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Academic Engagement with Wadden Sea Stakeholders: A Review of Past Foci and Possible Futures

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The Wadden Sea became a UNESCO World Heritage Site in 2009 owing to its geographical and ecological importance. Given its status and its global recognition, academic understanding of, and engagement with, a diverse set of stakeholders is crucial to the sustainability of the Wadden Sea and the wildlife that inhabit its transnational boundaries. As such, this paper reviews with whom, how, and to what extent the academy has engaged with Wadden Sea stakeholders. This study finds that stakeholder groups (whom, with vested interests in the sea, might be expected to be present) are missing from academic publications focused on stakeholders in the Wadden Sea. Moreover, existing studies tend to focus on singular, categorized stakeholder ‘groups’, and lack transboundary integration, as well as reference to UN Sustainability Goal 14 – a key target for environmental protection. In sum, the review provides (1) an analysis of academic work that engages Wadden Sea stakeholders to assist future researchers undertaking work in this global ecologically significant area, and (2) a discussion of where future academic work might be developed.

Keywords: biodiversity, review, stakeholder, Wadden Sea, UNESCO

INTRODUCTION

The Wadden Sea, a natural UNESCO World Heritage Site, is the largest tidal flat system in the world (Walsh, 2018). As Döring, Walsh and Egberts note (2021, 226), “following decades of international cooperation and conservation efforts, the Wadden Sea ... is recognized as one of the last remaining large-scale natural landscapes or areas of ‘wilderness’ in central Europe (Rösner 2018; Stock 2020)”. Rightly challenging its construction as ‘pristine’ environment, critical academic scholarship is now examining the Wadden Sea in an array of necessary ways, from its biodiversity, to its cultural significance. This is exemplified in a recent special issue of *Maritime Studies* (featuring papers by Döring et al., 2021; Döring and Ratter, 2021; Egberts and Riesto, 2021; Walsh, 2021).

This mini review is situated in a mere corner of this important literature, but aims to contribute further to it, by understanding the shape of academic engagements with the Wadden Sea. It offers a small-scale study that examines with whom, how, and to what extent the academy has engaged with Wadden Sea *stakeholders*. Such a review is arguably relevant. Academics are knowledge-makers and

information-sharers. They have a key role in producing what is known about the world in any given field (cf. Harding, 1986). Being self-critical of how we (academics) (co)produce knowledge about/with stakeholders, and how positionality manifests in our scholarship has important implications on the governance and conservation of space (Macnaghten and Chilvers, 2014).

In what follows the paper examines which stakeholders have been most actively included in academic literature about the Wadden Sea. It does so to 1) synthesize studies of Wadden Sea stakeholder engagement as they appear in the academic literature as a compilation for other scholars wishing to understand the shape, focus, and extent of previous stakeholder studies of the area (this particularly relevant for grounding future research); and 2) to elucidate what stakeholders perspectives might be absent from such work and what perspectives could be pursued in future work.

SETTING THE SCENE

Bordered by Denmark, the Netherlands, and Germany, the Wadden Sea is situated in the Southeast corner of the North Sea which is fed by the Ems, Elbe, and Weser rivers. It has tidal actions that cause the water to retract up to ~4 km twice daily, leaving behind vast mudflats that harbor a diverse array of bottom-dwelling marine organisms (Wolff, 2013). In addition to being a lifeline for biodiversity including plankton, fish, birds, and mammals, it is also home to a conglomerate of human activity including tourism, energy production, and ports (Christianen et al., 2017; Baird and Asmus, 2020). With ecological diversity, economic vitality, and cultural heritage, the Wadden Sea is an area of many 'stakes' (e.g. Grotenbreg and Altamirano, 2019; Horn et al., 2021). Indeed, there are a diverse array of *stakeholders* each with a vested interest in the Wadden Sea. It is thus a space of competing and conflictual uses and therefore at risk of overexploitation, development, and climate change, amidst other stressors (Gittenberger et al., 2016). As such, it takes a diverse set of organizations, agencies, and everyday people to manage the vast and ever changing seascape.

