

Whose Beach Paradise? Tourism and the Governance of Sargassum Algae Along Mexico's Caribbean Coast

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Abstract

The Mexican Caribbean is often viewed as “paradise.” Since 2015, massive landings of brownish Sargassum algae, a form of anthropogenic environmental change, have, however, begun changing the long-established imaginary. Although the algae massively change and endanger the vitality of the ecosystem, they are primarily framed and governed as a tourist problem. Based on ethnographic fieldwork in Mexico (2019–2022), I show that adaptation measures are not aimed at adapting to climate change but at adapting to tourist desires, illustrating how tourists' expectations are entangled with the everyday governance of Sargassum. Measures were undertaken to stabilize tourist paradise led to its long-term destabilization, which calls into question the sustainability of local communities.

Keywords: anthropogenic environmental change; tourism; algae bloom; Mexico; ethnography

Hello Maya—Goodbye Beaches? An Introduction

It is a cold, gray November day in 2019 in my hometown in Germany. I am well over 8,000 kilometers away from my research field in the Mexican Caribbean as I walk through town and stumble across an advertisement. My attention is immediately drawn to a colorful, bright poster: “Hello Maya,” the advertisement reads. An international airline offered flights from Germany to Cancún in Mexico for 329,99EUR. The poster shows a young woman wearing a green sweatshirt and accessorizing herself with feather earrings. She reminds me more of tourists I knew from field research than of my research partners belonging to the Mayan community. However, using constructed and over-emphasized “Mayaness” (Juarez 2008; Dürr 2012; Brown 2013; Dürr et al. 2020;) to attract travelers from Western Europe surprises me little. I find it striking as an anthropologist working in the Mexican Caribbean that the airline no longer makes use of its display of world-famous pristine beaches and turquoise waters the Riviera Maya is famous for. In the past, it would have been much more likely that I would have encountered an airline poster stating “Hello Paradise” along with a photo of the Caribbean on my walk. Why the change?

The poster I came across during my walk in 2019 was an advertisement at a time when the tourism industry along Mexico's Caribbean coast had already faced significant, threatening anthropogenic environmental change for several years. Warming ocean temperatures, increased input of fertilizer in the Atlantic Ocean, and deforestation along the Amazon River (Hu et al. 2015) have contributed to the atypical influx

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of *Sargassum natans I* and *VIII*, and *Sargassum fluitans III* (hereafter Sargassum). It is a brownish pelagic alga that floats on the ocean's surface, which can grow to a length of several meters and act as a natural habitat for several species in the ocean (Hu et al. 2015; Milledge and Harvey 2016).



The photo shows *Sargassum natans VIII*, which I collected on a beach in Mexico in order to analyze it in a lab. Like other species of Sargassum, the aerocysts are filled with air which enable the algae to float on the ocean's surface. Photo credit: Laura Otto.

Since 2011 Sargassum has arrived in atypical amounts on Caribbean shores. It was first noted in Barbados, and significant landings in Mexico followed starting in 2015. Once it arrives on shore, it poses severe problems and challenges to humans, flora, and fauna. Turtles hatching on beaches can no longer reach the ocean because the algae constitute an impenetrable barrier, making their “march” into the sea impossible. Underwater corals do not obtain enough sunlight to photosynthesize because Sargassum covers huge parts of the ocean's surface (Lopez et al. 2008). Humans face a more pronounced risk of respiratory problems due to the hydrogen sulfite released during decomposition. Moreover, the algae impact and change the tourism industry—as the advertisement, I came across in Germany indicates—with local tourist operators facing a decrease in tourism and associated financial burdens.

This article, based on ethnographic fieldwork in the Mexican Caribbean (2019–ongoing; McAdam-Otto 2022), analyzes how Sargassum is primarily framed as a tourist problem, discussing how the notion of a “tourist paradise” makes these algae governable in specific ways. To demonstrate practices of everyday governance, I examine the relationship between Sargassum and tourism in the Mexican Caribbean, with a geographical focus on the world-famous Riviera Maya, which stretches 160 kilometers

from Cancún to Tulum in the federal state of Quintana Roo. Tourism accounts for 80% of annual economic performance (Arce-Ibarra et al. 2017, 60). The tourism industry and the government made efforts to reinvent itself in the past years, of which the advertisement I came across is one example. There are numerous attempts to shift the tourist product to appeal to travelers in different ways: smaller cities such as Valladolid or Celestún are increasingly being promoted, amusement parks have been built, and not least, the controversial construction of the *Tren Maya*, a railway project which aims to connect the coast with archaeological sites, has begun. Despite all these investments and creations of new activities and sights, it is still the case that most vacationers in the Mexican Caribbean are in search of beach paradise. However, what do actors on the ground—such as hoteliers, tourist operators, or restaurant owners—do once the long taken-for-granted “paradise” is threatened? How do actors affected by Sargassum in Mexico adapt to a situation natural scientists consider as the new normal? And whose beach paradise is (de)stabilized in light of environmental transformation, and under which conditions?

My analysis, congruent with the theme of this Special Issue, is based on a notion of adaptation to climate and environmental change that not only takes situated knowledge seriously but, above all, recognizes that competing political agendas, social inequalities, and different interests come into play once anthropogenic environmental change, like Sargassum, surfaces. To contribute to this debate with my empirical case, I discuss how Sargassum is viewed and interpreted among different actors in the Mexican Caribbean. I show how tourism and the notion of the Caribbean as a “beach paradise” are entangled in the everyday governance of algae. Carving out how Sargassum is framed—predominantly as a tourist issue and not an environmental concern—helps reveal the complexities and contradictions in adapting to and governing the situation. I argue in this article that the framing of Sargassum as a tourist issue is employed to justify the measures taken to address its arrival. In addition, if Sargassum is not framed and dealt with as a tourist issue, almost nothing is done to address it. However, that leads to a situation in which the tourism-induced stabilization of the present and near-future “paradise” leads to its long-term destabilization at the same time, which calls into question the sustainability of local communities.

To bolster my arguments, I first situate my research within debates on climate change governance, framing, and adaptation. While adaptation to climate change is often viewed to be something neutral or positive, the case of Sargassum shows that adaptation measures are often characterized by specific interests, post-colonial relations, and ambivalences that may well intensify the consequences of environmental change. After all, concerns on site have consisted less of adapting to a changing climate or an increasingly damaged environment than to adapting to tourists’ expectations of a once-constructed paradise. Second, I demonstrate how the Mexican Caribbean was transformed into a tourist paradise and reflect on my fieldwork within this setting. The third part of the article is empirically oriented, and I engage with Sargassum’s arrival in non-touristified areas to discuss that adaptation measures are mostly non-existent if tourism is similarly absent. What follows is an analysis of tourists’ expectations in the area, and I show that tourism makes algae governable in a specific way. The conclusion offers thoughts about tensions arising among locals and tourists,

economy and ecology present and future in adaptation to climate and environmental change. The case discussed here reveals that the measures taken are not aimed at adapting to climate change, but are mainly ad hoc measures to save tourism, which may lead to further environmental damage.

