

From the Tropics to the Poles: Reflections of Early-Career Marine Researchers About Fieldwork

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Abstract

Fieldwork is essential for knowledge co-production in marine sciences. It enables the collection of empirical data and provides a platform for bridging various disciplines and knowledge systems. Although awareness of the need for equitable research practices appears to increase, ethical issues in marine fieldwork persist. “Parachute science” refers to research typically conducted in postcolonial contexts without equitable collaboration with local partners. Early-career researchers (ECRs) are confronted with these issues firsthand. They often carry out field-based activities, yet frequently have little or no formal ethical guidance and training. We are a group of marine ECRs who are, or have been, affiliated with research organizations in Western Europe. Many of us come from other regions, including the Global South. In this article, we reflect on our own experiences with knowledge co-production in marine research involving fieldwork from the tropics to the poles. Despite our different experiences, research contexts, and topics within the marine sciences, we all faced limited ability to meaningfully engage with local partners and the research context. Specific challenges involved navigating interdisciplinarity across the natural and social sciences, issues of positionality, research fatigue in the study area, and high administrative demands relating to scientific research and residency. We provide a set of recommendations in the form of guiding questions to support

coordinated, multi-level action and intentional steps away from parachute science. Only then can we reinvent marine science fieldwork as a cornerstone of equitable knowledge co-production, with ECRs as drivers of fairer, more impactful and fulfilling fieldwork experience.

Keywords

early-career researchers; interdisciplinarity; knowledge co-production; local actors; marine sciences; parachute science; transdisciplinarity

1. Introduction

Sustainability sciences, including marine sciences, are increasingly being called upon to solve complex real-world problems (Folke et al., 2016; Glaser et al., 2012; Schlüter et al., 2022). As safe and just planetary boundaries are exceeded, biodiversity loss, erosion of traditional livelihoods, overfishing, pollution, invasive species, coastal erosion, and rising sea levels are some of these pressing sustainability issues, with direct implications for social justice and human well-being (Rockström et al., 2023). Field-based collection of primary data is paramount for the development and progress of sustainability research, and marine sciences in particular. Fieldwork enables researchers to grasp and collect empirical information about ongoing social and natural processes in a systemic and interdisciplinary, up-to-date manner (Biggs et al., 2022). It also provides an opportunity to engage firsthand with local communities, who are at the frontline of local social-ecological system transformation (Baron-Aguilar et al., 2025).

Various collaborative research approaches have emerged since the 1970s that challenge dominant modes of academic knowledge production. Among them is participatory action research, originating in Latin American university circles (Hall & Tandon, 2017a), as well as transdisciplinarity, first articulated in European academic debates, and later further developed within sustainability science (Bernstein, 2015). Another approach is knowledge co-production, which can be understood as “iterative and collaborative processes involving diverse types of expertise, knowledge and actors to produce context-specific knowledge and pathways towards a sustainable future” (Norström et al., 2020, p. 2). Such processes may draw on interdisciplinary collaboration, integrating knowledge across academic disciplines, and transdisciplinary engagement, which interweaves academic and non-academic knowledge and actors, in an effort to bridge epistemological boundaries throughout the research process (e.g., Arlinghaus et al., 2025). Fieldwork constitutes a pivotal platform to foster knowledge co-production (Norström et al., 2020), but it often fails to reach its full potential for various reasons.

Marine sciences have relied on fieldwork for data acquisition and observation for centuries, yet these practices often involve ethical concerns (Baker et al., 2019; de Vos, 2020; Nakamura et al., 2023). Parachute science occurs when researchers, mostly affiliated with wealthier research organizations in the Global North, conduct field-based research in poorer regions, often in low- or middle-income countries of the Global South, while reproducing various forms of colonial dynamics of knowledge production. Such extractive research practices are fundamentally incompatible with the emergence of more equitable and ecologically sustainable societies (Escobar, 1996; Krenak, 2019). They also decrease the relevance of the research to local needs, the legitimacy of the research team, the robustness of the research design, and emerging outcomes (Breckwoldt et al., 2021).

More recently, the rise of big data and artificial intelligence, as well as the growing interest in modeling in conservation sciences, has raised concerns about whether fieldwork will be sidelined (Ríos-Saldaña et al., 2018). While shifting away from fieldwork may be seen as a way to avoid inequities in knowledge co-production, it can also reproduce them. For instance, the necessary reliance on empirical data for model validation can maintain a divide in which local knowledge is used to provide data for high-level analysis and interpretation conducted elsewhere (Nakamura et al., 2023). While this trend has primarily been noted in terrestrial conservation science (Ríos-Saldaña et al., 2018; Soga & Gaston, 2025), its effects can quickly be felt in marine sciences. Therefore, it is crucial to rethink the essential role that fieldwork can play in bridging different knowledge systems and fostering balanced, trusted, and long-term engagement across disciplines and actors, as long as knowledge hierarchies are not reproduced through inadequate research practices (Baker et al., 2019).

As both inheritors of these developments and critical agents of change, marine early-career researchers (ECRs) occupy a complex position with regard to advancing equitable knowledge co-production. Although there are signs that marine researchers are becoming more aware of the need to adopt fairer research practices, and ECRs take part in advancing these approaches (Kaikkonen et al., 2024; Kelly et al., 2019; Rölfer et al., 2022; West et al., 2025), they still face significant challenges in doing so. These include unpaid work, limited access to interdisciplinary training, a difficult relationship with supervisors, and high output expectations against limited time. International ECRs based in the Global North may face additional barriers such as language difficulties, administrative burdens, lack of a support network, precarious work conditions, and a lack of overall inclusivity in the work environment, especially ECRs from minoritized groups who face institutional biases and structural barriers related to multiple social identities (Kaikkonen et al., 2024, p. 2). However, to our knowledge, less emphasis has been given to how these compounding challenges affect ECRs' experiences of fieldwork and its outcomes. ECRs are often at the forefront of fieldwork logistics and data collection, although there seems to be little systematic evidence of this labor contribution. Conversely, fieldwork is a cornerstone of training for marine ECRs who work empirically.

