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Community-Based Research and Participatory Approaches in Support of SDG14

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Definitions

Community-based Participatory Research (CBPR) invites research subjects to become partners to address an issue in the community and lead to action and positive change (Duran and Wallerstein 2003; Gutberlet et al. 2014; Kindon 2016a; Coughlin et al. 2017). A few variations of the CBPR approach are present in the literature, such as community-based research (CBR), Participatory Action Research (PAR), and Community-based Participatory Action Research (CBPAR).

In **Community-based Research** (CBR), the role of the participants is not as much in-depth as CBPR; while there is still engagement and consultation, they are not coresearchers or coleaders on the project (Flicker et al. 2008).

Participatory Action Research (PAR) is closer to CBPR as it includes the three interconnected aims of research, action, and education (Duran and Wallerstein 2003); however, PAR does not necessarily include community participation – community in the sense of common interest or geographically defined. PAR "seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities" (Argyris et al. 2008).

Community-Based Participatory Action Research (CBPAR) can be perceived as the integration between CBR and PAR which aims to create social change through research and action – an approach that was developed from the global south academic world (Duran and Wallerstein 2003; Gutberlet et al. 2014; Giatti 2019).

Participatory Video (PV) is a collaborative method engaging a group or community in sharing their own stories using video, to support colearning and communication, and create positive change (PV-NET 2008).

Citizen science is widely used to engage participants or "citizen scientists" from the general public in gathering scientific data, to monitor species or environmental indicators, or help with data analysis (Dickinson et al. 2012).

When citizens or community groups collecting data are focused on a common issue or local area, it is defined as **community-based monitoring** (Whitelaw et al. 2003; Conrad and Hilchey 2011).

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Introduction

Community-based participatory research (CBPR) and participatory methods have been used to study and address environmental change while working closely with communities during that process. Community-based research is seen as an appropriate approach to address issues of importance to a community and lead to action and social change. In the past, researchers took a more "outsider's approach," keeping a distance between the researcher and the researched. That "outsider's approach" was questioned by Freire (1982, cited by Coughlin et al. 2017, p. 2), while proposing a more participatory and inclusive approach to doing research. CBPR represents a fundamental shift in the academic world where research is not *on* communities, but rather *with* and *for* communities. Some of the CBPR principles include: building capacity, combining knowledge and action to benefit everyone involved, supporting knowledge coproduction, enabling a collaborative partnership in all steps of the project, empowering the community and paying attention to social equity, using a cyclical approach that is refined along the way, and sharing results with all partners (Israel et al. 2003; Castleden et al. 2012). Levels of engagement in CBR vary depending on various factors – often community members are more involved in defining research questions, collecting data, and using results for advocacy reasons (Flicker et al. 2008). Engagement in data analysis and interpretation is less common in general, for a variety of reasons. Community members do not always have the capacity to be fully involved in research projects, and so it is recommended to offer all participants a choice to participate or not at various stages of the research (Wang et al. cited by Flicker et al. 2008).

Ethics, Positionality, and Critical Reflexivity

While this entry will not go into detail about ethics, it is important to mention that it is an important aspect of this research approach. CBPR tends to be an ethical approach for doing research; however, five themes have emerged to pay attention to. Those include: (1) The protection of the participants: considering transparency vs. vulnerability; (2) Conflicts between "insiders" and "outsiders": beliefs, expectations, or assumptions may differ (3) Power differences emerging from the collaboration; (4) Validity and research integrity: participants' capacity and levels of expertise may vary; and (5) Relational nature of CBPR and ethics review: constant evaluation and self-reflection is critical by the researcher (Wilson et al. 2018).

In doing research with communities, researchers may encounter challenges that require them to be critical of their own positionality, reflexivity, and power dynamics (Mistry and Berardi 2012; Blazek 2017). As researchers, it is really important to determine one's positionality and be reflexive during the process (Dowling 2016; Waitt 2016). Reflexivity is the process of looking at oneself and the research topic in a critical and self-reflective way. It means examining personal circumstances, from an outsider's point of view, and is often helped by keeping a research diary. It is hard but worthwhile. A researcher has to ask himself/herself questions, such as "What is happening? What social relations are being enacted? Are they influencing the data?" (Dowling 2016). A main initial point, explains Waitt (2016), is to recognize why a certain research topic (context) was chosen and initial preconceptions about the topic (bias). Positionality, which is also connected to reflexivity, is locating oneself in the context of the project and may include lived experiences. Positionality may change as the research evolves, so a crucial part of a positionality statement is noticing and contemplating on these transformations as the project evolves. In participatory research, it is necessary to be continuously reflexive to what is appropriate also to other partners of this process (Pain 2008).