The governance of the Wadden Sea stretches scales from the regional to the international. An intergovernmental agency made of two independent bodies shares governing responsibilities over the sea: The Trilateral Governmental Council and the Wadden Sea Board (WSB). The governing bodies of the Wadden Sea stretch over 40 islands, encompassing eight national parks. Zooming in, there are a number of regional bodies that are responsible for particular spaces and protected areas encompassing the Wadden Sea. For example, in Germany, inland areas of the Wadden Sea are stewarded regionally by entities such as the Lower Saxony Water Management. Other areas, such as the Wadden Sea National Park in Denmark, are controlled by an amalgamation of national and international agreements. Overall governance of the Wadden Sea seeks to protect coastlines, ensure healthy environments for human, non-human and more-than-human use, and more recently, works to

fulfil sustainable development goals including SDG14 delineating sustainable use of oceans (see Chezel and Nadaï, 2019; Kwiatkowski et al., 2020).

To date, there have been several academic studies focused on stakeholder engagement in the Wadden Sea, including the intergovernmental management of fisheries and work that maps the social-ecological landscape of the region (see van Hoof, 2012 and Sijtsma et al., 2019 respectively). This, and other work, is revealing of the range of issues and competing interests in the Wadden Sea and in turn, shines a light on the complexity of its governance. However, a review of the range of academic work attending to stakeholders in the Wadden Sea is revealing of what stakes matter for academic attention (and in turn policy) and which stakes may be more obscured via the longstanding foci of Wadden Sea policy (i.e., wildlife conservation and coastal protection).

What follows is limited in its scope. The review emerged as part of a specific, time-limited study on academic engagements with stakeholders and scholarly published work (in peer-review sources). It forms part of a larger project connecting partners from three continents (across 3 study areas, of which the Wadden Sea is one), to address the multilayered interactions between biodiversity change and society¹. This particular review did not extend to the vast grey literature on Wadden Sea stakeholders. This will form part of an additional future study. Drawing on the grey sources (policy reports, newspaper articles, magazine features, blogs, radio interviews and beyond), would reveal further findings about with whom and how academics engage with and share knowledge about stakeholders. Accordingly, this paper offers a small, but nonetheless revealing, intervention to contemporary Wadden Sea research.

WHY DOES UNDERSTANDING ACADEMIC ENGAGEMENTS WITH STAKEHOLDERS MATTER?

Governance encompasses "a wide range of actors in the production of policy outcomes, including NGOs, private companies, pressure groups, and social movements as well as those state institutions traditionally regarded as part of government" (Johnston et al., 2002, 317). Such a shift from 'government' to *governance* has been vital for democratizing management of the marine environment and for increasing 'buy in' or confidence from different groups of ocean users who are more likely to support regimes of management, if they were part of developing them. Accordingly, ocean governance is a practice or process that increasingly involves a range of 'stakes' – and

¹ This is the MARISCO project (Marine Research and Innovation for a Sustainable Management of Coasts and Oceans) combining partners in Germany at the Helmholtz Institute for Functional Marine Biodiversity at the University of Oldenburg; South Africa, at the Institute for Coastal and Marine Research (CMR) at the Nelson Mandela University; and the United States of America, at the National Center for Ecological Analysis and Synthesis (NCEAS) at the University of California, Santa Barbara. Information is available here: <https://www.marisco-project.de/>.

hence stakeholders – in order to achieve ocean outcomes reflective of a range of vested concerns and interests (UNESCO Ocean Decade, 2021). Broadly speaking, a stakeholder is defined as any “person, organization or group with an interest (professional or societal) or an influence on the marine environment or who is influenced directly or indirectly by activities and management decisions” (Newton and Elliott, 2016, 2). As such, understanding who stakeholders are (how vitally whether they are included or present in academic work and policy) is a fundamental part of understanding how governance happens, and in turn then, how specific visions of ocean futures come to be.

Within a Wadden Sea framework, stakeholders are vital because of the geographical location, economic importance, natural habitat, and historical-cultural legacy of this marine space (Koren, 2020). Many studies have sought to understand stakeholder roles and relationships in this significant sea. However, no study has sought to collate and analyze the scholar/stakeholder interface. Our study attempts this to illuminate what stakeholder perspectives are frequently attended-to in scholarly outputs on the Wadden Sea, and which might be absent and addressed in future work as scholars try to further democratize approaches to understanding the sea for biodiversity conservation.