This article emerges from the recognition of the importance of fieldwork for marine sciences development, and the limitations faced by ECRs in pursuing equitable knowledge co-production in marine sciences. We examine and underscore how challenges in conducting inter- and transdisciplinary research directly affect ECRs' experience of fieldwork in marine sciences, especially for ECRs based in the Global North and undertaking fieldwork elsewhere.

1.1. The Role of Fieldwork for Knowledge Co-Production

Conceptualizations of “fieldwork” have varied across disciplines and time (Bogusz, 2023a). Fieldwork has been described by marine researchers as part of their methods to investigate a research problem, either deductively (e.g., through conducting experiments) or inductively (e.g., through in-situ observations, measurements, and informal conversations; Bogusz, 2023a). From a more encompassing perspective, fieldwork can refer to an experiential stage of the research: that of *being* in the place of study (Bogusz, 2023b; Sultana, 2007). It is a non-linear, iterative, and “messy” process that may entail one or more field trips of different lengths, requiring preparatory and follow-up tasks (Cvitanovic et al., 2022). The field experience enables one to grasp, through various means such as observations, listening, touching, tasting, talking, and on-the-ground dynamics and processes (e.g., Hägele, 2024, as cited in Schadeberg et al., 2026, p. 2), that can directly inform a holistic

understanding of the research problem and context. The sense of *being* in a place is inherently relational and subjective (Bogusz, 2023b; Sultana, 2007). This means that our experiences are shaped by our own positionalities, assumptions, and epistemologies. Consequently, we become both agents *in* and subjects of the field insofar as the way we engage with it will directly affect the research process and outcomes.

Field-based practices for knowledge co-production are socially, politically, and historically situated, with implications for the research outcomes. “Parachute science” provides a useful lens through which to emphasize the historical, political, and geographical dimensions of field-based knowledge production practices in a world marked by deep social and economic inequalities (de Vos, 2020; Stefanoudis et al., 2021). The concept refers to practices in which researchers based in high-income countries conduct fieldwork in another country, usually in low- to middle-income countries, without consideration for local research needs, meaningful collaborations, and benefits for local partners. These practices, rooted in historical colonial dynamics of knowledge production, are still common in marine sciences (de Vos et al., 2023; Stefanoudis et al., 2021).

Parachute science relates to how knowledge is co-produced through field-based research practices, i.e., whose and what knowledge is considered legitimate. In field ecology research and other quantitative approaches to marine sciences, strict assumptions of objectivity potentially overlook “how nature is constructed through the choice of measurements taken and, consequently, those which are not, and what the predominance of one body of collected data means for the myriad of others that are left behind” (Baker et al., 2019, p. 289). Descriptions of field locations as “remote” perpetuate the stereotype of certain regions as “empty spaces” (Baker et al., 2019) or “untamed nature” (Diegues, 1998). Such framings can serve to legitimate extractive research practices as they overlook the fact that these regions have been home to societies for centuries, who inhabit these places, hold deep knowledge of local social-ecological systems, and are key agents of change. In marine science, local actors are often reported to be incorporated into the research process only during data collection, and in a manner subordinate to the research interests of leading researchers (Breckwoldt et al., 2021; Hedge et al., 2020). Successful participatory research appears to be less frequently reported (O’Connor et al., 2024; see, e.g., Grilli et al., 2021; Trimble & Berkes, 2013). Parachute science includes assumptions and practices that diminish local academic expertise or relegate local partners to fieldwork facilitation roles (Nakamura et al., 2023; Tilley & Kalina, 2021). These approaches are more easily endorsed in the absence of reflection on the researcher’s positionality and the ensuing power relations (Baker et al., 2019). They are also rooted in structural wealth disparities between the Global South and the Global North, and the associated inequalities in access to research infrastructure, equipment, and funding, as comprehensively addressed in de Vos (2022), Nakamura et al. (2023), and Ocampo-Ariza et al. (2023).

1.2. ECRs in Marine Fieldwork Knowledge Co-Production

Fieldwork confronts ECRs with diverse environments and social contexts that require collaboration skills with new actors, and adherence to formal and informal ethical requirements. Primary data collection through fieldwork, whereby researchers are expected to generate original data, remains an integral part of ECRs’ training in marine sciences. At the same time, the growing internationalization of academic curricula reinforces the importance of discussing how meaningful international collaboration can be achieved. ECRs who are based in the Global North and conduct fieldwork in the Global South, for instance, may be well positioned to foster collaborations between international research organizations and teams and potential

local partners. However, they may also be met with suspicion by the local partners, even if the fieldwork is being conducted in their home country (e.g., Giwa, 2015).