Some of the challenges of CBR or CBPR projects include funding and human resources, as these projects often require multiple steps, lots of communication, and dissemination requirements, which require long-term commitment (Tremblay et al. 2015). Indeed, Flicker et al. (2008) found that larger project financial resources were more prone to report greater levels of community member involvement. Castleden et al. (2012) also mentioned those challenges, while expanding on the

academic funding or ethics license processes that sometimes seem to be counterintuitive for doing community-based research. There is still work to be done to improve relationships and trust between researchers and communities (Wilson et al. 2018).

A variety of participatory methods or tools can be used to successfully engage communities on environmental topics, including photovoice, participatory video, participatory mapping, citizen science, and community-based monitoring (Whitelaw et al. 2003; Gutberlet et al. 2014, 2016; Tremblay et al. 2015; Cox et al. 2017). Here, we will review key themes, benefits, and challenges related to community-based approach and some of these participatory tools that can support the SDG14.

Arts-Based Approaches: Photovoice and Participatory Video (PV)

Photovoice

Developed in the 1990s by Wang and Burris (1994, 1997) with the "photo novella" approach, this method is considered an "empowerment education" tool that provides cameras to community members, so they can document their observations related to a certain topic. This experience is normally followed by interviews, dialogue, or the creation of captions (audio or written) to assist with the interpretation of the photos. It has been used to engage communities on projects related to health, and more recently applied to environmental projects. Photovoice can be a useful method for understanding the broader array of social and environmental changes that communities are facing (Bennett and Dearden 2013).

Participatory Video

The early days of the PV concept started on Fogo Island in the late 1960s (Crocker 2003, 2008), and it is now referred to as the *Fogo Process*. Created as a broadcast documentary project initially, it offered the opportunity for the local community to give feedback on inclusion and poverty. The National Film Board provided video equipment to these remote communities located north of Newfoundland, so they could share their voices on specific social issues. What started as a side project became way more interesting than the straightforward broadcast television tool. Through that process, they came to the realization that the filmmaking process was more powerful than the finished product, and can bring about social change. The sense of community and cooperation that came out of it was empowering. Around the same era, Freire's (1970) concept of conscientization, encouraging critical thinking, collective action, and empowerment, became a strong influence in participatory action research.

There are two impacts clearly emerging from the *Fogo Process* (Crocker 2003, 2008):

1. Channels of communication expand, within the community involved, between communities, and distant decision-makers, which give more power to the community to communicate their needs and issues.
2. The empowerment that comes from seeing your life or yourself as others see you, through the screen, has a powerful self-confidence impact.

Recognized as a great tool to empower communities (Cunsolo Willox et al. 2013; Tremblay et al. 2015; Tremblay 2013), as well as youth (Haynes and Tanner 2015; Cox et al. 2019), who do not necessarily have a say in certain political decisions affecting their lives, the use of PV has the potential to give "voices to the voiceless." However, this can be seen as an ideal concept and can look differently in practice. As Shaw (2012a, p.230) describes, "the empowerment narrative rests on the assumption that the balance of social power can change." With the use of digital media creating new spaces for interactions and reshaping more equal relationships (High 2005), the process is perhaps more important than the knowledge itself produced in terms of creating positive change (Shaw 2012b).

Benefits: Empowerment, Engagement, and Communication

The process of PV can have multiple benefits such as enhanced self-confidence, knowledge and leadership skills, critical self-reflection, organizational

capacity, and increase in the mobilization of community knowledge (Tremblay and Jayme 2015). Many of the participatory digital media approaches support capacity building, the coproduction of knowledge, increase awareness and education at different levels (participant, community, and policy-makers), and can contribute toward empowerment and representation (Gutberlet et al. 2016; Shaw and Robertson 1997; Shaw 2012a; Tremblay and Jayme 2015).