The Riviera Maya is not the only place in the world where the environment has been transformed and commodified into a tourism product now threatened by climate change. For example, ski areas in various parts of the world are losing their snow guarantee due to climate change, and some species can no longer be observed on safaris. In regions where tourism is the main economic driver, climate change has disproportionate effects on the livelihoods of local people, reflecting power relations within these dynamics: While, for example, Mayan communities in Mexico (Leatherman & Goodman 2005) formerly had to make place for the construction of tourist infrastructure, some Mayans later found work in tourism, which they are now at risk of losing due to the threats to the tourism sector. Efforts to maintain the Mexican Caribbean as a popular tourist destination, such as algae control, are underway. I argue that these measures are directed at the short-term stabilization of the tourist dream; long-term ecological destabilization, at times exacerbated by measures directed at stabilizing tourist paradise, occurs concurrently, impacting local communities' livelihoods. Governance of climate change phenomena in regions dependent on tourism thus raises questions of climate justice in Mexico and beyond.

What is Sargassum? Governing and Framing algae in the Mexican Caribbean

Some say Sargassum is an alien. Some say it is an invasive species, others say it is harmful algae bloom, some say it is marine litter, some say it is nothing but nature. [...] If you declare Sargassum to be invasive, the changes to receive funding are much higher. Also, it influences the response of officials, politicians, and the tourism sector. So, there is politics within the classification of algae.

The quote above stems from Arturo,¹ a marine biologist and reef expert who has worked in the beach town of Puerto Morelos for several decades. As a biologist, he was first and foremost concerned with what Sargassum does to flora and fauna along the coast, rather than primarily with the impact the algae have on the tourism industry. However, it was clear to him, as it was to many of his colleagues, that attention to the algae problem could be generated much more easily if the landings were discussed primarily as a threat to the economically important tourism industry. The argument that local ecosystems are under threat, Arturo reported, had significantly less clout with the travel industry and policymakers to invest in addressing the problem.

His account is revealing in that it illustrates that different interests, political agendas, and world views play a crucial role when discussing what to do with Sargassum. While different actors in the field I worked with—such as hoteliers, restaurant owners, tour guides, environmentalists, and scientists—agreed that something must be done, their motivations differed. My observation resonates with Artur and Hilhorst's (2012) argument that interests, conceptions of workable solutions, and power imbalances

shape climate change governance. Rittel and Webber (1973) have argued that environmental change is a “wicked problem.” Thus, it comes as no surprise that Sargassum is a complicated issue to adapt to and govern. I learned during fieldwork that the rules and views on what to do with Sargassum change with every election. CONAPESCA, the national fisheries’ commission, for example, gives permits to companies who wish to collect Sargassum at sea (“Permisos de Fomento de Pesca”); they view the algae as a marine resource. SEMAR, the Mexican navy, on the other hand, collects Sargassum at sea, predominantly treating it as a residue that is dumped at disposal sites on land. The “Lineamientos Técnicos y de Gestión para la Atención de la Contingencia ocasionada por sargazo en el Caribe Mexicano y el Golfo de México” (Technical guidelines to address and manage Sargassum contingency in the Mexican Caribbean and the Gulf of Mexico, translated by the author) are non-compulsory guidelines which offer suggestions on how to harvest, contain, remove, and treat Sargassum.

Even though legislation regulating its handling is absent and guidelines are non-compulsory, I witnessed different actors develop manifold ways of dealing with Sargassum in everyday life. I observed beach clean-ups, algae removal in the shallow and near-coast waters, and people who buried Sargassum under the sand. Some loaded the algae onto their boats and dumped it in the sea. The situation in Mexico is a prime example to show that designated authorities like nation-states or municipal governments cannot necessarily cope with the complexity of environmental change through top-down solutions. I am thus not interested in how policies or laws are implemented but in the “making” of governance (Cruikshank 2005; Krauss 2009) in everyday life. Following this approach, I acknowledge that various forms of societal self-regulation performed by diverse actors play an important role in negotiating and handling the complex issues of environmental change (Ostrom 1990; Rhodes 1997; Benz et al. 2007; Fröhlich and Knieling 2013, 17). I, therefore, interpret environmental governance as a perspective with which I analyze my material (Benz 2004; Benz et al. 2007; Morin and Orsini 2015). It enables taking seriously frequently contradictory and ambivalent decision-making processes in Sargassum handling, resonating with Fröhlich and Knieling’s (2013, 11; see also Börzel 2016) call for taking different actors—be they governmental or not—seriously in one’s analysis. Several of my interlocutors, including Arturo, repeatedly complained that the state and federal government were inefficient and non-reliable when it came to Sargassum management, and they emphasized that it was predominantly actors from within the tourism industry who were involved in managing Sargassum arrival.

Following the perspectives introduced above, governance is by no means apolitical or neutral. Arturo’s account quoted at the outset of this section already indicates that how phenomena are framed plays a crucial role in how they are governed, and actors from within the tourism industry who invested in Sargassum management share one overarching interest: They want to stabilize “beach paradise” so that the region remains attractive for tourists. From the travel industry’s perspective, it only makes sense to understand and address Sargassum primarily as a threat to tourism. In the interviews I held with hotel managers, tour guides, and restaurant owners, they repeatedly stated that “Sargassum ruins my business,” “the tourists really hate Sargassum,” “more algae less tip, less algae more tip,” or “Sargassum is a nuisance.” These

snippets hint at the acknowledgment that *Sargassum* is predominantly framed as a tourist issue, which is employed to justify the measures in play.

Not least has it been folklorists who have argued that how phenomena are framed, narrated, and represented is decisive for how they are dealt with. In other words, framing co-constitutes specific ways of dealing with “problems.” Bronner has noted that frames help to explain “how categories of action [...] arise and engage” (2010, 275). Frames, he further argues, are never determinate but can be negotiated and contested. Analyzing how different actors frame phenomena of environmental change has recently gained more attention in anthropology. Some studies are interested in discussing how people make sense of and interpret a changing environment (e.g., McQuaid et al., 2018). Others argue that frames construct specific narratives that guide and lead to action (e.g., Flottum and Gjerstad 2016). It was useful for me to analyze the framing of the algae to better understand its entanglement with tourism. If *Sargassum* is not framed and dealt with as a tourist issue, action to address the phenomenon is broadly absent. In contrast, its framing as a tourist issue mobilizes actors and resources. This observation resonates with Cameron’s (2012, 103) observation that certain forms of environmental change are problematized and thematized in specific ways, and how they are framed co-constitutes their governance.