We are a group of marine ECRs coming from the Global South and the Global North who have conducted, or are conducting, research affiliated with Western European organizations. Our study areas are located elsewhere, spanning from the tropics to the poles. We have interdisciplinary backgrounds to different extents, with training in oceanography, biology, zoology, environmental science, environmental governance, and fisheries management. This article emerges from a collaborative reflective process and draws inspiration from Cvitanovic et al. (2022). Each author independently wrote a testimony text describing the challenges and opportunities in knowledge co-production in their research context involving a fieldwork component. We discussed and compared what emerged from this writing exercise during three rounds of online meetings. Building on these discussions, we provide a set of recommendations in the form of guiding questions to support other ECRs in navigating research and knowledge co-production for a fairer, more impactful, and more fulfilling fieldwork experience. Importantly, we acknowledge that these recommendations emerge from our situated perspectives and the specific ways in which we have recounted our experiences, and may therefore not be applicable in all contexts for fellow marine ECRs.

2. Overview of Cases and Perspectives

In this section, we present summarized recounts of our experiences with knowledge co-production involving a fieldwork component from various stages of our early careers. An overview of the geographic and thematic context of each fieldwork reflection is represented in Figure 1. The full accounts can be found in the Supplementary File.

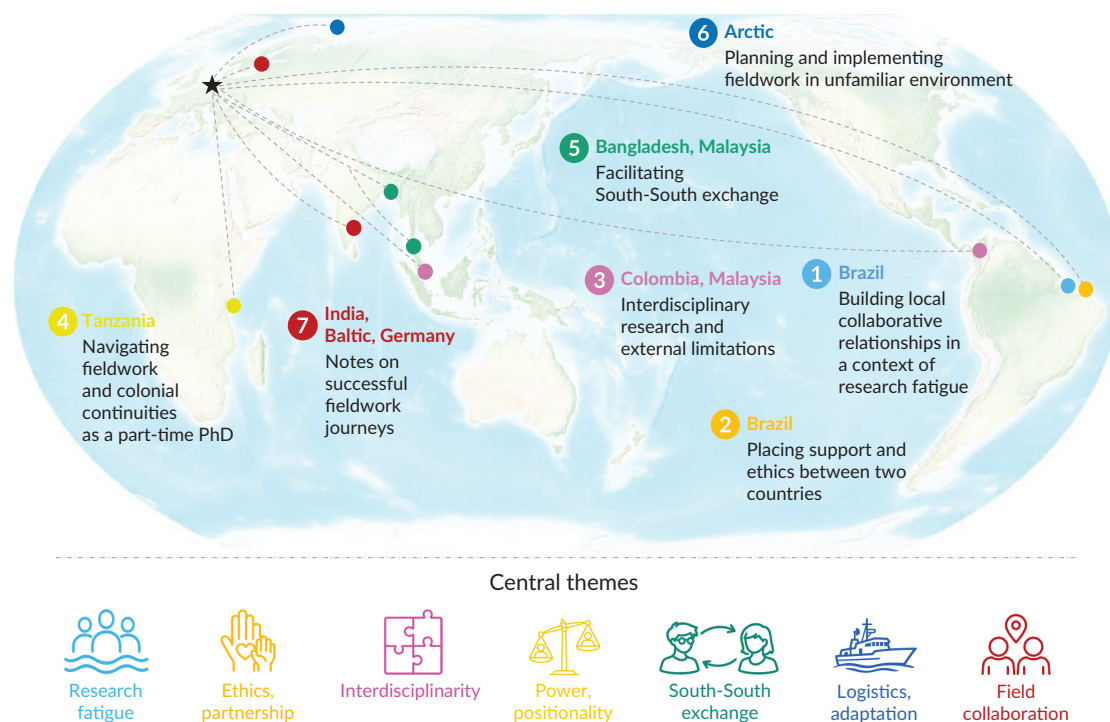


Figure 1. Illustrative geographic overview of the seven case reflections and the central themes emerging across cases. Note: Base map centered on 150°E, sourced and adapted from Equal Earth (n.d.).

2.1. Case 1: Building Local Collaborative Relationships in a Context of Research Fatigue in Northern Brazil

This case draws on my fieldwork experience undertaken as part of my PhD research project on the coast of the northern Brazilian state of Pará. Research fatigue, linked to repeated research engagement and limited perceived benefits, had been identified by colleagues working in the region. With a background in oceanography and little initial familiarity with my study region despite my Brazilian upbringing, I found myself aiming to pursue the inter- and transdisciplinary aims I had set in my doctoral project within time and budget constraints. My testimony recounts how I navigated a sense of limited legitimacy in conducting this research, whilst striving to pursue it in the most ethical and context-sensitive way possible given the constraints. A key part of this was building and nurturing a local collaborative network throughout and beyond my research, e.g., by allowing adequate time for fieldwork and interactions, and exploring digital communication channels to remain in touch. I also discuss the relevance of complying with local formal ethical clearance requirements, yet underscore that doing so does not automatically grant legitimacy to the researcher in the eyes of local communities and partners. In this context, I found that adopting an inductive qualitative research approach, when relevant, can be a great ally in the context of research fatigue. Prioritizing depth and quality of engagement over the number of interviews allowed for a more dialogical research process, giving room for participants to also steer the conversation, and acknowledging their time, trust, and willingness to share their experiences. While I was able to return to Pará to discuss the outcomes of my research after its completion and reconnect with my new acquaintances, this would not have been possible without remaining funds from my scholarship. This suggests that effective support for international inter- and transdisciplinary research requires promoting extended collaborations beyond the formal duration of a project, including through funding for return visits and long-term institutional partnerships.