REVIEW METHODS

Our review was conducted using the global database Web of Science, in addition with the University of Michigan Library system² collating all returned peer-reviewed articles of original research from 2000 to the end of May 2021 pertaining to Wadden Sea stakeholder engagement. Applying PRISMA guidelines for systematic reviews³, we constructed key search words and phrases (Moher et al., 2009). A complete list of search terms is in **Table 1**. We first read the various papers’ abstracts and titles and then selected the papers for subsequent full reads. The ones selected for full reads had to be original research studies printed in peer-reviewed journals. We excluded review or case study comparisons. Studies had to explicitly focus on the Wadden Sea by stating the paper’s geographical area within the borders set by UNESCO, including land and estuaries, or explicitly stating the Wadden Sea Region in their abstract or methods. Researchers had to clearly state who the stakeholder was, and the relationship being studied with the Wadden Sea. The relationship could have been stakeholder effects on the Wadden Sea region or vice versa. For these two reasons, we excluded studies that purely focused on pure natural scientific inquiry (e.g., shellfish competition effects on species fecundity). We then extracted relevant data from each paper to analyze key emergent themes.

²University of Michigan Library is the eighth largest academic library in North America with 20 libraries and 11 million volumes. This provided a greater number of returns offering a more comprehensive review.

³PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is a minimum set of items to aid authors aid reviews and meta-analyses.

TABLE 1 | Search terms included ‘Wadden Sea engagement’, in addition to associated interest groups (i.e., tourism, medical, and energy) plus variants.

Theme	Search Terms
Wadden Sea	Wadden Sea OR Frisian Island(s) OR Wattenmeer
Stakeholders	Stakeholder AND/OR Engagement OR Volunteer(s)
Interest Groups	Tourism OR Medical OR Energy OR Fisheries OR Military

Search words were determined by preliminary searches and were created to maximize the output by using both general and specific terminology plus their variants. We input identical phrasing into both databases and searched the abstracts, title, author, and keywords.

RESULTS

Overview

From our original searches, 4,772 different articles were suggested by our chosen databases. After removing duplicates, we then conducted title abstract reads as described above and removed 4,708 papers (primarily purely natural science based) resulting in 64 remaining citations. Of the 64 papers 51 were ultimately decided on and relevant data was extracted and analyzed (**Table 2**). The final 13 papers were removed after full read-throughs for lack of supporting information or because they were purely theoretical.

Stakeholders

Most evident in the academic literature concerned with stakeholders in the Wadden Sea is that focus on particular ‘types’ of stakeholder dominate. Given that most papers center on aiding management and policy – especially surrounding water and climate mitigation – there is perhaps an unsurprising attention to protection and management (i.e. stakeholders directly engaged in this task). The Wadden Sea has a tumultuous history of storms that without human interference would likely increase in destruction as sea level rises (Lotze et al., 2005; Koh and de Jonge, 2014; de Groot et al., 2017). Academic engagements with stakeholders in engineering, management, and policy is perhaps to be expected. However, a concurrent viewpoint is that oftentimes academics engage with stakeholders based on an understated but rather well-understood idea that only certain subjects are typically relevant to decision making (see Flannery et al., 2018). This alerts us to limitations in how other stakeholders (beyond official management spheres) are included in, and part of, processes related to the research on the Wadden Sea. Yet as the general stakeholder literature reveals, incorporating a wider range of stakeholders – in academic research as well as directly in science projects – enables different knowledge to be revealed and the process of decision making to be more democratic (Newton and Elliott, 2016). Greater focus on stakeholders ‘missing’ from current analysis (military actors, diverse groups of tourists, coastal residents, pharmaceutical companies), could arguably increase the understanding of the uses of the Wadden Sea (Brinkhoff et al., 2004; Vanclay, 2012; Egberts and Hundstad, 2019).

Recognition of other stakeholders is particularly important given that the Wadden Sea is a UNESCO World Heritage Site (see Yun, 2015 for the importance of this status). Having the title of world heritage site implies an explicit understanding that these

TABLE 2 | Final consortium of papers selected for review with indication of the the primary stakeholder targeted and country where stakeholders reside.