My conversations with Eva, who, like Arturo, is a highly regarded marine biologist, were essential to understanding how the framing of *Sargassum* has shifted in recent years and how its current dominant framing as a tourist issue makes the algae governable in specific ways. Eva conveyed that when *Sargassum* first arrived in Mexico in atypical amounts in 2015, residents and locals were concerned with what the algae were, if it would keep returning in the future, whether it was harmful, etc. At the beginning of *Sargassum*’s arrival, people were concerned with the environment and sought her expertise. Eva recalled that initial enthusiasm for protecting the environment against *Sargassum* faded quickly. Instead, concerns about the future of tourism became dominant. What followed was not a search for solutions on how to succeed in protecting the ecosystems of the Mexican Caribbean but a search for measures to maintain tourist travel. As mentioned above, I observed several of these measures: beach clean-ups either by hand or with heavy machinery, the dumping of algae in the jungle or the ocean, and the burying of *Sargassum* underneath the sand, to name a few. In the context of this Special Issue, discussing these practices in terms of everyday governance and adaptation is compelling. Recent scholarship in cultural anthropology calls for a critical analysis of adaptation (Cameron 2012; Smucker et al. 2015; Klepp and Chavez-Rodriguez 2018; Nightingale et al. 2020). The case at hand contributes to this call as it enables us to understand that while adaptation to climate change is often viewed to be something neutral, positive, or “the only viable option for survival” (de Wit 2014, 57), it is instead characterized by specific interests, post-colonial relations, and ambivalences that may well intensify the consequences of environmental change. After all, my field was less concerned adapting to a changing climate or an increasingly damaged environment than with adapting to tourists’ expectations of a once-constructed paradise. The following charts the development of the area as a global tourist paradise, embedding algae arrival within the context of international mass tourism.

The Mexican Riviera Maya and its Construction of a Tourist Paradise

In May 2022, I attended a conference that covered numerous anthropological themes. The first evening of the conference was informal and began with a dinner to facilitate participants' getting to know each other. We introduced ourselves, and I informed the colleagues I shared a table with about my fieldwork in the Mexican Caribbean, mentioning that I study anthropogenic climate change. None of the people present had heard about Sargassum. I revealed that my research had commenced in February 2019, that I had carried out several months of in-person fieldwork in 2019, 2020, and 2022, and that I had conducted participant observation and 26 in-person interviews with different actors involved in algae management or are affected by its arrival. In 2021, due to COVID restrictions, I interviewed nine more people online. I noted at the conference dinner that the algae brought together several actors with whom I work: marine biologists, policy advisors, governmental representatives, villagers, fishermen, NGO coordinators, environmentalists and volunteers, hoteliers, hotel association representatives, entrepreneurs, tourists, even bloggers and local tour guides.

My research is informed by Marcus' (1995) idea of "following", and my empirical material is enhanced by reports, newspaper articles, and scientific publications from the natural sciences. Other documents, such as round table papers, leaflets, and white papers, expand my corpus of material. The conversations I had at various sites during fieldwork took place either in Spanish, English, or German. I have also collaborated with scientists from CONACYT (Consejo Nacional de Ciencia y Tecnología) in Mexico. Our joint work includes 83 further interviews and conversations we held with different stakeholders in Mexico and Florida in the United States, where Sargassum also beaches. The material was collected between January and March 2022 and provided additional insights into how actors deal with Sargassum. The empirical and ethnographic body of material is supplemented by numerous informal conversations I had with beach clean-up crews, tourists, politicians, army officers, hotel and restaurant owners, and their staff.

Over time, I became both an observer and participant in the field. I was invited to Sargassum conferences and workshops concerned with finding solutions for the algae problem, gathered experiences as a beach cleaner, and gained insights into governmental organizations responsible for the safety and cleanliness of beaches in the area. I told the researchers at the conference dinner that I spend a lot of time at the beach during fieldwork. One colleague sitting beside me at the conference dinner laughed and said: "You know how to choose your field wisely." Laughter among the group. Then, people wanted to see photos of Sargassum, and how the beaches I work at look like. My phone circled the room, displaying a photo slideshow documenting my experiences. The faces contorted, I heard terms like "ugly" or "disgusting", and the colleague made a further statement: "You *don't* know how to choose your field wisely. You didn't end up in paradise." How come my colleagues immediately associated the Mexican Caribbean with paradise, a place to which they had never been?



This is not how my colleagues had imagined the beach—and thus my field—in Mexico. Photo credit: Laura Otto.

As early as 1974, the Mexican government selected Cancún to become the country's first planned-out tourism resort area, with Vassallo-Oby (2010) stating: "Cancún represents hyper-commodification of space and culture." In only forty years, Cancún, a former isolated fishing village with about 430 inhabitants in the early 1970s, developed from a rural area into an international, well-known mass tourism spot with 630,000 permanent residents and 15 million international tourists in 2019. The area's economic stability attracted national and international investors, and Cancún's successful industry model is used for large-scale tourism across the globe. The production of a mass tourist zone along the Mexican Caribbean results from multinational corporations' investment, tourist travel, and national government planning, funding, and regulation. These dynamics are further entrenched through tourists and their visits, their consumption of both "Mayaness" as the manifestation of the "exotic," as well as of beaches as "paradise." The spaces between the mega-resorts are filled with restaurants, tour operators, shops, and nightclubs.



Picture perfect! The white sand and crystal-clear water attract millions of tourists to the Mexican Caribbean every year. Numerous travelers consider pictures like this to be paradise. Photo credit: Laura Otto.

Spring breakers, retirees, honeymooners, and families seek adventure, relaxation, and fun when traveling to Mexico's beaches. Cancún, as we know it today, was, as Vassallo-Oby (2010, 39) highlights, created as a "playground of indulgence." Sun, sea, and sand are sold here—with Drew Foster, former Chairman of Caribbean Connection, a leading UK tour operator, stating in 1995 (Mowforth & Munt 1998, 64) that the "Caribbean is a great product." It is not only Cancún, however, which has been commodified, reproduced, and promoted for large-scale, global tourism consumption: the much smaller towns of Puerto Morelos, Akumal, and Tulum, farther south in Quintana Roo, have also attracted growing numbers of tourists and turned from villages into consumable "paradises" and 'places of fun and relaxation,' with the latter two attracting a younger, health-conscious and Instagram-savvy crowd of tourists in search of Yoga retreats, white sandy beaches and the opportunity to disconnect from busy lives at home.

The commodification of the environment and local cultural habits went hand in hand with the production of the Caribbean as a "great product." National and international agencies and institutions, local people, and resources—such as Maya ruins, beaches, and cultural traditions—were all managed and made saleable to tourists (Pisunyer & Daltaubuit 1990). These dynamics coincided with an urbanization and infrastructure boom (Manuel-Navarrete and Redclift 2012), and different types of (spatial, social, and socio-spatial) segregation ensued (see Carranza-Edwards & Rosales-Hoz 2018; Urrea-Marino 2018). It is predominantly tourists who have gained access to the coast through their resorts, and are now understood as Quintana Roo's new colonizers (Juarez 2008; Brown 2013). In this vein, Manuel-Navarrete and Redclift (2012, 177) have shown how the consumption of space along the Mayan Riviera has led to specific

patterns of access and exclusion, with Torres and Momsen depicting that locals refer to the area as “Gringolandia.” Cancún, consequently, is “neither Mexican nor American” (2005, 68). Tourism is a powerful and effective force in the region, and the Riviera Maya is a contact zone (Pratt 1991) between the global North and South. Since 2015, the contact zone is not only negotiated among humans, but Sargassum has entered the scenario, too.