2.2. Case 2: Participatory Mapping in the Tropics—Placing Support and Ethics Between Two Countries

This case highlights the challenge of navigating ethics requirements and everyday life tasks while I was doing my PhD research, which aimed at both inter- and transdisciplinarity, in an area in Brazil that was new to me—even though it is my home country—while having to live and do desk work in Western Europe, where language and institutional procedures were a new—albeit exciting—experience. I report here on the challenges of having to figure out fieldwork dynamics with little supervisory and institutional support. When I finally landed in my fieldwork site, I encountered a region permeated with research fatigue and high expectations from researchers, and an understandably skeptical attitude towards outsiders. I felt that I needed to give back to the local communities through outreach work, but back “home” in the country where I was based at the time, in Europe, I felt the pressure to focus on peer-reviewed publications for my thesis, which, as I was told, were the academic products that really counted. Everything else would be a distraction, a procrastination of sorts. This focus on papers was not in alignment with the ethics and interactions with fieldwork actors that I had in my research area and the few times I went there, creating an internal conflict that made me question my role as a researcher, both in terms of a knowledge producer and as a citizen of the country where I was doing fieldwork. I believe these pitfalls, and more legitimate knowledge co-production, could have been achieved had I received better support, especially in terms of ethics and the necessary permits and processes involved. It is not a silver bullet, but paying special attention to ethics can entail better planning, including more robust inclusion and collaboration with local actors. Even if much of the planning faces real-life challenges, having contingency plans and constant adaptation strategies can ensure that inclusion and collaboration are permanently revisited and confirmed.

2.3. Case 3: Between the Great Expectations of Interdisciplinary Research and the Reality of External Limitations

In this case, I reflect on the challenges of conducting interdisciplinary fieldwork as an ECR within a large, natural science-dominated project based in Western Europe, focusing on mangrove restoration in Colombia and Malaysia. Although my PhD was originally designed to bridge ecology and social science, my fieldwork focused on social science to balance out the strong representation of ecology in the project and contribute to its social science objectives. But as the research environment, training opportunities, and supervision were primarily grounded in natural sciences, I lacked strong disciplinary anchoring in the social sciences, as well as sufficient mentorship and methodological guidance, further complicated by the Covid-19 pandemic. Striving for interdisciplinarity was later hindered by the strong disciplinary boundaries within my university of affiliation, which prompted a change in supervision mid-PhD. During fieldwork, I grappled with questions of legitimacy and responsibility as a European researcher working in Global South contexts without fluency in local languages, and often as the sole social scientist in the team. While the Western scientific discourse I was surrounded by emphasized stakeholder engagement, in practice, social science contributions were frequently treated as instrumental to natural science objectives rather than valued in their own right. This disconnect became particularly evident in conversations with local communities, where concerns about extractive research were common. Time and funding constraints limited opportunities for sustained engagement and feedback. I ultimately experienced this as falling short of my ethical aspirations. This case highlights how the undervaluation of social sciences, combined with structural constraints faced by ECRs, can contribute to extractive research dynamics, even when intentions are reflexive and ethically grounded.

2.4. Case 4: Navigating Fieldwork and Colonial Continuities as a Part-Time PhD

In my case, I share insights about doing a PhD without funding while working part-time and grappling with my positionality as a white German researcher studying coastal governance in Tanzania. I consider myself a marine social scientist with an interdisciplinary background in intercultural relations, behavioral studies, and environmental governance. For my current research, I draw on institutional and critical social theories. Fieldwork, especially deep contextual understanding and meaningful engagement with local actors, is central to my qualitative and critically reflexive research approach, but difficult to implement amidst time and financial constraints. These are common fieldwork limitations for ECRs, even heightened for those without funding and with additional work or family responsibilities. In my testimony, I share how I dealt with balancing opportunity, financial risk, and ethical considerations to make the most of a three-month scoping field stay in Tanzania. I also reflect on my privileges and responsibilities working in a (post-)colonial context and feelings of inadequacy when my ethical ambitions surpass my capacities to actually deliver local benefits and foster equal partnerships. In my situation as an unfunded part-time PhD, I try to find pragmatic strategies and to identify synergies and collaboration opportunities for realizing fieldwork throughout my nonlinear research journey.

2.5. Case 5: Facilitating South–South Exchange From Within Global North Research Structures

In this case, I reflect on my experiences as an ECR from India working in Western Europe on transdisciplinary research in tropical coastal contexts. My perspective is shaped by my training in an international joint master's programme and my later work at a Western European marine research institute. Both settings

exposed me to interdisciplinary and intercultural research environments, where I built peer networks with ECRs from different Global South contexts. These networks were central to my work as a knowledge exchange officer in a mangrove re-establishment research project in Malaysia, where I could draw on existing South–South connections to plan immersive stakeholder engagement activities. Through engagements with diverse local actors, it became clear that locally expressed priorities did not necessarily match externally framed project goals. In Bangladesh, collaboration with local ECRs enabled deeper reflection on the justice dimensions of coastal mega projects, including how gender, caste, religion, and regional political dynamics shape coastal development. Together, drawing comparisons with similar infrastructure cases from neighbouring countries highlighted the value of South–South exchange to explore the regional patterns of environmental injustices. For me, these experiences suggest that South–South exchange can help reduce extractive research dynamics in international projects, especially when Global South researchers, including ECRs, are recognized as advisors and agenda setters, rather than only as logistical managers. At the same time, the international platforms that enabled my own experiences to facilitate South–South exchange are not easily accessible to all ECRs from the Global South. This raises the question of how such collaborations might look if led more directly by Global South institutions, projects, and forums.