Authors	Title	DOI	Stakeholder	Country
Brinkhoff et al., 2004	Antibiotic Production by a Roseobacter Clade-Affiliated Species from the German Wadden Sea and Its Antagonistic Effects on Indigenous Isolates†	https://doi.org/10.1128/AEM.70.4.2560-2565.2003	Medical	Germany
Buck et al., 2008	Meeting the quest for spatial efficiency: progress and prospects of extensive aquaculture within offshore wind farms	https://doi.org/10.1007/s10152-008-0115-x	Energy	Germany
Busch et al., 2011	Conceptualizing the link between marine ecosystem services and human well-being: the case of offshore wind farming	https://doi.org/10.1080/21513732.2011.618465	Community Policy/ management	Germany
Chezel and Nadaï, 2019	Energy made in Northern Friesland: fair enough?	https://doi.org/10.1080/13549839.2018.1531837	Community Policy/ management	Germany
Daams and Sijtsma, 2013	Planting the SEED: Towards a Spatial Economic Ecological Database for a shared understanding of the Dutch Wadden area	https://doi.org/10.1016/j.seares.2012.12.002	Community Policy/ management	Germany
De Jong, 2005	The Wadden Sea Forum: The Relevance Of Stakeholder Participation For Sustainable Planning	https://doi.org/10.2495/SPD051262	Policy/management	Netherlands, Germany and Denmark
De Vos and Bush, 2011	Far More than Market-Based: Rethinking the Impact of the Dutch Viswijzer (Good Fish Guide) on Fisheries' Governance	https://doi.org/10.1111/j.1467-9523.2011.00539.x	Fisheries	Netherlands
Dijk et al., 2016	Options for socioeconomic developments in ICZM for the tri-national Wadden area	https://doi.org/10.1016/j.ocecoaman.2015.10.004	Policy/management	Netherlands, Germany and Denmark
Döring and Ratter, 2018	The regional framing of climate change: towards a place-based perspective on regional climate change perception in north Frisia	https://doi.org/10.1007/s11852-016-0478-0	Community Policy/ management	Germany
Egberts and Hundstad, 2019	Coastal heritage in touristic regional identity narratives: a comparison between the Norwegian region Sørlandet and the Dutch Wadden Sea area	https://doi.org/10.1080/13527258.2019.1570310	Tourism	Netherlands Denmark
Folmer et al., 2013	The role of wildlife in emotional attachment to a nature-based tourism destination	https://doi.org/10.1080/14724049.2013.864297	Tourism	Germany
Folmer et al., 2016	Sustainable tourism development and the world heritage status of the Wadden Sea: The case of Terschelling	https://doi.org/10.2989/rhm.2016.6.1.6.1294	Tourism	Netherlands
Gerkenmeier and Ratter, 2018	Multi-risk, multi-scale and multi-stakeholder – the contribution of a bow-tie analysis for risk management in the trilateral Wadden Sea Region	https://doi.org/10.1007/s11852-016-0454-8	Policy/management	Netherlands, Germany and Denmark
Gerkenmeier et al., 2018	Managing coastal risks at the Wadden Sea: a societal perspective	https://doi.org/10.1108/DPM-04-2017-0074	UNESCO	Netherlands Germany Denmark
Gilissen et al., 2019	Towards a rights-based approach in EU international river basin governance? Lessons from the Scheldt and Ems Basins	https://doi.org/10.1080/02508060.2019.1649629	Policy/management	Germany
Grotenbreg and Altamirano, 2019	Government facilitation of external initiatives: how Dutch water authorities cope with value dilemmas	https://doi.org/10.1080/07900627.2017.1374930	Water	Netherlands
Hanssen et al., 2009	The Role of Ecological Science in Environmental Policy Making: from a Pacification toward a Facilitation Strategy	https://doi.org/10.5751/ES-02884-140143	Policy/management	Netherlands
Heslinga et al., 2017	Using a social-ecological systems perspective to understand tourism and landscape interactions in coastal areas	https://doi.org/10.1108/JTF-10-2015-0047	Tourism	Netherlands
Heslinga et al., 2019	Strengthening governance processes to improve benefit-sharing from tourism in protected areas by using stakeholder analysis	https://www.tandfonline.com/doi/full/10.1080/09669582.2017.1408635	Tourism	Germany
Heslinga et al., 2020	Towards Resilient Regions: Policy Recommendations for Stimulating Synergy between Tourism and Landscape	https://doi.org/10.3390/land9020044	Tourism	Netherlands
Hofstede, 2003	Integrated management of artificially created salt marshes in the Wadden Sea of Schleswig-Holstein, Germany	https://doi.org/10.1023/A:1024248127037	Policy/management	Germany
Horn et al., 2021	Food web models reveal potential ecosystem effects of seagrass recovery in the northern Wadden Sea	https://doi.org/10.1111/rec.13328	Policy/management	Germany Denmark
Jeuring and Haartsen, 2017	The challenge of proximity: the (un)attractiveness of near-home tourism destinations	https://doi.org/10.1080/14616688.2016.1175024	Tourism	Netherlands
Jeuring, 2018	Pluralising touristic production and consumption roles of residents? An SME perspective on proximity tourism	https://doi.org/10.1080/02508281.2017.1410973	Tourism	Netherlands

