network of stakeholders were undoubtedly under.

All engagement strategies had their advantages and disadvantages. However, as indicated by Counsell *et al.* (2020), when adapting conferences to an online format, it is important to retain the key components such as talks, workshops, networking opportunities, and other social events. While all experiences of participation in scientific conferences may not be applicable to participative processes, it is important to identify which main aspects are particularly valuable either in-person or online for better stakeholder engagement. Some positive aspects that were common among all three strategies presented here were investments in communication before, during and after each interaction, activities designed to attend the objectives proposed for each event (*e.g.* building narratives to represent impact pathways of marine litter in different compartments, clustering inputs into similar categories to organize contributions, educational videos illustrating examples of parameters that should be monitored and assessed), and being dedicated and attentive to the needs of attendees. Even social events were adapted with the inclusion of

a musical activity during the closing webinar of the online workshop.

Good practices on stakeholder engagement are essential components of participatory processes and crucial to the means of reaching effective and inclusive decisions (Talley *et al.*, 2016; GEF, 2018). This is even more impactful in a period of intense change and urgent calls for action, where collaboration is most needed. Although challenging, the benefits of investing in multiple modes of interaction and encouraging an active network far outweighs the time and financial costs associated with re-adapting the scenario to ensure stakeholder participation.

The Covid-19 pandemic compromised the previously planned activities for the development of the

PEMALM participative processes, but it did not prevent them from happening. The redesign of collaborative and engagement approaches presented and reflected here illustrates the potential of a virtual platform as a tool for the co-construction of public policies. Hybrid strategies, be them a single workshop allowing in-person and online participation or a series of sequential interactions that begin in-person and transition to a virtual format, seem to balance the benefits of both methods and can be a way forward in broadening participation in this type of process, without compromising its quality. We expect these formats will become increasingly more popular and accessible, bringing new challenges and opportunities to policy making.

## 5. Conclusion

PEMALM is the first document of its kind in Brazil and it is at the forefront of new approaches for the development of public policies built in a participatory way for the monitoring and assessment of marine litter. In addition, the initiative has recruited, formed and strengthened a network of stakeholders who produce information on the topic and represent a group able to guarantee the sustainability of a monitoring proposal. In a social isolation setting, adapting the

participative process, the stakeholder engagement and the co-construction of a public policy for marine litter was a challenge that sprouted positive accomplishments and lessons learned. We incorporated adaptations of methods and approaches to reorient working conditions in order to meet common objectives and promote the advancement of knowledge on the marine litter pollution subject.

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