2.6. Case 6: From Expectation to Adaptation—Planning and Implementing Fieldwork in an Unfamiliar Arctic Environment

This case reflects the realities of planning and implementing fieldwork in a new field of study or environment. Moving my study site from the tropics in the Global South into Arctic research meant entering an environment that was both physically and institutionally unfamiliar to me. Although my PhD was based in Western Europe and focused on a natural science subject, I had no prior experience working in the Arctic, and much of the planning relied on literature rather than lived knowledge of the region. During the fieldwork, delays in ice melt made it difficult to access the nearshore zone, making the sampling process more complex than anticipated. In addition to adjusting methods to suit local conditions, I had to navigate the extensive regulatory frameworks governing the transport of biological samples and research equipment to and from the Arctic. Moreover, having a Global South citizenship required applying for the visa, which added to the bureaucracy. These logistical bureaucratic challenges required continual adaptation in the field, highlighting the gap between imagined research design and the realities of implementation among the ECRs.

2.7. Case 7: Notes on Successful Fieldwork Journeys

This case draws attention to the significance of fieldwork in natural marine sciences, more specifically in marine geochemistry, displaying insights gained from successful fieldwork expeditions mostly involving an interdisciplinary approach. Fieldwork constitutes a crucial part of natural science projects, entailing a substantial responsibility in the generation of high-quality datasets. These datasets may subsequently serve different purposes, including the description of environmental processes, modelling approaches, and decision-making in governmental frameworks. Here, I draw on the significance of collaboration for carrying out interdisciplinary work. It was always crucial to have researchers specializing in both the same and different fields on board, in addition to local collaborators who possessed extensive knowledge of the field site, superior to any non-local specialist, and provided the local infrastructure. Secondly, the affiliated institute was always the foundation for me to acquire the skills and the knowledge to undertake the project and the fieldwork. This encompassed both scientific supervision and administrative tasks. Therefore, it is

important to emphasize that this should always be accompanied by effective in-house communication. To conclude, during the execution of the fieldwork, adaptability and decision-making played an important role. The necessity to adapt to different environments and implement realistic strategies was constantly required.

3. Discussion

Awareness of the risks of reproducing parachute science is particularly relevant to those ECRs affiliated with a Global North research organization and conducting fieldwork in contexts marked by strong social inequalities arising from colonial legacies. The cases describe fieldwork in the Global South (cases 1–5 and 7), but also regions such as the Arctic (case 6), where Indigenous peoples and local communities (IPLCs) continue to have their rights to their territories and their traditional livelihoods violated (Rode, 2017).

3.1. Differences Across the Social and Natural Marine Sciences

The relationship between IPLCs' livelihoods, rights violations, and coastal and marine biodiversity conservation is a central area of inquiry in the marine social sciences (Bennett et al., 2017), as in cases 1–5. Because of this, the modalities of engagement with local actors, as well as the interwovenness between marine social sciences, historical and political processes, and power dynamics operating locally, may be more apparent than in the natural sciences.

The Western conception of the natural sciences tends to view marine sciences as vehicles for generating “neutral” and “objective” knowledge (Baker et al., 2019). This body of research focuses primarily on marine and ocean processes and elements, which are considered not to require human participation other than that of the researcher in the position of neutral knowledge generator (Baker et al., 2019). However, even natural science-oriented research which does not specifically employ methods such as interviews or surveys necessarily engages with the context before, during, and after fieldwork. For instance, subjective engagement with the research context happens via the imaginaries that we construct of it through readings, pictures, and discussions, as illustrated by case 6; the methods chosen to generate the data; and how the research results are selected, and how and to whom they are disseminated. These choices influence research, policy, and practice agendas (Baker et al., 2019). Furthermore, natural science fieldwork does not happen in a vacuum, but in places that have cultural and ecological importance for local inhabitants. Failing to recognize field sites as embedded in local systems of social relations may contribute to the reproduction of extractive research practices, which may, in turn, amplify research fatigue, the marginalization of overlooked actors, and maladaptation. Furthermore, interdisciplinary thinking can improve understanding of, and engagement with, the social and biogeophysical dimensions of the research problem within its context.

Considerable progress has been made in higher education and research organizations globally to foster interdisciplinarity (e.g., Hall & Tandon, 2017b; Sandroni et al., 2026). However, there is still a need to pursue efforts to bring about changes in university curricula and structures that encourage critical thinking about knowledge co-production in marine sciences. This need has motivated calls for a cultural shift in oceanography, which seeks to more decisively integrate social, cultural, and political dimensions into oceanographic education (Gerhardinger et al., 2024). This shift is all the more significant given that government priorities for ocean research change in response to geopolitical developments (Alger & Sumaila, 2025; Turra, 2021), as well as the increased reliance on global datasets in conservation sciences

(Ríos-Saldaña et al., 2018). These changes are leading to new approaches to field-based marine research methods and potentially transforming the dynamics of collaborative relationships (Celliers et al., 2026). The recommendations offered in this article can support a more effective interdisciplinary and reflexive approach to fieldwork. Nevertheless, critical monitoring of the implications of these developments in ocean research and their impacts on context-specific processes of knowledge co-production remains essential.

3.2. Formal Ethical Clearances Versus Informal Social License

Formal ethical clearances and research permissions are key mechanisms and relevant to national legislation in all countries where the seven cases describe fieldwork research. In our cases, only social science-oriented research projects (cases 1–5) needed to obtain ethical clearance. Natural science-oriented research was instead required to obtain formal permits related to sampling and transportation. Such projects would require ethical clearance only if vertebrate animals were handled through experiments, or if the project directly involved local knowledge. On the one hand, the lack of an explicit requirement for natural science research in terms of ethics and accountability with local partners, including local communities, does not help address extractive research practices. On the other hand, the benefits of formal ethical approval or a permit to gain local social licences to conduct research can be limited if a strong, trust-based network is not well established between the research organization and local partners and actors, and if budget and time constraints significantly limit the ability to engage local actors in the research process.

