Mainstreaming Earth System Governance into the UN Decade of Ocean Science for Sustainable Development

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ABSTRACT

The objectives and challenges of the UN Decade of Ocean Science for Sustainable Development stress the need to generate new knowledge about ocean problems, involve multiple stakeholders, and develop solutions for sustainable ocean development. In this perspective article, I argue that Earth System Governance (ESG) research could contribute significantly to addressing these needs. First, it can identify salient frames for ocean problems that trigger policy action. Second, it can inform stakeholder involvement by mapping powerful and marginalized interests and suggesting pathways towards more inclusive participation. Third, it can support viable and effective ocean solutions based on insights into political support coalitions and governance design. To make these contributions, ESG needs to be mainstreamed into ocean science. Governance researchers can facilitate mainstreaming by (i) greater knowledge cumulation around ocean issues, (ii) stronger engagement with frameworks of actionable knowledge production, and (iii) proactive integration into inter- and transdisciplinary ocean research.

1. Introduction

People in many countries around the globe consider that human activities are threatening the ocean environment (Lotze et al., 2018, p. 19). The United Nations Decade of Ocean Science for Sustainable Development from 2021 to 2030 responds to these concerns as it seeks to mobilize “the science we need for the ocean we want” (UNESCO-IOC, 2021, p. 17). The UN Decade of Ocean Science (hereafter ‘Ocean Decade’ or ‘the Decade’) has raised expectations of creating “a global movement to transform ocean science for a better world” (Pendleton et al., 2020, p. 9652). While ocean science in the Decade is defined in interdisciplinary ways encompassing the natural and social sciences (IOC-UNESCO, 2020, pp. 55–56), proposed priority research areas have an implicit natural science focus (Polejack, 2021, p. 7; cf. Ryabinin et al., 2019). It is true that natural science research and its dissemination can help identify new threats from changing ocean uses (Pendleton et al., 2020, pp. 9654–9655) and improve people’s ocean literacy (cf. Santoro et al., 2018). It is also true, however, that we already possess extensive knowledge about present human pressures on the ocean environment, including climate change, overfishing, excessive nutrient inputs, and marine plastic litter. International efforts to limit these pressures have produced a fragmented landscape of issue- and region-specific agreements alongside the global legal framework of the United Nations Convention for the Law of the Sea (UNCLOS) (Bigagli, 2016, pp. 157–158). The World Ocean Assessment concluded that, despite these efforts, “human activities now have so many and such great impacts on the ocean that the limits of its carrying capacity are being (or, in some cases, have been) reached” (United Nations, 2017, p. 37). By and large, the existing governance landscape has neither halted the over-exploitation and degradation of marine resources and ecosystems nor facilitated their regeneration.

This perspective article discusses how governance research could contribute to the Ocean Decade. It echoes and specifies the suggestion that interdisciplinary ocean science needs to integrate governance aspects (Visbeck, 2018, p. 3). I focus on Earth System Governance (ESG) as a longstanding concept and open but integrated research network that explores political solutions and novel, more effective governance mechanisms to cope with the current transitions in the biogeochemical systems of the planet (Burch et al., 2019, p. 2; cf. Biermann et al., 2019, p. 18). In three steps, I develop the argument that ESG research, based on its current ten-year Science and Implementation Plan (Earth System Governance Project, 2018), can make significant contributions to the Ocean Decade. First, I identify needs for governance research arising from the Decade’s implementation plan. Second, I illustrate potential
contributions of ESG research to the Decade around the aspects of problem framing, stakeholder involvement, and viable and effective governance solutions. Third, I formulate recommendations on how to harvest these contributions by mainstreaming governance research into ocean science. I conclude that making governance research a priority is paramount for the Ocean Decade to deliver sustainable results.

2. Why the UN Decade of Ocean Science needs governance research

The starting point of my argument is the implementation plan of the Ocean Decade, which originated from a multi-stakeholder process under the auspices of the Intergovernmental Oceanographic Commission (IOC) of UNESCO (Ryabinin et al., 2019). According to this plan (UNESCO-IOC, 2021), the broad objectives of the Decade are to identify what ocean knowledge is required, to generate this knowledge, and to increase its use. The implementation plan operationalizes these objectives in the form of ten challenges. These challenges of the Ocean Decade structure actions (programs, projects, etc.) and suggest pathways towards desired outcomes like clean, healthy, and resilient oceans. Together, objectives and challenges guide the implementation of the Decade as a focal point for diverse actors.