(Continued)

TABLE 2 | Continued

Authors	Title	DOI	Stakeholder	Country
Kalisch, 2012	Relevance of crowding effects in a coastal National Park in Germany: results from a case study on Hamburger Hallig	https://doi.org/10.1007/s11852-012-0195-2	Tourism	Germany
Karrasch et al., 2017	Collaborative landscape planning: Co-design of ecosystem-based land management scenarios	https://doi.org/10.3390/su9091668	Policy/management	Germany
Kenterelidou and Galatsopoulou, 2021	Sustainable Biocultural Heritage Management and Communication: The Case of Digital Narrative for UNESCO Marine World Heritage of Outstanding Universal Value	https://doi.org/10.3390/su13031449	Community Policy/management	Netherlands, Germany and Denmark
Kwiatkowski et al., 2020	Volunteering and collaborative governance innovation in the Wadden Sea National Park	https://doi.org/10.1080/13683500.2019.1571022	Volunteers	Denmark
Liburd and Derksen, 2009	Emic perspectives on quality of life: The case of the Danish Wadden Sea Festival	https://doi.org/10.1057/thr.2009.3	Community Policy/management	Denmark
Liburd et al., 2020	Co-designing tourism for sustainable development	https://doi.org/10.1080/09669582.2020.1839473	Tourism	Denmark
Michler-Cieluch and Kodeih, 2008	Mussel and Seaweed Cultivation in Offshore Wind Farms: An Opinion Survey	https://doi.org/10.1080/08920750802273185	Fisheries	Germany
Osthörst and Mänz, 2012	Types of cluster adaptation to climate change. Lessons from the port and logistics sector of Northwest Germany	https://doi.org/10.1080/03088839.2011.650724	Policy/management	Germany
Plieninger et al., 2016	Implementierung des Ökosystemleistungs-Ansatzes in deutschen Biosphärenreservaten	https://doi.org/10.1007/s13147-016-0438-z	Policy/management	Germany
Schröter et al., 2020	Distant regions underpin interregional flows of cultural ecosystem services provided by birds and mammals	https://doi.org/10.1007/s13280-019-01261-3	Tourism	Germany Netherlands
Sijtsma et al., 2012	Deep feelings around a shallow coast. A spatial analysis of tourism jobs and the attractivity of nature in the Dutch Wadden area	https://doi.org/10.1016/j.ocecoaman.2012.05.018	Tourism	Netherlands
Sijtsma et al., 2019	Multi-scale mapping of cultural ecosystem services in a socio-ecological landscape: A case study of the international Wadden Sea Region	https://doi.org/10.1007/s10980-019-00841-8	Community Policy/management	Netherlands, Germany and Denmark
Sterr, 2008	Assessment of Vulnerability and Adaptation to Sea-Level Rise for the Coastal Zone of Germany	https://doi.org/10.2112/07A-0011.1	Management Science	Germany
Süsser, 2018	Coastal dwellers-power against climate change: a place-based perspective on individual and collective engagement in North Frisia	https://doi.org/10.1007/s11852-016-0467-3	Policy/management	Germany
Swart and Van Andel, 2008	Rethinking the Interface between Ecology and Society. The Case of the Cocker Controversy in the Dutch Wadden Sea	https://doi.org/10.1111/j.1365-2664.2007.01366.x	Policy/management	Netherlands
van der Aa et al., 2004	World Heritage as NIMBY? The Case of the Dutch part of the Wadden Sea	https://doi.org/10.1080/13683500408667986	Tourism	Netherlands
van der Molen et al., 2018	Trade-offs and synergies in joint knowledge creation for coastal management: insights from ecology-oriented sand nourishment in the Netherlands	https://doi.org/10.1080/1523908X.2018.1461082	Policy/management	Netherlands
van Hoof, 2012	If you can't beat them; joint problem solving in Dutch fisheries management	https://doi.org/10.1186/2212-9790-11-12	Fisheries	Netherlands
Van Loon-Steensma and Vellinga, 2019	How "wide green dikes" were reintroduced in The Netherlands: a case study of the uptake of an innovative measure in long-term strategic delta planning	https://doi.org/10.1080/09640568.2018.1557039	Policy/management	Netherlands
van Loon-Steensma, 2015	Salt marshes to adapt the flood defences along the Dutch Wadden Sea coast	https://doi.org/10.1007/s11027-015-9640-5	Policy/management	Netherlands
Vugteveen et al., 2014	How to structure and prioritize information needs in support of monitoring design for Integrated Coastal Management	https://doi.org/10.1016/j.seares.2013.10.013	Community Policy/management	Netherlands
Walsh, 2018	Metageographies of coastal management: Negotiating spaces of nature and culture at the Wadden Sea	https://doi.org/10.1111/area.12404	Policy/management	Germany
Werners et al., 2016	Method selection in adaptation research: the case of the Delta Programme for the Dutch Wadden region	https://doi.org/10.1007/s10113-015-0799-9	Policy/management	Netherlands
Wielenga, 2018	Shifting land use in German coastal mainland destinations: historical development of tourism in Norden- Norddeich	https://doi.org/10.1108/JTF-04-2018-0014	Tourism	Germany
Wiering et al., 2015	The rationales of resilience in English and Dutch flood risk policies	https://doi.org/10.2166/wcc.2014.017	Policy/management	Netherlands
Winkler and Hauck, 2019	Landscape stewardship for a German UNESCO Biosphere Reserve: a network approach to establishing stewardship governance	https://doi.org/10.5751/ES-10982-240312	Policy/management	Germany
Wolsink, 2010	Near-shore wind power—Protected seascapes, environmentalists' attitudes, and the technocratic planning perspective	https://doi.org/10.1016/j.landusepol.2009.04.004	Energy	Netherlands