Typical of parachute science, the potential disconnect between field-based marine science research and local actors and knowledge may be at odds in countries where national legislation recognizes that the culture and identity of IPLCs are closely tied to local biodiversity. Malaysia (case 3) and Brazil (cases 1 and 2), for example, have recently passed laws that recognize the need for the prior informed consent of IPLCs when undertaking research, as well as measures for benefit-sharing, the protection of associated traditional knowledge, and the participation of IPLCs in decision-making regarding biodiversity genetic resources (e.g., Law n. 13.123/2015 in Brazil and the 2017 Access to Biological Resources and Benefit Sharing Act in Malaysia). These regulations align with the directives of the Kunming-Montreal Global Biodiversity Framework and the Nagoya Protocol on Access and Benefit-Sharing (Convention on Biological Diversity, 2022; Nunez-Vega et al., 2025). We recommend that ECRs from any discipline be aware of the various relevant global and national-level policies at the intersection of ecological and cultural heritage and related property. While this may be a time-consuming task, research organizations that work internationally are well positioned to raise awareness of these policy tools and encourage their uptake in ECRs research.

3.3. Inter- and Transdisciplinarity From the South

Inter- and transdisciplinary research premises (Breckwoldt et al., 2021; Lang et al., 2012) offer guidance for the development of meaningful research collaborations, thereby supporting efforts to break away from parachute science. However, a misalignment remains between the reality of inter- and transdisciplinary career development and institutional expectations that creates structural challenges for ECRs who want to pursue more participatory and equitable research approaches.

While some European funding agencies are starting to encourage the creation of work packages focused on fostering transdisciplinarity, these welcome yet nascent developments mostly concern larger, international

research projects (Holm et al., 2013). In parallel, institutional partnership and related networks within Global South regions and countries offer essential spaces to question externally defined agendas and develop more context-sensitive research designs (case 5), while acting as catalysts for broader transformations (Hall & Tandon, 2017a). Global South-led networks and institutional partnerships demonstrate how South–South exchange can provide spaces to question externally defined agendas and develop more context-sensitive research approaches (case 5). For instance, the International Participatory Research Network connected researchers and practitioners across Africa, Asia, and Latin America around locally situated and experiential knowledge (Hall & Tandon, 2017a). Ongoing regional initiatives such as Western Indian Ocean Marine Science Association’s Early Career Scientists Network and the Southeast Asian Fisheries Development Center provide regional and interregional platforms for ECR training, peer networking, and mentorship. In broader scientific fields, programmes such as the South Asian Network for Development and Environmental Economics and the Latin American Council of Social Sciences are other important Global South platforms that foster South–South exchange and collaboration.

The above examples remain particularly relevant for fostering South–South exchange, providing spaces to share situated knowledge, develop collaborations, and shape research agendas from within Global South contexts. The resulting exchanges and collaborations among Global South-based and Global South-connected researchers, practitioners, and peers reshape the landscape of Global South ECR-led academic knowledge co-production, transformation, and innovation (Dalton et al., 2020; Gewin, 2023; Kalinga, 2019). However, South–South exchange should not be assumed to be inherently equitable, nor should responsibility for sustaining it fall primarily on individual ECRs without appropriate institutional support.

4. Addressing the Perils of Parachute Science

Our testimonies reflect common challenges experienced by ECRs in marine science (e.g., Brasier et al., 2020). We particularly relate to challenges of ECRs conducting inter- and transdisciplinary research (e.g., Rölfer et al., 2022; Shellock et al., 2023; Strand et al., 2022), which directly influenced the outcomes of our fieldwork. A common denominator across the seven cases is our limited ability to engage with local partners, actors, and the research context as meaningfully as we would have liked. This results in varying degrees of a parachute science approach in our fieldwork. These challenges create feelings of discomfort, illegitimacy, and powerlessness as we try to negotiate them and adopt equitable research practices. Clearly, the feeling of urgency to move away from extractive research practices is a necessary driver for transformative change at the individual level. However, the responsibility for change must be more firmly rooted at the collective and structural level (e.g., Hall & Tandon, 2017b). These include project, supervisory, and research organization levels, all the way to funders. ECRs should not feel alone in this endeavour, especially since they are often at the forefront of fieldwork and data collection in marine sciences.

We propose a set of guiding reflective questions and recommendations focusing on how to better anticipate and prepare for such challenges. These recommendations are intended for ECRs (Figure 2), supervisors (Figure 3), and research and funding organizations (Figure 4), and aim to enhance the fieldwork-based research experience for ECRs and their local partners, making it fairer, more fulfilling, and formative.