When Sargassum and Tourism (do not) Meet

When residents along the shores of the Mexican Caribbean noticed Sargassum’s first arrival in atypical amounts in 2015, nobody expected it to become a serious and long-term phenomenon along the white beaches of the Caribbean. As I was told during fieldwork, many people believed that “what comes by itself goes by itself,” and that the massive arrival was an aberration and marked a one-time event. Ultimately, Sargassum cannot be considered an invasive species in the region: Many interlocutors told me that “it had always been there in small amounts,” and that they used to play with the algae in the water when they were children—most of them referring to the 1970s and 1980s. Over the decades, however, Sargassum densities increased. Between 2003 and 2011, about one million tons of Sargassum were approximated to be present in the Caribbean each year. By 2011, the number had risen to 200 million tons. While estimating exact amounts of Sargassum in the ocean and on beaches is difficult, 2022 has become known as the new “peak year” of Sargassum presence. On some days, three-meter-high algal mountains piled up overnight on the Mexican coasts. “Sometimes,” as Marianna, an environmental manager at a resort in Playa del Carmen, reported, “you enjoyed sunset at the beach, you go to bed, you sleep. You wake up in the morning, and you cannot see any sand. The day before, then, felt like it was only a dream.” Some of the natural scientists among my interlocutors emphasize their inability to predict future Sargassum beach landings but stress that the conditions for further reproduction and landings on shore are optimal. It is thus likely that the scenario of intense beaching events will be the “new normal” in the Mexican Caribbean. However, the “new normal” is not uniformly interpreted and addressed. There are stark differences between areas made accessible to large-scale tourism and areas in which tourism does not contribute significantly to economic output.

“Nobody Sees it, Nobody Collects it”—Algae Arrival in Non-touristified Areas

While, as described above, the Riviera Maya is a famous tourist destination, not *all* coastal villages and beaches have become touristified areas. In the southern part of Quintana Roo, where I spent several weeks at the beginning of 2022, fishing villages devoid of tourists still exist. The absence of tourists does not, however, imply that there is also an absence of Sargassum arrival. I had learned from discussions I had with my interlocutors back in 2020 that its arrival had an impact on less-touristified regions that was quite different from the way in which tourist areas dealt with the algae. I had heard reports about how it piled up several meters along the outskirts of villages, that the rotting smell of decomposing algae could be detected from several blocks away from the shore, and that villagers were saddened by the ecological

transformation Sargassum implied, such as that recently hatched turtles could no longer make their way into the open ocean and perished in the algae mats. During my fieldwork, I also often wondered what the atypical amounts of Sargassum meant for fishermen and rural communities.

The trip I embarked on early in 2022 to the south of the federal state was revealing: I learned from fishermen and their families about the algae's ability to cover the shallow waters. While they had been able to 'fish their breakfast' without effort in front of their houses for decades, they now needed to go out farther by boat because the algae covered the surface of the water, contributing to the absence of small fish nearby. Taking the boat out to go fishing requires more time and, more importantly, additional financial resources for extra fuel to go out into deeper waters. In poorer communities, that is not necessarily possible, and people are at risk of food insecurity and malnutrition, as *Júan* told me:

Sargassum has made my life so much more difficult. No one likes the algae. Fish will not eat it, and also the birds avoid it. So it is everywhere in the shallow water and on the coast. Sometimes my boat gets stuck. The algae get caught in the propeller. Then, I have to call a friend to help me. On days like that, I do not bring food home.

Nevertheless, these were not their only concerns: Communities south of the *Sian Ka'an* Nature Reserve also live from lobster farming, among other activities. The lobsters live in cages in the waters near the coast. The massive accumulation of algae extracts oxygen and nutrients from the ocean, which are essential for the lobsters' survival. In addition, the algae carpets lead to a precipitous increase in water temperature—to such an extent that lobster farmers occasionally find their lobsters cooked in their cages. Their central source of income is threatened by Sargassum's arrival.

Repeatedly, people who live in the southern part of Quintana Roo told me that they used to live in paradise when they grew up. They spoke of the joy they had when they swam in the crystal-clear waters, told me about how they harvested fresh coconuts from the palm trees growing along the coast, and how wide the beaches were – not comparable, they said, to what I got to see when I arrived in the Mexican Caribbean. While they told me these stories and shared their memories, I sensed that people were sad: They were mourning the loss of what they considered an intact ecosystem, they were concerned about the future of the area, and they were saddened by having lost, at least in part, what used to be their paradise. Moreover, while they also understood the Mexican Caribbean as paradise—much like international tourists – they were not able to make use of Sargassum's framing as a tourist issue, as tourists did not vacation in their villages. My interlocutors were disappointed by public authorities that they did not receive (or received only little) help in dealing with the problem; their criticism, however, was surpassed by their concern regarding their future as coastal residents. Some of them, I learned, also dreamt of transforming "their" paradise into one for tourists to benefit from tourism economically. Others, however, see the future in the tourism industry as no longer viable due to the vast amount of algae. And some wondered if they might not ultimately have to leave their villages if Sargassum does not stop arriving.



Sargassum accumulates on beaches and in shallow waters. The algae color the water brown, cover the sand, and the warmth generated by algal decomposition processes is noticeable. When decomposing, it releases hydrogen sulfite which makes it smell like rotten eggs. Photo credit: Laura Otto.

Despite the danger to villagers' livelihood, little is done to address the algae issue. A lack of financial resources makes investments in Sargassum removal impossible, and its ever-recurring beaching highlights the difficulty of knowing what is to be done to counter the way in which their way of life is jeopardized. While villagers are aware of the problems Sargassum entails—they feel them every day, after all—they are simply overwhelmed by the volume of algae. Their inaction is by no means rooted in ignorance. The absence of constructive and feasible ways to deal with Sargassum marks the most conspicuous difference compared to regions heavily involved in tourism, where altogether different practices emerge in dealing with the algae. As my interview partner Juan, who works for an NGO and several projects directed towards the integrity of the local environment, told me: "In these areas, where is much less tourism, the Sargasso accumulations are enormous. But nobody [i.e. tourists] sees it there, nobody collects it" (March 2020). His account hints at what I observed many times: If Sargassum is not framed as a tourist issue, measures to address its arrival are largely absent.

What Tourists Want

Júan's statement is emblematic of tourists' expectations when they travel to the Riviera Maya, as he suggests that the algae is removed *when* tourists see it or because tourists *would* see it. What shimmers through is that tourists do not wish to encounter Sargassum, and that actors from within the tourism industry make concerted efforts to remove the algae from their beaches. My fieldwork was revealing in terms of what tourists expect in the Caribbean, as I was able to observe what happens when they "meet" Sargassum. On days when the algae is present in smaller amounts, it is common for tourists to still go to the beach, placing their towels in the sand and bathing in the sunshine and water. On days when the algae is abundant, I observed that many left the beaches right after they arrived; they complained loudly about how dirty the beaches were, and some accused local workers, such as tour boat operators, that they were not working hard enough to maintain the Mexican beaches. When I became part of such a conversation among tourists from the United States and Tiago, who offers sailing trips in Tulum, in February 2022, I realized that he tried to educate the travelers: He emphasized Sargassum's relevance for the ecosystem, argued that algae are a natural phenomenon, and tried to convince his potential guests that a boat trip in the deeper waters farther out would still be enjoyable. The strategy of normalizing Sargassum is one I observed repeatedly: In some places, local governments installed placards stating that Sargassum has always been there and is a phenomenon at *all* coastal destinations, is needed for humans and animals alike, and that the algae contributes to creating dunes and sand. Normalizing Sargassum and the efforts to convince tourists of it not being problematic was largely unsuccessful, as travelers had concrete expectations: white beaches and clear waters. Tourists I interviewed mentioned in our conversations that they, like Anna,

went to Mexico for the really cool beaches. I thought that I would find really white sand, and turquoise waters here. I knew that Mexico is maybe less authentic than other destinations in Latin America, but I wanted that chicness. I had planned to take photos for Instagram, but the algae was everywhere.