The production of knowledge potentially happens at multiple stages in the PV process: through the making of the videos (discussions, brainstorms, storyboarding, and interviews) and via the video itself viewed by the participants and shared with the community (Mitchell et al. 2012). Participatory video has been considered an effective communication and dissemination tool (Crocker 2008; Shaw and Robertson 1997; Tremblay 2013; Wheeler 2012; White 2003). This reach can happen at different levels: with the audience targeted, which can be a group, a community, or policy-makers. There is the potential for PV to "open up spaces in between top-down and bottom-up where participants' social influence can emerge if conditions are favorable" (Shaw 2012b, p.18). PV can indeed create a bridge for dialogue and integrate different and often missing voices into policy discussions, but it is hard to know how much impact this new form of knowledge will have in terms of social change impacts or changes in policy (Wheeler 2012).

Issues Related to Power and Representation

The PV approach is beneficial because it is causing a shift in representation and power – although it is still not completely neutral. People involved (i.e., funders, practitioners, and participants) can have different motivations and those can be conflicting (Shaw 2012a). One of the themes or issues in the PV literature concerns the issue of representation (Braden 1998, 1999; Wheeler 2012; Zoettl 2013). Representation can have two meanings: one, an "image of," and two, "speaking on behalf of," and both are used in the video-making context for participatory representation (Braden 1999). PV has certainly a crucial and needed role in bringing underrepresented voices to policy spheres; however, as Cahill et al. (2007) question: "who has the 'authority' to represent a community's point of view? Who should speak for whom, and in what language?". Indeed, PV has been seen as a major tool in combining process and product to offer opportunities for marginalized communities to contribute "in both forms of self-research and ways of self-representation" (Evans and Foster 2014).

It is important to recognize that, as critiqued by Walsh (2016), PV and PAR in general rarely address the political norms about power on which they are grounded. Because of its more liberal political views, there is a tendency to put the problem on "individuals without power to emancipate themselves" within a system that is presented as equal. She argues that there is a "hopeful naivety" around the use of PV and its potential benefits. Those empowered voices end up somewhere and serve someone – PV should try to not only go beyond expressing those concerns to people in power, but also promote reflection to create new ways of experiencing the world (Walsh 2016). Gaventa and Cornwall (2008) looked at how power and knowledge are connected and how participatory research aims to change power relations by questioning the traditional ways of knowledge production. To challenge power inequities, one must use and produce knowledge to influence prevalent knowledge of the issues and power interactions which affect "the lives of the powerless," a goal that proponents of participatory research have been advancing.

Shaw (2017) has identified some important ethical questions raised with PV, particularly related to the risk of incorrect exposure, the politics related to the community response, and power relationships between project partners. Indeed, the end product does not always reflect the full picture of a story or reality. There are obstacles to empowerment in the field of participatory video. In particular, the power structures existing in a community will create an unequal access to the tool, where not all voices may be represented (Gadihoke 2003). Empowerment does not miraculously happen, and there is sometimes the problematic assumption that using PV as a tool will "give voice to the voiceless." There are ways to

tackle these challenges, such as being inclusive in the participant selections, for example, by inviting not only students but also youth who are not at school or by allowing multiple voices to be heard through the creation of different edits of the videos. Kindon (2003) advocated for the use of PV as a feminist practice and with the potential to disrupt hierarchical power relations and create spaces for change. In a follow-up of this pivotal paper in 2016, she raised concerns about the benefits of PV such as empowerment or feminist practice of looking, which should be moderated by more careful consideration to "the complexities of power within which the technology and its conventions are imbricated" (Kindon 2016b). Figure 1[1] gives an overview of the participatory video process, its benefits, and challenges or influencing factors.

Citizen Science and Community-Based Monitoring

Citizen science is widely used to engage participants or "citizen scientists" from the general public in gathering scientific data, to monitor species or environmental indicators, or help with data analysis (Dickinson et al. 2012). Certainly, it can be labor intensive and expensive for environmental monitoring or sampling programs led by academics, governmental, or nongovernmental organizations to be carried out. When citizens or community groups collecting data are focused on a common issue or local area, it is defined as community-based monitoring (Whitelaw et al. 2003; Conrad and Hilchey 2011).