What can ECRs do?	
Getting familiar with the context	
How can you get familiar with your research context? Are there possibilities for a funded exploratory fieldwork during the initial stages of your research? What do you need to exercise reflexivity, especially on positionality?	• Learn about the local cultural, social, environmental, and political context of your research area. • Be curious beyond your immediate research topic. • Use knowledge of the local context to better understand your research problem. • Prepare for fieldwork by familiarising yourself with issues that may affect your work in the field.
Research organization Infrastructure	
Have there been any projects developed by your organization of affiliation in your study region? Who was involved, and what were the outputs? What contacts and networks do your host organizations, your supervisors, work colleagues, and friends have with relevant regional and local organizations and people? To what extent can you build on them? Can you be affiliated to or engage with a local university, institute, or lab? Are there possibilities to combine fieldwork with other planned work trips or to collaborate with colleagues who work on other projects in the same region?	• Identify trusted intermediaries in the study area before starting fieldwork. • Use the networks of supervisors and colleagues to establish local contacts. • Build relationships with local communities and organizations early in the research process. • Combine work trips with fieldwork or seek collaborations with colleagues who work on other projects in the region, especially when funding is lacking.
The role of ethics In research	
How might your positionality, internalized assumptions, and epistemological choices influence your engagement in the field? What kinds of permits are required for your research (e.g., ethical clearances, sampling permits, etc.)? What are the official procedures and institutional requirements for obtaining ethical clearance or sampling permits from your host organization(s), and from the government and other institutions in your fieldwork area? Based on these requirements and good practices, how will you communicate your ethical measures and practices to the interviewee(s) and record consent when conducting interviews? Are there any records of research fatigue in your study area? What types of research outputs can you envisage? To what extent will these benefit local partners and research participants?	• Exercise reflexivity and discuss it with your mentors and peers. • Seek out ethics-related training and resources early on in the research process. • Discuss ethical challenges with supervisors and colleagues throughout the project. • Engage with local organizations and actors to support equitable collaboration before, during, and after fieldwork. • Explore opportunities for joint outputs and local fieldwork support. • Ask local partners what forms of feedback and communication would be most useful to them. • Adapt research communication strategies to local preferences and contexts. • Use informal exchanges to build trusted relationships with local partners. • Plan time and resources for sharing findings with local partners and communities.
Conducting inter- and transdisciplinary research	
What level of inter- and transdisciplinarity do you aim for in your research project? Do you have the necessary supervision/mentorship/support to carry out such research, and if not, can you identify with whom to collaborate and where to get it? How can you connect with other inter- or transdisciplinary ECRs to build solidarity and share coping strategies?	• Set clear and realistic goals and expectations in defining your inter- and transdisciplinary aims throughout the research process. • Clearly define the collaborators from different disciplines and backgrounds involved in your project. • Regularly discuss progress, limitations and challenges with supervisors, local partners, colleagues, and trusted peers. • Make use of available training opportunities to strengthen research skills. • Complement institutional training with online courses and workshops where needed. • Document challenges encountered during inter- and transdisciplinary research. • Use professional platforms and networks to advocate for structural improvements and find support among your fellow ECRs.

Figure 2. Recommendations in the form of guiding questions intended for marine ECRs to support fairer and more fulfilling marine fieldwork experiences.

What can supervisors do?	
Supporting the design and management of inter- and transdisciplinary research	
How do you support ECRs in navigating multiple and potentially conflicting expectations associated with inter- and transdisciplinary research (e.g. academic, institutional, and societal)? To what extent are the goals and timelines co-developed with ECRs realistic given the complexity of their research? How regularly are structured check-ins used to identify challenges and prevent overwhelm in non-linear research processes? What are the limits of your own expertise? Where can complementary expertise be found to best support your doctoral candidate?	• Provide active guidance to help ECRs navigate the demands of inter- and transdisciplinary research. • Co-develop realistic goals and timelines that reflect the complexity of inter- and transdisciplinary work. • Hold regular check-ins to monitor progress and prevent overload. • Encourage open discussions about challenges within research groups. • Share experiential knowledge to help normalize common difficulties faced by ECRs. • Support ECRs in accessing additional guidance, networks, and resources where expertise gaps exist. • Encourage and support diverse research outputs beyond traditional academic publications. • Help to establish collaborations to improve the research project.
Supporting ethical research practices	
How do you mentor ECRs in understanding and navigating the ethical dimensions of inter- and transdisciplinary research? How are potential ethical challenges anticipated and discussed before and during fieldwork? How are equitable and meaningful collaborations with local partners and stakeholders supported?	• Promote ethics as an ongoing, context-sensitive process rather than a one-off approval step. • Integrate ethical reflection throughout all stages of the research process. • Encourage early discussions of context-specific ethical requirements and potential challenges • Support ECRs in navigating ethical approval procedures for different fieldwork settings. • Facilitate connections with local partners and stakeholders that prioritize meaningful, respectful collaboration. • Avoid instrumental approaches to engagement with local communities and partners.
Supporting fieldwork planning and logistics	
How do you support ECRs in anticipating and preparing for logistical challenges associated with fieldwork? How aware are you of the bureaucratic and administrative requirements for fieldwork, particularly in the research context of your mentee? How are fieldwork procedures and experiences documented and shared within the research group? Is "invisible" labor recognized and accounted for in evaluation and supervision? Are you able to connect your (unfunded) ECRs to other colleagues or projects to facilitate fieldwork opportunities?	• Identify and discuss logistical challenges early in the fieldwork planning process. • Provide support for navigating administrative and bureaucratic requirements across institutions and countries. • Provide guidance to design fieldwork within the available time and budget. • Strengthen shared knowledge within research groups by documenting fieldwork procedures, challenges, and lessons learned. • Integrate permits, visas, sample transport, and equipment logistics as core elements of research planning. • Build realistic time buffers into fieldwork timelines. • Recognize logistical work, compliance, and in-field adaptation as part of scientific work. • Reflect logistical demands in supervision practices and progress evaluations, not only research outputs. • Identify synergies and draw on your networks to generate opportunities for funding, travel, and peer cooperation for your (unfunded) ECRs to organize and conduct fieldwork.
Supporting ECR well-being and navigating structural challenges	
How regularly do you check in with ECRs about their well-being alongside research progress? How are mental health challenges associated with early-career and field-based research recognised and addressed? Are you able to recognize early signs that your supervisee needs mental health support? Do you know how to redirect them to the proper channels? How are you supporting ECRs in navigating bureaucratic and administrative burdens?	• Ensure sustained attention to ECR well-being in demanding and uncertain research environments. • Conduct regular check-ins that address not only academic progress but also mental health, workload, and administrative pressures. • Acknowledge and actively help mitigate bureaucratic burdens faced by ECRs. • Provide clear guidance and referral pathways to relevant institutional support services. • Recognize the limits of supervisory roles and connect ECRs to appropriate external support where needed • Distinguish clearly between advisory supervision and psychological support roles, and reorient the ECR to professional mental health services when needed.