Anna's statement expresses what travelers expect in the Mexican Caribbean. The irony here is that Anna, like numerous other travelers I interviewed, was inspired by Instagram, among other sources, to travel to Tulum and the Riviera Maya. They were all magically drawn to the images of inviting water and white sand. In Mexico, upon tourists encountering Sargassum, I kept hearing: "But this beach doesn't look like on Instagram!". Instead of reflecting on how Instagram creates illusions, my tourist interlocutors were primarily interested in continuing to serve the Instagram effect, rather than either not posting or posting a more realistic image. I could see tourists clearing tiny sections of the beach of algae to quickly photograph themselves without Sargassum. These practices perpetuate what has long been observed in the Riviera Maya: Tourists have a considerable power to decide who or what is not seen, thus relegating local actors—be they human or non-human—to places tourists assign to them. The local population repeatedly appears in tourists' photos as proof of "authentic experiences," but they are, much like the algae, not documented in photos of and on the beach. If the algae are depicted in Instagram posts, it is often accompanied by the

accusation that the local population cannot keep the beaches clean. Thus, tourism is not least a “way of seeing” (Urry 1990), or an industry that practices a powerful “making see-able.” These “tourist performances” (Farías 2010) comprise, as is shown here, “manipulations of images” (ibid.).

However, it is not only travelers who continue to reproduce images of paradise. While the earlier mentioned airline advertisement does not try to attract tourists by displaying “perfect” beaches, others still use these pictures. Despite the algae landings, hotels and tour providers still advertise the expectations of travelers that are evident in the quotes, which Omar understood and criticized as a “delusion.” Tadeo is an entrepreneur in the town of Puerto Morelos. He said a more honest approach towards the transformations in the Caribbean should be employed: “Still, hotels and tour operators show their potential guests flyers with all white beaches and blue waters. And then they come here and see something else, they feel like they are ripped off” (February 2020). Tourist numbers have already dropped, and hoteliers and other actors in the industry are concerned with having to deal with tourists’ complaints. Juan reported to me (2020):

The impact on tourism is huge. Because travelers, they upload photos, and others can see it. They will not come here. And they stopped coming already. People say online that our beaches are history [...]. People are looking for sun, beaches, coconut with rum—but they don’t want Sargassum. (March 2020)

In addition, people write about the bad smell originating from Sargassum’s decomposition, and they report nausea and difficulties breathing. In online fora and tourist blogs, Sargassum is repeatedly framed as a nuisance, a photo disruptor, a vacation horror.

Camila, a marine biologist who is one of my interlocutors, mentions that once Sargassum arrives, “the roof is on fire” (February 2022). Stakeholders from the tourism industry then find themselves in a situation characterized by significant pressure. The region’s dependence on tourism creates a situation in which people start to ‘fight’ Sargassum, and I have observed that bombastic vocabulary is used once algae arrives. “There is a war against Sargassum,” Dan, a contractor who cleans the beach for hotels and helps them remove the algae, explained: “We need to work together, otherwise, we will lose this war. Every day, there is invasion” (February 2022). The narration and representation of Sargassum as an ‘invader’ and a ‘destroyer’ is used to justify its removal by different measures, ranging from removal by hand to heavy machinery to address tourists’ expectations. What is striking here is that all the measures employed do not aim at adapting to the changing environment, but they aim at adapting to meeting tourists’ alleged needs: white beaches.

“Playas Limpiezas” – Cleaning Beaches and Stabilizing Tourist Paradise

With Sargassum being primarily viewed and narrated as a threat to the tourism industry, tourists and their expectations play a crucial role in dealing with the algae. While several of my interlocutors viewed Sargassum as a natural phenomenon, and that nature should take care of it, they also acknowledged that hoteliers and tour opera-

tors needed to intervene, as their businesses are under genuine threat. The hoteliers I talked to repeatedly stressed that they have guests who are severely disappointed with Sargassum on the beach and view it as an aesthetic problem. Concern about the impact of tourist dissatisfaction on their continued business practice—would tourists continue to travel to the Mexican Caribbean, or would they abstain from traveling to the region’s coast? —was ever-abundant. Jorge, a manager in a hotel in Puerto Morelos, told me that he and his team “are working on solutions that allow resort guests to use the beach. It is our goal to provide a place tourists can enjoy.” Here, again, the measures undertaken solely aimed at adapting to tourists’ expectations, but a notion of adapting to anthropogenic climate change was absent in his account. The expectations of tourists are powerful in terms of dealing with the algae. Tourists’ expectations not only contribute to making the algae governable in specific ways, but economic concerns about the future of tourism—as opposed to ecological concerns about the environmental well-being of the region—are the primary motivation to deal with and remove the algae from the beaches.

The changes brought about by Sargassum reveal hoteliers’ and the tourism industry’s approach to maintaining and working towards the stabilization of a beach paradise. The narration in advertisements, online travel fora, and in tourists’ minds cements the belief that the distinguishing feature of the Mexican Caribbean is its clean, white, sandy beaches. It is the narrative that stakeholders in the region are selling and which tour operators are entrenching. When I spent time in Playa del Carmen during my fieldwork in 2020, I interviewed different tour operators along the promenade who were predominantly selling snorkeling and diving trips to nearby shipwrecks and reefs. I observed how they used their phones to show potential guests pictures of the ocean and the beaches—and, of course, they used photos of clean waters and clean beaches to attract customers. They emphasized that guests present at the moment were fortuitous, as algae had been removed, the beaches and waters resembled the condition of the coast’s prevailing narrative, and that nothing stood in the way of an excursion into paradise.

While tour operators predominantly used photos on their phone to “prove” paradise-like conditions, hoteliers had to invest to keep their beaches Sargassum-free. These investments range from barriers to stop algae on the water to beach cleaning, either carried out by hand, with the help of machines, or by human-machine collaboration. Stabilizing tourists’ expectations of the beach paradise requires substantial investments: I learned from a hotel manager in Puerto Morelos that her company hires 1,300 workers—predominantly men from the Chiapas region—to remove Sargassum from the properties’ beaches. These workers earn approximately 2,000 Mexican Pesos a week, which translates to 90 Euros; in total, it generates costs of almost half a million Euros every month that the hotel invests in algae removal. These investments were, however, considered necessary as tourists would otherwise stop coming. In other words, these measures are aimed not only at satisfying those travelers who are already on site by meeting their expectations, but also at ensuring that potential guests are not deterred. Stabilizing the present beach paradise is a costly endeavor.



Barriers, as seen here in the photo, are installed in front of hotel beaches to keep the algae away. It does not, however, hinder the algae from accumulating behind the barrier. These barriers must be cleaned and maintained regularly to be effective, which is costly. Photo credit: Laura Otto.