The Decade’s objectives and challenges involve governance issues in at least three ways. To begin with, many of them stress knowledge generation. For instance, the second Decade objective is to “generate comprehensive knowledge and understanding of the ocean, including human interactions and interactions with the atmosphere, cryosphere and the land-sea interface” (UNESCO-IOC, 2021, p. 25). Five out of the ten ocean challenges relate to knowledge generation, such as better understanding different land- and sea-based pollution sources and the effects of multiple stressors (UNESCO-IOC, 2021, p. 22). Knowledge generation is not a neutral process but inherently political. It involves the framing of ocean problems in terms of type, perpetrators, victims, urgency, and possible approaches for solutions. Problem frames delineate boundaries within which future ocean governance can unfold. The Ocean Decade itself exemplifies this because its framing around the need for more ocean research stresses science-related activities and downplays policy-oriented action.

Furthermore, the objectives and challenges reflect the idea of involving multiple stakeholders in the Decade’s activities. This idea is strongest under the third Decade objective aiming at capacity development for sustainable ocean solutions. Specific aims are, amongst others, to “undertake interdisciplinary, multistakeholder co-design and co-delivery of ocean solutions” and to “expand and enhance inclusive and integrated management frameworks and tools” (UNESCO-IOC, 2021, p. 25). Like knowledge generation, stakeholder involvement is political. It is political because stakeholders pursue distinct interests and the design of stakeholder processes determines which of them can shape outcomes. Unequal access or lack of power resources of some actors imply that others are in a privileged position for shaping the future of oceans (Singh et al., 2021; cf. Haas et al., 2021). This risk is inherent in the Ocean Decade given that the lack of resources and access to global governance forums may hinder the involvement of stakeholders from diverse backgrounds.

Finally, several objectives and challenges emphasize the need to develop solutions. Objectives refer to solutions in areas such as education and training, applications and services, technology and innovation, and management and policy (UNESCO-IOC, 2021, p. 25). Challenges in the Ocean Decade include finding solutions for addressing different pollutants and multiple stressors, for developing an equitable and sustainable ocean economy, and for strengthening climate resilience (UNESCO-IOC, 2021, p. 22). Many of these solutions require more conducive governance frameworks (Brodie Rudolph et al., 2020, p. 11). Such frameworks need to be politically viable, i.e., backed by sufficiently broad actor coalitions to become established and endure. To contribute to long-term sustainability goals, institutions and policies at different scales also need an effective design that incentivizes desired behavioral changes. In this context, the Ocean Decade itself is a governance experiment that scholars can evaluate for its effectiveness in mobilizing societal and relevant inter- and transdisciplinary ocean science.

Because of their inherently political nature, the Ocean Decade’s objectives and challenges closely relate to governance questions. The Decade needs a better understanding of ocean problem framing, the role of interests and power in stakeholder involvement, and the design of politically viable and effective governance solutions. Additionally, monitoring and evaluating the Decade’s own governance mechanisms could improve their performance and inform comparable sustainability initiatives.

3. What Earth System Governance research can contribute to the Ocean Decade

ESG research is instrumental in addressing governance-related needs of the Ocean Decade because it can (1) guide reflections about salient problem framings; (2) inform the development of more inclusive stakeholder processes; and (3) suggest strategies for designing politically viable and effective governance solutions (Fig. 1). I link these potential contributions to the research lenses of the ESG Science and Implementation Plan as summarized by Burch et al. (2019) and highlight relevant contextual conditions. I illustrate the contributions with recent examples of governance research and outline next research steps.

3.1. Framing ocean problems saliently

Reflections of ESG about anticipation and imagination (cf. Burch et al., 2019, pp. 11–12), including the framing of changing risks and the generation and assessment of alternative futures, can guide the Decade’s knowledge-generation activities. Generally, the embedment of ESG research in the Anthropocene context (cf. Burch et al., 2019, pp. 5–6) constitutes a holistic alternative to the traditional paradigm of environmental politics. Unlike the latter, it does not assume a human-nature dichotomy that downplays social-ecological interactions and justice matters (Biermann, 2021). Both elements are crucial for understanding ocean problems. A good example is marine plastic pollution. A holistic analysis recognizes that several social-ecological pathways contribute to this problem (Alpizar et al., 2020). It also identifies unjust burden shifting due to plastic exports from the Global North to the South as a key problem characteristic (Cotta, 2020). An ESG frame adequately captures these complexities of ocean threats.