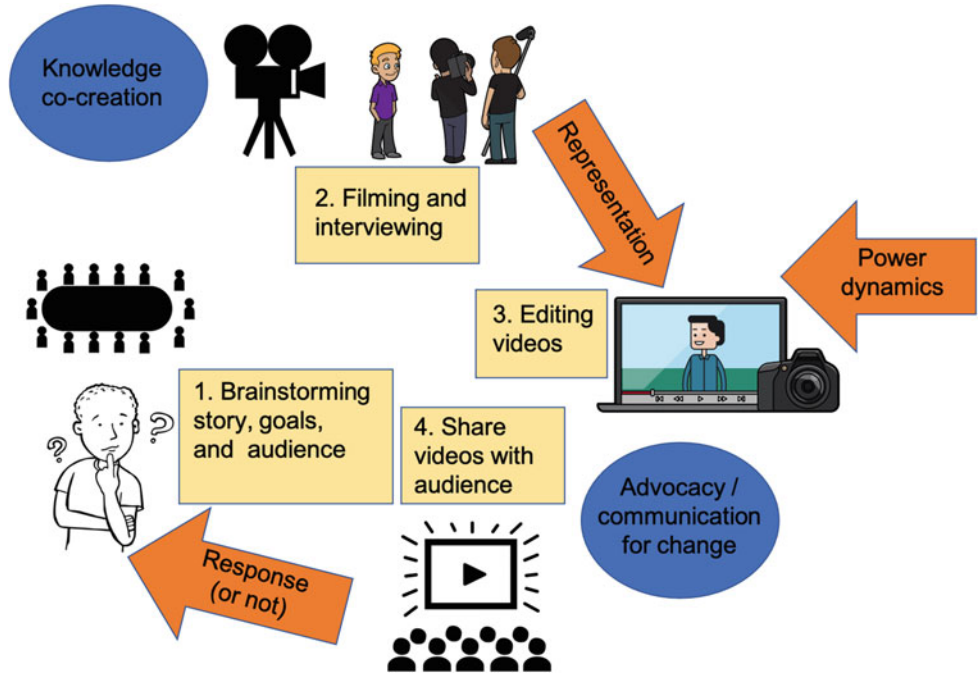
There are real advantages to involve citizen scientists in programs to expand the geographical scale, increase the level of samples, or monitor certain species long-term. Advantages of those types of projects include the increase of the scientific capacity, social networks, and influence on decision-making at the local level (Whitelaw et al. 2003). On the educational side, participants have the potential to acquire new skills related to the scientific data collection, critical thinking, and analysis, where participants can use this knowledge to create new research questions, design more studies, or develop models to answer those queries (Dickinson et al. 2012). In addition, citizen science has been recognized as a great tool to increase public awareness and science education, bridge scientific and the public facilitating more support for science, as well as environmental stewardship (Dickinson and Bonney, cited by Dickinson et al. 2012).

Challenges Related to Citizen Science Programs

There are some challenges related to the use of citizen science and community-based monitoring (See Table 1), although systematic reviews of citizen science projects provide recommendations and guidance to help alleviate some of the challenges. One of the critiques of citizen science and community-based monitoring is the validity and reliability of the data collected (Whitelaw et al. 2003). Careful attention to the design of the protocols is crucial to help with data accuracy (Pocock and Evans 2014), and so is the step of validating data (Gardiner et al. 2012). In an effort to help with combining data from different citizen science projects, there is a momentum toward creating data and metadata standards for the Public Participation in Science Research (PPSR) (Fraisl et al. 2020), although there is still much room for improvement in regard to data access and data-sharing standards (Turbé et al. 2020).

In addition, it requires a considerable amount of time and effort to retain and recruit participants in citizen science projects, including promotion,

[1]Creative Commons Credits for the diagram: "File:Video Camera 1 2 – The Noun Project.svg" by aartiraghu is marked under CC0 1.0. To view the terms, visit http://creativecommons.org/publicdomain/zero/1.0/deed.en; "File:Cartoon Guy Being Filmed By A Camera Crew For A Marketing Video.svg" by Free Clip Art is licensed with CC BY-SA 4.0. To view a copy of this license, visit https://creativecommons.org/licenses/by-sa/4.0; "brainstorming" is marked under CC0 1.0. To view the terms, visit https://creativecommons.org/licenses/cc0/1.0/; "File:Cartoon Video Editing And Streaming.svg" by Free Clip Art is licensed with CC BY-SA 4.0. To view a copy of this license, visit https://creativecommons.org/licenses/by-sa/4.0; "File:Movie – The Noun Project.svg" by XOXO is marked under CC0 1.0. To view the terms, visit http://creativecommons.org/publicdomain/zero/1.0/deed.en