During field research, I became part of a beach cleaning brigade and actively participated in Sargassum management. The beach cleaners I joined were employed by a company in Puerto Morelos which offers its service to several hotels along the Riviera Maya. While working together, I learned what it meant to clear a beach of algae—it is a Sisyphean task. A Sunday in late February 2022 is particularly revealing here. February is usually not part of the so-called Sargassum season, which typically lasts from April to September. It was therefore quite a surprise for the hotels that large quantities of Sargassum landed on the beaches in winter, and barriers and other “technological fixes” had not yet been installed in the ocean to keep the algae at bay. The explanation for the arrivals was that cold fronts and strong winds had moved the algae to the coast. Since Mexican borders were not closed during the COVID-19 pandemic, most hotels were at full pandemic-conforming capacity. Thus, the hotels found themselves under pressure to act.

That Sunday in late February was supposed to be my day off and I wanted to relax on the beach from several weeks of field research and algae cleaning. Overnight, however, such vast quantities of Sargassum landed that I assisted in cleaning the beach, and again I found myself on the sand with a rake in hand. After three hours,

we allowed ourselves a half-hour break; during that time, so much new algae washed up making it seem like the hours we had spent on shore cleaning had been in vain. While we cleaned, tourists looked at us—some with praise, some with pity, some with puzzlement. When I looked at the ocean and said to Melissa, who has been cleaning beaches for several years, that I already saw the next algae approaching in the waves, she told me to simply work with my back to the ocean and just look at the ground—anything else would be too frustrating. After six hours of work, according to the estimates of the company manager, we had collected 10 tons of biomass—7 tons of algae, 3 tons of sand.

Stabilizing the Present, Destabilizing the Future

While the beach clean-up we carried out contributed to tourists' satisfaction, removing sand poses a risk to the region. Meeting travelers' needs in light of algae arrival also means contributing to beach erosion. Camila, the biologist I quoted above, raised her concern: "Hotels protect their business. They do something they are not prepared for. That is efficient, but harmful" (February 2022). Several scientists told me about their concerns regarding the conditions of the beaches. Like Camila they criticized that algae removal is often carried out in uncoordinated fashion, it is conducted unprofessionally, and beach cleaning to fulfill tourists' dreams illustrates that the "needs of nature" (Leatherman & Goodman 2005) are not a priority. Viewing Sargassum primarily as an economic problem, not as an ecological one, does not only lead to a situation in which 'nature' is treated as an afterthought, but the same applies to communities which do not live from tourism. Beaches and the coastal zone are viewed primarily as an economic good meant to appeal to tourists; in other words, clean beaches are needed to satisfy tourists' demands. Yet "Gringolandia" and the provision of what Torres and Momsen (2005, 68) call a "utopian tropical paradise" leaves its marks on the region. As I argue, the stabilization of the beach paradise in the present goes hand in hand with its destabilization for the future.

The consequences of Sargassum removal are already noticeable: I have observed since 2019 that the palm trees on the beaches are much less deeply rooted in the sand. Their roots are exposed, and they hardly have any stability left, which is the result of strong winds and hurricanes, but also relates to the sand carried away by Sargassum cleaning. In addition, the texture of the beaches has changed due to beach cleaning, as Tadeo mentioned:

When they clean up the Sargassum, they are also taking sand away, little by little. I don't know if you walked on our beaches recently, but the ground, it is so hard and dry, before it was softer, not the same thing. Some people also began digging holes and they bury Sargassum on the beach. That makes the sand very, very hard. The beach is changing a lot. (February 2020)

These subtle changes may not be noticeable to travelers at first glance; those who do not have the comparison will not detect the difference but will rather enjoy the clean beaches. These are changes felt and observed by the local population. Tourists are much less concerned with these transformations, and instead share photos on social media of the cleaned beaches, thereby stabilizing the famous "beach paradise."

They praise hoteliers for making these efforts and comment positively on their work. That plays into the hands of hotel and tour operators: it makes them hope that others will travel to the Riviera Maya in the future, contributing to further investment in beach cleaning.

The practice of cleaning beaches by raking algae off the beaches does not only affect sand quality; it also contributes to beach erosion. My research shows that the disposal of seaweed is intertwined with the general waste problem along the Riviera Maya: the region does not have a functioning waste system, and like packaging, plastic and other waste, Sargassum does not necessarily end up in designated facilities.



This photo depicts Sargassum which has been removed from the beach and is now rotting along a road; it is mixed with other waste. I took the photo in a village in the southern part of the Mexican Caribbean coast. Reports from villagers indicate that they do not know where better to dispose of the algae because they do not have access to designated disposal sites. Photo credit: Laura Otto.

Scientists and environmentalists are very concerned about the uncontrolled dumping of Sargassum. J uan reported the following in our conversation:

After they removed Sargassum from the beaches, they just put it somewhere. Somewhere where nobody can see it. Somewhere, where there is space available. That is where they put it. It happens because the state does not want to give resources for appropriate dumping sites. There are methods and techniques to create proper dumping sites, but they don't want to make the investment. So, they let people dump it in the jungle. (February 2020)

One may think that the disposal of algae in the jungle is less problematic than other waste or plastics. However, the uncontrolled disposal of algae leads to further environmental problems: Not only is hydrogen sulfite released, but the algae contain metals which seep into the groundwater. The Riviera Maya area is known for limestone soil which is highly permeable. *Cenotes*, pools of fresh water under the surface of the earth, are infiltrated by algae pollutants. These pools have been important to local populations dating back centuries, and their contamination leads to the pollution of groundwater upon which local communities depend.

Conclusion: Goodbye Beaches? A Cautious Outlook

This article has empirically examined Sargassum algae's arrival in the Mexican Caribbean. Since the 1970s, the region has been purposefully constructed and marketed worldwide as "tourist paradise" (Mowforth & Munt 1998, 64). The enactment of tourism spaces often leads to the equation of places and meanings—in this case the equation of the Riviera Maya as a "beach paradise." "Tourism spaces" (Wöhler et al. 2010, 14) are not simply out there but are stabilized by various actors and practices—and can be destabilized by anthropogenic climate change, as is the case with Sargassum.

For almost a decade, the region has been affected by massive algae beaching events. Dealing with it poses new challenges for local stakeholders. It is fair to say that the phenomenon of Sargassum algae discussed here is indeed—like other forms of environmental change—a "wicked problem" (Rittel & Webber 1973). This article illustrates the insights ethnographic analysis can generate for such complex issues, as it allows disentangling different actors' perspectives and their preferred ways of dealing with change. By employing an analytical perspective that helps understand governance as everyday practices and co-constituted by how phenomena are viewed, framed and problematized, I offer an urgently-needed, empirically-grounded case study of how societies cope with ecological and environmental transformations.

I carved out that Sargassum is predominantly framed as a tourist issue, thereby showing how tourism and algae governance are entangled, which demonstrates that governance of and adaptation to environmental change are by no means apolitical or neutral (Smucker et al. 2015; Klepp & Chavez-Rodriguez 2018). Despite its ecological root cause, Sargassum arrival is predominantly framed as an economic problem for the region. How to address the issue remains contested for two primary reasons: (1) scholars from within the natural sciences do not know with certainty the degree to which different factors contribute to its growth, such as warming ocean temperatures, a change in currents and winds, as well as increased input of fertilizer in the Atlantic. (2) Dealing with Sargassum is a challenge considering the lack of certitude concerning the temporality of algae arrival, its quantity, and where exactly it will land.