More specifically, governance research elucidates how problem framing can trigger policy action. Scientists can make their findings salient by aligning their framing with policy windows (Rose et al., 2020). As the establishment of large-scale marine protected areas in Brazil illustrates, policy windows allow for major policy changes when an alternative is readily available (Goncalves and De Santo, 2021). Still, some frames are more effective than others are. For instance, framing ocean acidification as a problem concurrent to climate change has failed to mobilize international policy action (Harrould-Kolieb, 2020). Research on climate negotiations found that justice frames are more influential than pure scientific frames (Allan and Hadden, 2017). This finding underscores the need for normative research into justice implications of ocean challenges. Governance research can unpack injustices in areas such as marine protected areas, fisheries management, marine spatial planning, blue economy, and climate change adaptation (Bennett, 2018, p. 140). This ties in with the increasing attention that ESG research devotes to the study of inequalities as a contextual condition (cf. Burch et al., 2019, p. 5).

Additionally, ESG research on governance architecture and agency (cf. Burch et al., 2019, pp. 7–8) can examine the influence of scientists amongst other agents and within different institutional structures. The well-established concept of epistemic communities suggests that science can facilitate international cooperation in marine protection (Haas,
1990). However, increasing regionalization reduces the occurrence of central epistemic communities as exemplified by changes in the protection regime for the Mediterranean (Balsiger et al., 2019). Another limitation is the risk of increasing politicization of science. Some scholars see such risk in negotiations of an international agreement for protecting biodiversity in areas beyond national jurisdiction (De Santo et al., 2019, p. 2). As countermeasure, they propose to create “an autonomous and diverse scientific advisory body” that follows the climate (IPCC) and biodiversity examples (IPBES) (De Santo et al., 2019, p. 3). Comparisons of regional fisheries management provide additional insights into institutional designs that facilitate translation of science into policy (Gonçalves, 2021). ESG research can thus inform the development of well-functioning ocean science-policy interfaces (Claudet et al., 2020, pp. 36–37).

In sum, ESG offers a holistic paradigm for knowledge generation in the Ocean Decade, helps to identify policy windows and effective problem frames, and provides lessons for improving ocean science-policy interfaces. Especially, ESG researcher can make an impactful contribution when studying these aspects for ocean threats that are still subject to high uncertainty and that lack governance mechanisms.

3.2. Supporting inclusive stakeholder involvement

The ESG community can inform strategies for stakeholder involvement based on its study of justice and allocation as well as democracy and power (cf. Burch et al., 2019, pp. 8–11). Stakeholder involvement is beneficial in ocean science, for instance, to integrate the human dimensions into large-scale marine protected areas (Christie et al., 2017) and to identify links between ocean health and human health (Britton et al., 2021). Furthermore, participatory research approaches like co-production have contributed to better science-policy-practice interfaces for marine species conservation and fishery management (Cvitjanovic and Hobday, 2018). Yet, such optimistic views do not grasp the full picture.

Governance research raises several concerns related to stakeholder involvement. First, powerful stakeholders may try to shape research questions and concepts strategically in line with their interests. For instance, the notion of “blue economy” is subject to competing conceptualizations of which some include carbon-intensive industries like oil and gas extraction while other exclude them (Voyer et al., 2018). This definitional aspect is important because it mirrors which ocean uses are considered legitimate and receive a “social license to operate” (Voyer and van Leeuwen, 2019). By mapping competing interests and power relations in transformation contexts (cf. Burch et al., 2019, pp. 3–4), ESG research can inform the design of stakeholder processes in ocean science, management, and governance.

Second, even participatory processes may fail to involve marginalized actors. A persistent challenge is the integration of traditional indigenous knowledge perspectives into research developed from Western perspectives (Raymond-Yakoubian and Daniel, 2018, p. 105). Governance research has identified successful representation mechanisms that strengthen indigenous influence, for instance, in the conservation and management of whales and walrus in the Arctic (Young and Kim, 2021, p. 5). By contrast, another Arctic example—the role of indigenous organizations in the Arctic Council—reminds us that lack of resources and capacity can undermine the promises of participation (Barry et al., 2020, p. 2). Such lessons from ESG research could enhance the inclusiveness of participatory processes in the Ocean Decade.

Third, the democratic quality of participatory processes may vary. Some participatory processes in marine spatial planning took exclusionary, technocratic forms (Flannery et al., 2018). This is problematic as decisions on ocean policy involve competing goals and value trade-offs. Research on climate governance has shown that support for institutions taking such decisions is linked to legitimacy perceptions of the procedural rules (Bäckstrand et al., 2021). ESG researchers also argue that, even within the framework of planetary boundaries, there is space for democratic deliberations among policymakers, experts, and citizens about targets (Pickering and Persson, 2020). These reflections...
can serve as starting point for improving the democratic quality of ocean governance taking into account the contextual diversity in norms and knowledge systems (cf. Burch et al., 2019, p. 6).