Community-Based Research and Participatory Approaches in Support of SDG14, Fig. 1 Participatory video process (yellow rectangles), benefits (purple circles), and influencing factors or challenges (orange arrows). (Source: Creative Commons)

Community-Based Research and Participatory Approaches in Support of SDG14, Table 1 Review of benefits and challenges of citizen science and community-based monitoring

Benefits	Challenges
Community engagement and network	Retaining participants
Awareness and education increase	Sustainability of funding
Easy or cheaper access to data for scientists	Data reliability, validity, and quality control
Better monitoring (more data on ecosystems)	Data use for policy-making
Support policy-making	Access to expertise
Can help detect new events or species	

Adapted from Conrad and Hilchey 2011

frequent communication, and incentivizing participation through contests or certificates (Dickinson et al. 2012). Communicating results back to the citizen scientists is also a great way to maintain momentum and interest in the program (Forrest et al. 2019). To ensure the viability of a project, it is critical to have the leadership in place, a database, and a website, which all require access to long-term funding.

A lack of transparency related to data use, as well as tracking impacts on research and publications, are also some of the issues expressed, which can impact participants' retainment and policy linkages. Turbé et al. (2020) also found that while many citizen science projects claim open access to their data, most projects only provide data summaries or maps on their websites – very few actually provide a straightforward way to download the data. Although policy impact is difficult to determine, one of the gaps in the literature regarding citizen science is how the data collected is used in environmental decision-making (Conrad and Hilchey 2011; Turbé et al. 2020). Determining policy connections is complicated. Turbé et al. (2020) who assessed over 500 citizen science projects in Europe indicated that project coordinators often had problems determining appropriate policy needs, reaching

policy-makers, and persuading them of the significance of citizen science data. In addition, determining the uses of citizen science data is very difficult, both in science and in policy. There seems to be no direct link between the end users of the data and project coordinators and no easy way to monitor the use of citizen science data. This emphasizes the struggle to recognize concrete policy impact and to connect it to a particular policy sector. Some recommendations by Turbé et al. (2020) to improve the connection between citizen science and policy connections include (1) expanding the coverage of environmental policy sectors by citizen science programs; (2) increasing outreach to decision-makers via capacity building, displaying best practices, and protocols, so that government officials are more inclined to use and trust the data collected; (3) centralizing access to citizen science resources via knowledge hubs would improve access to data and help projects to combine resources for training and assistance; (4) promoting diverse partnerships and collaboration to create innovative funding mechanisms (NGO/private sector/academic); and (5) aiming to measure citizen science impacts and track success (i.e., outcomes, numbers of participants) through project evaluation – which in turn will help future funding (Turbé et al. 2020).

To link citizen science and policy requires careful attention – some improvements are needed for the data collection, data analysis tools, and validation approaches, so that the data is organized in a way to ensure high quality, comparability, and supports the link to policy (Fraisl et al. 2020).

Turbé et al. (2020) called for SDGs to be thoroughly analyzed to find and encourage citizen science opportunities that can feed into policy implementation and monitoring. Citizen science contributions to the achievement of the UN Sustainable Development Goals (SDGs) have been assessed by Fraisl et al. (2020) and have shown that it has the potential to contribute to all 17 SDGs. More specifically, Fraisl et al. (2020) found that citizen science is already contributing to the SDG14 indicator 14.1.1 and could contribute to 14.3.1, 14.4.1, and 14.5.1 (See Table 2). This shows great potential for putting citizen scientists at the center of the monitoring of the SDG14, especially in data collection like time series, and strengthening rapid response to environmental hazards. With the potential for the public to inform policy, citizen science can be a vehicle to increase confidence, reliability, and eventually accountability throughout the course of the SDG monitoring (Fraisl et al. 2020).