Its framing as a tourist issue leads to specific governance and adaptation practices.

As I have argued, Sargassum's specific framing is employed to justify the measures in play—be it the installation of barriers, the removal with either hand or heavy machinery, or its dumping in the jungle. When Sargassum is not framed as a tourist issue, little is done to address it. The result is a situation in which the stabilization of the present and near-future “paradise” leads to its simultaneous destabilization, calling into question the sustainability for local communities. That being said, the case at hand reveals that adaptation within the context of anthropogenic climate change must by no means be viewed as necessarily “good,” protecting, or neutral, but is loaded with actors' diverging interests, shaped by power imbalances and social inequalities, and is often tied to post-colonial relations. Adapting hap-hazardly and in an ad-hoc fashion to tourists' needs indeed contributes to further environmental damage.

We can see this particularly well if we recall the situation of the fishermen. I have indicated above that the notion of the area as ‘paradise’ is not only invoked by tourists and the tourism industry, but residents and villagers also told me that they used to live in what they considered paradise. Their paradise, however, is no longer what it used to be. They issued concerns about their future, grieved the loss of ecosystem integrity and biodiversity, and were saddened by transformation in such rapid and seemingly uncontrollable ways. Tourists, however, displayed different sentiments when they did not encounter “paradise”: They were frustrated with ruined holidays, they complained about the government and tourism operators who, allegedly, were not working hard enough to clean the beaches, and they were concerned that their photos would not reflect that they had indeed visited “paradise.” Their concerns and interests ultimately shaped the dominant framing of Sargassum governance. It produced a situation in which adaptation to tourists' needs trumped adaptation based on environmental and residents' needs.

The stabilization and adaptation practices aim to cement tourists' imaginaries of what the Caribbean *should* look like. It has much to do with and is motivated by the significant commercial role tourism plays in the region's economic development. Hoteliers and tour operators aiming at satisfying their customers are primarily concerned with the problems of the present and the immediate future. Attracting further tourists in the near future necessitates the stabilization of the present. Clean beaches are important for current travelers and for making the Riviera Maya enticing to future travelers. At the same time its short-term stabilization raises serious questions about the possibility of ensuring an ecologically-sound, longer-term paradise. Stabilizing tourists' beach paradise with its current practices implies its destabilization at the same time. Whose beach paradise is being stabilized also points to environmental justice (Alba et al. 2020).

Tourism is far more than leisure, encounters between travelers and locals, or an industry. To borrow from Marisol de la Cadena (2019) tourism is all these things, but *not only* these things. While Sargassum's framing of a tourist issue may (in the short term) stabilize the travel industry and allow for the continued sale of ‘beach paradise’, it comes at a longer-term cost to the region and its population. If the cautious predictions of my interlocutors come true, airlines and other companies in the tourism industry will have no choice in the future between advertising Mayaness instead of beaches, because the latter may cease to exist. Some will then lose their ‘beach paradise’ as tourists, others will lose the “beach paradise” as residents.

Abstracting from my specific case and returning to the topic of the Special Issue; the case illustrates that views on adaptation may differ amongst actors on the ground. Agreement about how to adapt or what to adapt to is largely absent. Bearing diverging views in mind, it is difficult to generate solutions to environmental change when different interests, world views and power relations overlap. Within governance of and adaptation to environmental change, tensions emerge between ecology and economy, residents and visitors, between the present and future. Sargassum along the Mexican Caribbean has certainly borne that out.

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Notes

- 1 All interlocutors gave their consent to participate in either verbal or written form. They were given pseudonyms throughout this article.

Works Cited

- Alba, Rossella, Silja Klepp, and Antje Bruns. 2020. “Environmental Justice and the Politics of Climate Change Adaptation - The Case of Venice.” *Geographica Helvetica* 75, no. 4 : 363–68.
- Arce-Ibarra, A. Minerva, Juan Carlos Sejio, Maren Headley, Karla Infante-Ramírez, and Raúl Villanueva-Poot. 2017. “Rights-based Coastal Ecosystem Uses and Management: From Open Access to Community Managed Access Rights.” In *Governing the Coastal Commons: Communities, Resilience and Transformation*, edited by Derek Armitage, Anthony Charles, and Fikret Berkes, 60–80. London: Routledge.
- Artur, Luis, and Dorothea Johanna Maria Hilhorst. 2012. “Everyday Realities of Climate Change Adaptation in Mozambique.” *Global Environmental Change* 22 : 529–36.
- Benz, Arthur. 2004. “Einleitung: Governance – Modebegriff oder nützliches sozialwissenschaftliches Konzept? In *Governance – Regieren in komplexen Regelsystemen*, edited by Arthur Benz, 11–28. Wiesbaden: VS.

- Benz, Arthur, Susanne Lütz, Uwe Schimank, and Georg Simonis. 2007. "Einleitung." In *Handbuch Governance. Theoretische Grundlagen und empirische Anwendungsfelder*, edited by Arthur Benz, Susanne Lütz, Uwe Schimank, and Georg Simonis, 9–25. Wiesbaden: Springer.
- Börzel, Tanja. 2016. "Theorizing Regionalism: Cooperation, Integration, and Governance." In *The Oxford Handbook of Comparative Regionalism*, edited by Tanja Börzel and Thomas Risse, 41–63. Oxford: Oxford University Press.
- Bronner, Simon J. 2010. "Framing Folklore: An Introduction." *Western Folklore* 69, no. 3/4: 275–297.
- Brown, Denise Fay. 2013. "Tourists as Colonizers in Quintana Roo, Mexico." *The Canadian Geographer* 57, no. 2: 186–205.
- Cameron, Emilie S. 2012. "Securing Indigenous Politics: A Critique of the Vulnerability and Adaptation Approach to the Human Dimensions of Climate Change in the Canadian Arctic." *Global Environmental Change* 22, no. 1: 103–14.
- Carranza-Edwards, Arturo, and Leticia Rosales-Hoz. 2018. "Mexican Beach Sands: Composition and Vulnerability." In *Beach management Tools – Concepts, Methodologies and Case Studies*, edited by Camilo Botero, Omar Cervantes, and Charles Finkl, 273–92. Wiesbaden: Springer.
- Cruikshank, Julie. 2005. *Do Glaciers Listen? Local Knowledge, Colonial Encounters, and Social Imagination*. Vancouver: University of British Columbia Press.
- de la Cadena, Marisol. 2019. "Uncommoning Nature: Stories from the Anthro-Not-Seen." In *Anthropos and the material*, edited by Penny Harvey, and Christian Krohn-Hansen, 35–58. Durham: Duke University Press.
- de Wit, Sara. 2014. "Denaturalizing Adaptation, Resocializing the Climate: Theoretical and Methodological Considerations on How to Follow a Travelling Idea of Climate Change." In *Denaturalizing Climate Change: Migration, Mobilities and Space*, edited by Friederike Gesing, Johannes Herbeck, and Silja Klepp, 56–64. Bremen: Artec-paper 200.
- Dürr, Eveline. 2012. "Urban Poverty, Spatial Representation and Mobility: Touring a Slum in Mexico." *International Journal of Urban and Regional Research* 36, no. 4: 706–24.
- Dürr, Eveline, Rivke Jaffe, and Garteh A. Jones. 2020. "Brokers and Tours: Selling Urban Poverty and Violence in Latin America and the Caribbean." *Space and Culture* 23, no. 1: 4–14.
- Farás, Ignacio. 2010. "Sightseeing Buses: Cruising, Timing and the Montage of Attractions." *Mobilities* no. 5: 387–407.
- Flottum, Kjersti/Gjerstad, Oyvind. 2016 "Narratives in Climate Change Discourse." *WIREs Climate Change*, 8 no. 1: <https://doi.org/10.1002/wcc.429>
- Fröhlich, Jannes, and Jörg Knieling. 2013. "Conceptualising Climate Change Governance." In *Climate Change Governance, Climate Change Management*, edited by Jörg Knieling and Walter Leal Filho, 9–26. Berlin: Springer.
- Hu, Chuanmin, Lian Feng, Robert Hardy, and Eric Hochberg. 2015. "Spectral and Spatial Requirements of Remote Measurements of Pelagic Sargassum Macroalgae." *Remote Sensing of Environment* 167: 229–46.
- Juarez, Ana M. 2008. "Ongoing Struggles: Mayas and Immigrants in Tourist era Tu-