Figure 3. Recommendations in the form of guiding questions intended for supervisors to support fairer and more fulfilling fieldwork experiences for marine ECRs.

What can research and funding organizations do?	
Support of inter- and transdisciplinary research	
How can you, as an organization, structurally support inter- and transdisciplinary research pathways for ECRs? Are you providing adequate training for inter- and transdisciplinary, ethical, and field-based research? Do your funding mechanisms allow for early-stage engagement and co-design with local actors? Do your timelines and funding mechanisms reflect the realities of inter- and transdisciplinary research?	• Allocate time for early career researchers to develop cross-disciplinary skills. • Offer targeted training in inter- and transdisciplinary methods, ethics, and field-based research. • Develop training programmes in collaboration with partner institutions and networks. • Support interdisciplinary career pathways through affiliations across multiple departments and organizations. • Provide seed funding for early community engagement and project co-design, especially for transdisciplinary projects. • Establish funding structures that account for the longer timelines of inter- and transdisciplinary research. • Acquire equipment and build infrastructure for supporting fieldwork.
Ethical, safe, and well-prepared fieldwork	
Do you provide clear and accessible guidance on ethical clearance requirements across all countries where research is conducted by people associated with your organization? Are there mechanisms in place to prepare ECRs for fieldwork beyond supervisory support (e.g. checklists, mentoring, or peer review)? How are lessons learned from previous fieldwork experiences systematically captured, shared, and made accessible to ECRs planning new fieldwork? To what extent is knowledge exchange on fieldwork risks, ethical dilemmas, and context-specific challenges enabled across projects and disciplines over time?	• Provide clear and regularly updated guidance on ethical clearance requirements across research contexts. • Develop accessible preparation tools for field-based research, such as checklists and ethical protocols. • Offer training and organize internal discussions on ethical and safe fieldwork practices, especially on local engagement under time and financial constraints. • Ensure institutional support extends beyond supervisory guidance. • Facilitate access to experienced researchers, regional experts, and peer networks. • Support ethical decision-making throughout the fieldwork process.
Structural support and well-being of ECRs	
How accessible and effective is your administrative support for ECRs navigating international bureaucracies such as visas, research permits, and mobility requirements? Do all ECRs, regardless of employment or funding status, have equitable access to training, fieldwork resources, and institutional support? How systematically do you support the mental and physical well-being of ECRs throughout demanding fieldwork and early-career research trajectories?	• Introduce flexible funding arrangements that reflect the non-linear nature of field-based research. • Provide dedicated funding for fieldwork and related research expenses, especially for ECRs working on a scholarship. • Provide training in research grant writing and funding acquisition. • Support alternative employment and PhD pathways, including part-time arrangements. • Build appropriate flexibility into research to accommodate iterative research processes. • Strengthen administrative support for funding acquisition, international mobility, and fieldwork logistics. • Provide assistance with visas, research permits, customs regulations, and sample transport. • Ensure equal access to training, fieldwork opportunities, and institutional resources regardless of employment or funding status. • Further establish part-time PhDs frameworks at universities, flexible funding opportunities in later stages of the PhD, and increased visibility of and connection to other ECRs with no funding or not following a typical three-year timeline. • Embed accessible and proactive mental health support within institutional structures for ECRs.

Figure 4. Recommendations in the form of guiding questions intended for research organizations and funding bodies to support fairer and more fulfilling fieldwork experiences for marine ECRs.

5. Conclusion

Fieldwork is crucial for developing and co-producing knowledge in marine sciences. It brings together various actors and knowledge systems, enabling direct engagement with the systems and processes under study. However, field-based research often involves varying levels of parachute science, which reinforce colonial systems of knowledge production hierarchies. This article emerged from the need to discuss how fieldwork can be reinvented as a platform for fostering more equitable knowledge co-production. We are a group of international ECRs who are, or were, affiliated with Western European research organizations. In this article, we shared our experiences conducting inter- and transdisciplinary marine fieldwork in different countries spanning tropical and polar regions. Despite differences in our research contexts, topics, and inter- and transdisciplinary focus, our testimonies show that the challenges we faced ultimately crystallized in our limited possibility of ethical engagement with our research context and local research partners, including local communities. This may indicate that the structural challenges that we, ECRs, face in inter- and transdisciplinary marine research are likely to contribute to the prevalence of a certain level of parachute science practices in our field-based research. We acknowledge that our challenges might be partially attributed to individual limitations and that other ECRs in similar situations manage to successfully conduct their research. However, this is considerably harder for those already grappling with institutional biases and structural barriers due to their social identities. We argue that overcoming structural challenges should not hinge on individual abilities, societal standing, and support systems alone. Therefore, we suggest addressing structural challenges through coordinated action at multiple levels: individual ECRs developing adaptive strategies, supervisors providing appropriate support, and organizations implementing systemic improvements, training, and reforms. Only through such actions can ECRs contribute to transforming marine fieldwork into a more ethical, fair, and locally grounded set of practices, as required to address complex marine sustainability challenges.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

The data on which this article is based are provided in the Supplementary File.

LLMs Disclosure

DeepL was used for grammar and spelling revision.

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