Community-Based Research and Participatory Approaches in Support of SDG14, Table 2 Citizen science current and potential contributions to SDG14 indicators

SDG14 Indicators	Current contribution	Potential contribution
14.1.1 Plastic debris density, coastal eutrophication	X	
14.3.1 Marine acidity measurements		X
14.4.1 Proportion of fish stocks within biologically sustainable levels		X
14.5.1 Coverage of protected areas in relation to marine areas		X

Adapted from Fraisl et al. 2020; UN 2021

More generally, globally recognized policy frameworks, such as the Sustainable Development Goals (SDGs), should be systematically analyzed in order to identify and promote the many opportunities that citizen science can bring to policy implementation and monitoring.

Citizen Science Examples in Support of SDG14

There has been an increase of citizen science projects addressing marine plastic pollution and increase in participation over the last few years, indicating that the public is becoming more aware of the issue and taking actions (Fraisl et al. 2020; Napper and Thompson 2020). There are many examples of citizen science projects related to plastics monitoring in the literature. This past year was a bit different in terms of participation due to COVID-19, although the Marine Conservation society in the UK still attracted over 2000 participants for their annual beach cleanup – as opposed to 10,000 the year before. Nevertheless,

data have shown a sharp increase of personal protection equipment (i.e., masks, gloves) found on beaches, resulting in 30% of the marine debris (Marine Conservation Society 2020). Data collected annually are contributing to a worldwide report on litter levels.

Tourists traveling to remote places, such as the Arctic, have the potential to contribute to plastic debris data collection in areas that would be normally hard to reach by citizen scientists. Bergmann et al. (2017) looked at data collected by cruise ship travelers who carried out surveys on six beaches in Svalbard. They categorized and quantified marine debris and took photos of impacts on wildlife. Over 80% of the marine litter encountered belonged to the plastics category, most of which came from fisheries. Because tourism is an important source of litter around the world (Alshawafi et al. 2017), involving tourists in citizen science is a great opportunity to bring awareness and educate them on the impacts of plastics on wildlife and on beaches (Eastman et al. 2013).

Another study involving citizen scientists in a microplastics sampling program also found that the real value of the initiative was the community outreach and better awareness related to plastic pollution (Forrest et al. 2019). Monitoring microplastics (<5 mm long) is harder than plastics due to the potential for sample contamination. Hence, the authors offered some recommendations (see Table 3) to increase consistency and replicability for future microplastics citizen science projects.

Community-Based Research and Participatory Approaches in Support of SDG14, Table 3 Recommendations to increase consistency and replicability in microplastics citizen science projects

Obtaining blank samples from the field and laboratory is important to look at potential atmospheric contamination from microfibers
Standardizing sample sites of interest to participants is also crucial (i.e., shoreline vs. boat sampling)
Samples should be mailed to the researcher for sample processing to ensure quality control. There is more risk of contamination if the citizen scientists process samples
Encouraging the use of the sampling sheets to standardize the results as sometimes it can be inconsistent among participants
It is also important to make sure results are available publicly and in a timely manner for the citizen scientists to see to keep their commitment and interest alive

Adapted from Forrest et al. 2019

Conclusion

Community-based participatory research and the use of participatory methods have great potential to engage groups or communities in environmental issues, monitoring or sampling to make a difference and contribute to science and policy. Although there are challenges related to the tools described, past experiences and case studies offer recommendations to support meaningful community engagement, increased awareness and education, increased capacity building, and positive impacts.

In order to support SDG14 to conserve and use the world's ocean, seas, and marine resources, there is an urgent need to increase public education and awareness on the issues of plastic debris (Napper and Thompson 2020). Using a community-based participatory approach and participatory tools, such as citizen science, community-based monitoring, or participatory video, can increase local knowledge and awareness, enable communication within community and between community members and policymakers at various levels, in order to make an impact locally to support ocean-friendly choices, reduce plastic usage, and spread awareness on the importance of marine life for community health and livelihoods.

Cross-References

- ▶ Coastal Pollution: An Overview
- ▶ Community-Based Marine and Coastal Protected Areas
- ▶ How to Measure Success: the Indicators and Targets for SDG14
- ▶ Microplastics
- ▶ Plastic Pollution in Aquatic Ecosystems: From Research to Public Awareness

- ▶ Plastics and Oceans: A Socio-ecological Perspective
- ▶ Sustainable Development Goals to Reduce and Prevent Marine Litter
- ▶ Tourist Traps: Assessing the Role of Tourism in Sustaining Life Below Water

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