In short, ESG maps the interests and power differentials of stakeholders in the Ocean Decade, provides insights for making participatory processes more inclusive, and reflects on the democratic legitimacy of their outputs. As a first step, governance scholars could study these aspects of stakeholder involvement in transdisciplinary research projects launched under the Decade.

3.3. Developing politically viable and effective governance solutions

The ESG research lenses of governance architectures and agency as well as adaptiveness and reflexivity (cf. Burch et al., 2019, pp. 7–8; 12–13) can inform solutions that are politically viable and effective, considering complex and changing interactions of actors, institutions, and ecosystems. Political viability can rely on support coalitions of businesses and environmental activists in influential states. Such Baptist-and-bootlegger coalitions successfully advocated international measures addressing bycatch in fisheries and may be applicable to fishery management more broadly (Barkin et al., 2018). Similarly, environmental activism and voluntary business measures enabled progress in the phaseout of micro-beads in some countries (Dauvergne, 2018). Additionally, business takes action through self-regulation. In aquaculture, firms adopted private regulation to maintain water quality as a common pool resource for growing salmon (Vormedal and Gulbrandsen, 2020). By identifying potential leaders and support coalitions, ESG research can accelerate governance responses to pressing ocean problems.

Several ESG streams have generated findings about effective governance designs. A first stream concludes that international institutions and multi-level policies need to fit the problem they seek to address. For international institutions, two common perils considered by ESG scholars are reductionism (implementing simple recipes without consideration of context) and overload (taking on board too many actors or issues) (Young and Stokke, 2020). Governance research still needs to explore how these perils can be avoided while adapting institutions in ways that consider the ocean as a global social-ecological system (Bigagli, 2016). Likewise, for policies, scholars identified the application of panaceas as a reason for failed management and unintended side effects in fishery governance (Young et al., 2018). They suggest institutional diagnostics as a tool to identify governance designs that suit the context. In this respect, governance research can shed light on the interactions among different actors and between actors and institutions (Haas et al., 2021).

A second and related stream has explored growing governance complexity. In ocean governance, the multitude of partially overlapping global and regional regimes constitutes a heavy and somewhat lethargic architecture (Mendenhall, 2019). Mushrooming nonstate initiatives add further complexity. Some suggest orchestration by international organizations as a way to reap the benefits of polycentric systems while limiting their drawbacks (Lister et al., 2015). Governance research can identify suitable orchestrators or promising regional integration mechanisms (Mahon and Fanning, 2019). Others stress the need to embrace governance complexity in response to existing and new ocean risks (Haas et al., 2021). Governance research can support the development of reflexive governance arrangements that adapt flexibly to the challenges of the Anthropocene context (cf. Burch et al., 2019, p. 13). Monitoring and evaluating the governance mechanisms of the Ocean Decade could generate insights into how such an initiative, which is embedded in UN hierarchies but relying on decentralized coordination structures (cf. UNESCO-IOC, 2021, pp. 40–44), can orchestrate a diverse stakeholder ecosystem and respond to changing ocean threats.

A third research stream examines transnational governance arrangements involving nonstate actors like civil society organizations and/or business. In fisheries and aquaculture certification, the effectiveness of some schemes has suffered from lax rules and limited market uptake (Kalfagianni and Patteberg, 2013). Furthermore, North-South imbalances persist in such schemes as the case of the Marine Stewardship Council evidences (Renkens and Auld, 2019). In global shipping, some observers consider that industry self-governance preempts ambitious international regulation (Alger et al., 2021). Others hold that, under certain conditions, progressive environmental practices of shipping companies can pave the way for more stringent public regulation (Hofmann, 2022). Thus, ESG research assesses the context-specific ability of state and nonstate actors to govern ocean solutions for transformative change (cf. Burch et al., 2019, p. 4).

In summary, ESG can identify potential support coalitions for solutions emerging from the Ocean Decade and guide the design of a more effective ocean governance system. Here, ESG scholars could focus on how the interplay of actors and institutions shapes the adaptiveness of governance arrangements to changing ocean uses and pressures.

4. How to mainstream Earth System Governance into ocean science

Contributions of ESG research to the Ocean Decade on salient problem framing, inclusive stakeholder involvement, and viable and effective governance solutions will only materialize through interdiscipli- nary integration (cf. Claudet et al., 2020). Insufficient integration of governance research into ocean science would result in siloed findings hampering translation into coherent and integrated policies. As the Decade’s implementation plan does not specify contributions of single disciplines or fields, governance research may be overlooked when conducted in isolation. This risk is real in ocean science, which has traditionally been dominated by the natural sciences (Polejack, 2021, p. 7). To facilitate an evidence-informed transition to sustainable ocean governance (Brodie Rudolph et al., 2020), ESG needs to integrate with the broader ocean science community. For governance scholars, such integration provides new opportunities for testing and advancing the conceptual and theoretical underpinnings of ESG research.