- lum." *The Journal of Latin American Anthropology*, 7 no. 1: 34–67.
- Klepp, Silja, and Libertad Chavez-Rodriguez. 2018. *A Critical Approach to Climate Change Adaptation: Discourses, Policies and Practices*. Routledge: London and New York.
- Krauss, Werner. 2009. "Localizing Climate Change: A Multi-sited Approach." In *Multi-sited Ethnography: Theory, Praxis and Locality in Contemporary Research*, edited by Mark-Anthony Falzon, 149–65. Farnham: Ashgate.
- Leatherman, Thomas, and Alan Goodman. 2005. "Coca-colonization of Diets in the Yucatan." *Soc Sci Med*, 61 no. 4: 833–46.
- Lopez, Cary, Quay Dortch, Elizabeth Jewett, and David Garrison. 2008. *Scientific Assessment of Marine Harmful Algal Blooms*. Washington DC: NOAA.
- Manuel-Navarrete, David, and Michael Redclift. 2012. "Spaces of Consumerism and the Consumption of Space: Tourism and Social Exclusion in the 'Mayan Riviera'." In *Consumer Culture in Latin America*, edited by John Sinclair and Anna Cristina Pertierra, 178–93. New York: Palgrave Macmillan.
- Marcus, George E. 1995. "Ethnography in/of the World System: The Emergence of Multi-sited Ethnography." *Annual Review of Anthropology* 24: 95–117.
- McAdam-Otto, Laura. 2022. "'It's all about the beaches': Sargassum algae, Tourism, and Coastal Transformations along the Mexican Caribbean." *Coastal Studies and Society*. <https://doi.org/10.1177/26349817221132379>.
- McQuaid, Katie, Robert Vanderbeck, Gill Valentine, Chen Liu, Lily Chen, Mei Zhang, and Kristina Diprose. 2018. "Urban Climate Change, Livelihood Vulnerability and Narratives of Generational Responsibility in Jinja, Uganda." *Africa*, 88 no. 1: 11–37.
- Milledge, John, and Patricia Harvey. 2016. "Golden tides: Problem or Golden Opportunity? The Valorisation of Sargassum from Beach Inundations." *Journal of Marine Science and Engineering* 4, no. 3: 1–19.
- Morin, Jean-Frederic, and Amandine Orsini. 2015. *Essential Concepts of Global Environmental Governance*. London: Routledge.
- Mowfourth, Martin, and Ian Munt. 1998. *Tourism and Sustainability: New Tourism in the Third World*. London: Psychology Press.
- Nightingale, Andrea Joslyn, Siri Eriksen, Marcus Taylor, Timothy Forsyth, Mark Pelling, Andrew Newsham, Emily Boyd, Katrina Brown, Blane Harvey, Lindsey Jones, Rachel Bezner Kerr, Lyla Mehta, Lars Otto Naess, David Ockwell, Ian Scoones, Thomas Tanner, and Stephen Whitfield. 2020. "Beyond Technical Fixes: Climate Solutions and the Great Derangement." *Climate and Development*, 12 no. 4: 343–52.
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.
- Pi-Sunyer, Oriol, and Magali Daltabuit. 1990. "Tourism Development in Quintana Roo, Mexico." *Cultural Survival* 14, no. 1: 9–13.
- Pratt, Marie-Louise. 1991. "Arts of the Contact Zone." *Profession*: 33–40.
- Rhodes, Roderick Arthur William. 1997. "Understanding Governance: Policy Networks, Governance, Reflexivity and Accountability." *Organization Studies* 28, no. 8: 1–22.

- Rittel, Horst, and Melvin Webber. 1973. "Dilemmas in a General Theory of Planning." *Policy Sciences*, 4, no. 2 : 155–69.
- SEMARNAT. 2021. *La Secretaría de Medio Ambiente y Recursos Naturales da a conocer los Lineamientos Técnicos y de Gestión para la Atención de la Contingencia ocasionada por Sargazo en el Caribe Mexicano y el Golfo de Mexico*. Accessed January 11, 2023. <https://www.gob.mx/semarnat/documentos/lineamientos-tecnicos-y-de-gestion-para-la-atencion-de-lacontingencia-ocasionada-por-sargazo-en-el-caribe-mexicano-y-el-golfo-de-mexico>.
- Smucker, Thomas, Ben Wisner, Adolfo Mascarenhas, Pantaleo Munishi, Elizabeth E. Wangui, Gaurav Sinha, Daniel Weiner, Charles Bwenge, and Eric Lovell. 2015. "Differentiated Livelihoods, Local Institutions, and the Adaptation Imperative: Assessing Climate Change Adaptation Policy in Tanzania." *Geoforum*, 59: 39–50.
- Torres, Rebecca, and Janet Momsen. 2005. "Gringolandia: The Construction of a New Tourist Space in Mexico." *Annals of The Association of American Geographers*, 95 no. 2: 314–35.
- Urrea-Marino, Ulsía. 2018 "Privatization of the Mexican Coast, the Case of the Municipality of Solidaridad, Quintana Roo from the Perspective of the Public Administration and Everyday Life Practices." In *Beach Management Tools – Concepts, Methodologies and Case Studies*, edited by Camilo Botero, Omar Cervantes, and Charles Finkl, 701–18. Wiesbaden: Springer.
- Vassallo-Oby, Christine. 2010. "Circulation and Consumption: Transnational Mass Tourism in Cancún, Mexico." *Student Anthropologist*, 2 no. 1 : 38–45.
- Wöhler, Karlheinz, Andreas Pott, and Vera Denzer. 2010. *Tourismusräume. Zur soziokulturellen Konstruktion eines globalen Phänomens*. Bielefeld: Transcript.