sites are meant to be protected for future generations. This necessitates a greater need for more voices to be captured in the academic literature that can inform decision makers. Missing stakeholders is not a new phenomenon, however, as in many cases there are both explicit and implicit drivers forcing out stakeholders from engagement in policy work, and academic reflections in the process. In some cases, there may be initial push-back from being named a world heritage site by locals (van der Aa et al., 2004). This sentiment happened in Germany where there was vocal opposition to being classified as a UNESCO site, alongside continued disagreements surrounding other industries such as energy (Wolsink, 2010; Winkler and Hauck, 2019). In this case contentious issues may drive a decline in participation of stakeholder work (see also Flannery et al., 2018).

Regionally Focused Papers

While the Wadden Sea is an international ecosystem, important to the economies of Denmark, Germany, and Netherlands, and utilized by thousands of people each year, papers that recognize the *connectedness* of stakeholders across the Wadden Sea are strikingly low. Only 7% of the papers surveyed engaged stakeholders from all three affected countries or also included internationally recognized stakeholders. Even fewer are papers that use bilateral analysis of stakeholder engagement. More importantly, many papers that use joint stakeholder analysis only occurred in the last three years, in spite of the naming Dutch and German parts of the Wadden Sea as a world heritage site in 2009 and Danish parts in 2014. Additionally, those joint papers have been explicitly confined to the 'big' stakeholder categories of policy and management surrounding decisions on climate change preparedness and mitigation. While working with and implementing stakeholders into academic work is difficult – most notably because of scheduling, dismissal, funding, and complex organization across international barriers – collective efforts are needed across countries and categories for the development and implementation of effective plans (Rodríguez-Izquierdo et al., 2010). The difficulty in collective work is further exacerbated because of the challenges of reconciling people, places and 'problems', where cartographic country borders do not represent the borders wildlife, ships, or commerce adhere to, for example.