Interdisciplinary integration should involve the mainstreaming of governance research into ocean science in three steps (Fig. 1). First, the ESG community needs to cumulate the knowledge it can feed into ocean science. The level of knowledge cumulation on environmental governance is relatively low in general (Newig and Rose, 2020). For ocean governance, however, an ESG taskforce exists that could become a motor of knowledge cumulation. The scope of this task should include ocean-related findings and findings from other issue areas that are transferable to ocean contexts. This adds an issue-specific focus to the Harvesting Initiative that has synthesized findings from the past decade of ESG research (e.g., Biermann and Kim, 2020).

Second, the ESG community needs to engage more with increasingly popular frameworks of actionable and action-oriented knowledge production (Canguila et al., 2017, 2021). These frameworks stress that research needs to complement its problem focus with a solution focus. The ESG community, thanks to combining analytical and normative research, can create both causal and actionable knowledge about ocean governance. However, a stronger focus on solutions requires greater emphasis on practice-oriented outputs in addition to conventional academic publishing. The ESG Science and Implementation Plan recognizes this need as it proposes the key goal “to make active contributions to communities of practice” (Earth System Governance Project, 2018, p. 88).

Third, the ESG community needs to proactively seek integration into inter- and transdisciplinary ocean research. The ESG network understands itself as bridging disciplinary divides within the social sciences (Biermann et al., 2019, p. 21). To integrate into ocean science, however, ESG researchers need to expand collaborations with natural scientists and ocean stakeholders. They also need to keep up with increasingly relevant research practices like knowledge co-production, which treats stakeholders as co-creators (cf. Claudet et al., 2020;
The ESG community can support these steps for mainstreaming governance into the Ocean Decade by upgrading its network structure. The existing structure of the ESG project has proven successful in the past (Biermann et al., 2019) but needs targeted adaptations to forge connections with ocean science and similar communities. Considering the call for more transdisciplinarity in ocean science (Claudet et al., 2020, pp. 40–41), the ESG network needs to strengthen its transdisciplinary capacities too. A comparative assessment of eleven global research networks in sustainability showed that ESG places limited strategic emphasis on supporting its network in co-production and on several aspects of connecting actors and scales (Schneider et al., 2021, p. 134). The ESG network could improve on these dimensions by learning from specialized networks, such as the Global Alliance for Inter- and Transdisciplinarity (cf. Vienni Baptista et al., 2021), and by institutionalizing its stakeholder relationships around key issues. Such improvements would increase the general societal impact of ESG research; and the Ocean Decade’s transformative ambition (Pendleton et al., 2020) is a unique opportunity for ocean governance scholars to pioneer these changes.

5. Conclusion

In this article, I argued that ESG research could contribute significantly to an impactful Ocean Decade. My general point was that “the science we need for the ocean we want” (UNESCO-IOC, 2021, p. 17, my emphasis) involves manifold political issues that can be understood only from a governance perspective. Specifically, I showed that the objectives and challenges of the Decade relate to governance questions in at least three ways. First, knowledge generation in the Decade involves problem framing. Governance research can help identify salient problem frames that are likely to trigger policy action. Second, stakeholder participation throughout the Decade is a political process shaped by different interests and power resources. ESG research can map actors’ interests and power relations and inform the creation of more inclusive processes. Third, the Decade’s focus on solutions calls for integrating insights about political viability and effectiveness. The ESG community has built a rich body of research into support coalitions that make solutions politically viable and into effective governance designs at different scales. Besides this, governance research can monitor the Decade’s procedures to identify potentials for improving the performance of this and similar orchestrating initiatives. These contributions presuppose the mainstreaming of governance research into ocean science. The ESG community can facilitate this mainstreaming by (i) enhancing knowledge cumulation around ocean issues within the network; (ii) engaging more strongly in the production of actionable and action-oriented knowledge; and (iii) seeking integrative connections with ocean science and similar communities. Considering the work reported in this paper.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References


Cvitanovic and Hobday, 2018; Nash et al., 2021). New directions in ESG research reflect these needs by welcoming the combination of disciplinary research with layers of inter- and transdisciplinary research (cf. Burch et al., 2019, p. 14).

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