Call for Explicit Integration of Sustainable Development Goals

Lastly, there is a globally-recognized need to meet SDGs. Specifically important with the Wadden Sea region are 13 (climate), 14 (which states that oceans must be used sustainably to ensure future generations can utilize their resources) and 15 (life on land) (United Nations, 2015). However, within the academic work on the Wadden Sea, there is a notable lack of work that reflects on the relationship between stakeholders and specific sustainable initiatives.

While we might expect a lack of acknowledgement given the relative novelty of SDG14 in specific stakeholder-centered scholarly work, it still warrants a discussion of where and how these connections can occur. Even though the current management of the Wadden Sea is not centered on sustainable development *per se* but rather on conservation of both wildlife

and coastal environment, it is likely that SDGs overall and particularly SDG14 will become a relevant point of discussion as initiatives of the United Nations Oceans Decade takes shape (Kabat et al., 2012). Given the known efficacy of goal-oriented mindsets and the short timeframe in which to meet SDG14, there is the potential for efficacy in management outcomes if there were an increase in academic literature that addresses stakeholder engagements with SDGs in tandem with the Wadden Sea. Conceivably, without meeting SDG14 or other sustainable goals, dire consequences are likely for communities (social and ecological) with at-risk communities worst affected (Armstrong, 2020).

DISCUSSION

Understanding the status of the Wadden Sea, its diverse stakeholders, and the academics whom write about them in scholarly work, is important as the challenges of climate change put pressure on this area and those connected to it. What visions of the future are written into and out of scholarship through the power of academic authoring? What might be learned from the observations here, regarding the ways academics work with, and write about stakeholders? First, while 'utilizing' common, established, or 'well known' stakeholders is on par with current paradigms of governance, increasingly literature shows that incorporating new voices is best for successful policy implementation (Bryson et al., 2013; Michels and De Graaf, 2017). There is tremendous stakeholder-centered work that has resulted in the effective management of the Wadden Sea, especially that of balancing the needs of agriculture, sea level rise, tourism, and conservation (i.e., De Vos and Bush, 2011; Süsser, 2018; Liburd et al., 2020). However, we wonder whether academics may themselves work with and write wider stakeholder interests into their (our) work. This may be a vital part of democratizing knowledge. Often called tacit knowledge, this is localized and passed-down knowledge that is embedded into cultural practices but often overlooked in research studies (Nikas et al., 2017). Second, in addition to academics giving greater voice to those beyond the 'typical' stakeholder groups, is the need for greater work combining studies of stakeholders across borders (as well as-collaboration of researchers between borders). Recent work has rightly noted that governance can be complicated in the Wadden Sea due to differing conservation practices, embedded in different imaginaries of the space (Walsh, 2020). Work such as this – which recognizes complexities – is greatly needed, and in respect of stakeholders across borders. Because the policy sphere must think beyond borders when addressing issues such as transboundary biodiversity hotspots like the Wadden Sea, integrating stakeholder knowledge across conventional state lines is vital. This requires *academic* stakeholder research to reach outside of its often national 'pockets' (driven by national funding regimes), to more integrative cross-boundary approaches. This has challenges: often requiring more complex research designs, overcoming access issues, language barriers and so on, but it is vital for better grappling with 'slippery' environmental concerns. Third, in spite of the importance of the

Wadden Sea in the context of SDGs, there is not, as yet, extensive work connecting-up academic engagement with stakeholders in understanding how stakeholders relate to SDGs, such as SDG14 particularly.

This mini review has asked with whom, how, and to what extent the academy has engaged with Wadden Sea stakeholders to show which stakeholders dominate in scholarly work, and which themes are examined, or not. Although the reach of peer-reviewed academic work can be limited (some journals can appear behind paywalls, books may be expensive) academics produce a currency of knowledge that informs how people and places become understood (which can feed into how they might be managed through linkages between science and policy). Understanding academic work is therefore part of the picture of governance. In the Wadden Sea particularly – with the looming climate crisis, the reality of rising seas, and temperature instability – continued academic work that engages stakeholders, but also critically reflects on that engagement, is necessary as both governments and conservation bodies look more critically at measures to mitigate the effects of climate change.

AUTHOR CONTRIBUTIONS

KP proposed the idea of a review to assess stakeholder engagement; J-CD provided oversight and geographical

expertise. GIG carried out the review and analysis. All authors contributed to writing the manuscript and providing feedback. All authors read and approved the final manuscript.

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