

The Challenging Climate for Women in Caribbean Fisheries—From Seaweed to Seafood, and Practice to Policy

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Abstract: While scholars agree that Caribbean small-scale fisheries should be managed as social–ecological systems, the domination of natural science over social science is staggering. This inequity is reflected in gender analysis of impacts of climate change and variability on women in fisheries. There is little information on how climate impacts women’s livelihoods and leadership in Caribbean fisheries. Most data concern the marine environment and male-dominated harvest sector. We set out to learn more about climate impacts on, and climate adaptation by, women in fisheries, including how fisheries climate science could incorporate gender mainstreaming. Over the past three years, a transdisciplinary team has assembled sets of mainly qualitative data to address these issues, mainly through interviews and interactive workshops with women and men in the fishing industries and organizations of Caribbean countries. The challenges women face due to climate are diverse and include influxes of sargassum seaweed that change species composition and abundance in catches of seafood. Women not only deal with challenges in their livelihoods and households, but also in becoming fisherfolk leaders who influence and engage policy. This chapter examines such challenges and offers ideas for improvement in the context of gender mainstreaming.

1. Introduction

Many scientists agree that climate change is the most pervasive and urgent global threat of our time, contributing to complex environmental, socioeconomic, and governance issues that impact developed and developing countries. However,

a much smaller community of scholars and practitioners has documented the linkages between climate change and gender inequality showing differentiated impacts on men and women because of gender division of labour and differences in use, control and ownership of assets and natural resources. (Tovar-Restrepo 2017, p. 412)

This is the situation in the Caribbean, where limited information exists on gender in fisheries and their nexus with climate change. Diverse gendered impacts of climate change burden women in Caribbean fisheries, both directly and indirectly (Morrow 2017). Excluding gender from applied research to conceptualize, examine, and address climate change impacts on fisheries means that an inadequate understanding and inappropriate solutions could intensify maladaptation (Sturgeon 2017). As argued by

feminist authors in the collection assembled by Frangoudes et al. (2019), there is an urgent need to transform gender relations in fisheries, including climate aspects.

Attention must be paid to both women (Solano et al. 2021) and men (Salguero-Velázquez et al. 2022) to understand gender relations. In the Caribbean fisheries harvest sector, few women fish, and a small but unknown number own or co-own fishing vessels. Most work in postharvest, with a few in ancillary services. The Caribbean Regional Fisheries Mechanism (CRFM) is the authoritative regional fisheries body and source of statistics. It estimates that about 470,000 persons have fisheries sector livelihoods in its 17 CRFM member states, with a third of these (mostly men) in harvest (CRFM 2021). This leaves about 320,000 persons employed in fish processing, marketing, distribution, and ancillary services (e.g., ice production, gear supply, boat repair, research, development, and management). CRFM does not provide gender disaggregated data for any country, and lists collection and analysis of gender-disaggregated data as its first priority (CRFM 2020a).

There are few women in the Caribbean fisheries harvest sector, but extreme weather events increase hazards at sea and reduce the number of fishing days for the harvest sector dominated by men. This in turn limits the fish landings to be sold by the women who dominate postharvest. Fishery households tend to be poorer and female-headed, further increasing the burden on women (IDB 2020). As women work harder and longer to secure supplementary income for their households, less time is available for training and education, and for participation in fisherfolk organization leadership. Limited access to assets needed to cope with and adapt to climate impacts may translate into women fisherfolk having less power to engage and influence climate-related decisions in fisheries governance and wider society. Women's voices at all levels of governance and all forums for decision making are likely to lead to empowerment, with more equitable and sustainable development (IDB 2020; Kabeer 1999; Morrow 2017).

Women have been recognized as key actors in climate change adaptation and mitigation, given their diverse roles in fisheries as scientists, managers, civil society trailblazers, and resource users. Women are change agents who catalyze the transformation necessary to achieve climate-smart resilience in the supply of Caribbean seafood (CRFM 2020a). Yet, women's ability to adapt to climate change is often limited by entrenched societal gender norms, roles, and inequalities that "result in women being the most disadvantaged by the impacts of climate change and least well placed socially, legally and economically to respond to them" (Morrow 2017, p. 402). These challenges motivate women's empowerment and gender mainstreaming (FAO 2017; IDB 2020). Women must engage in climate change discourses, given the disproportionate impact on the vulnerable in society (Morrow 2017). Documenting the climate challenges faced by women in fisheries and how they deal with them in livelihoods and organizational leadership can inform gender mainstreaming (GIFT 2018).

In this chapter, we examine challenges in women's livelihoods and leadership in Caribbean small-scale fisheries and suggest gender mainstreaming at the

fisheries–climate nexus. The next section sets out the methods followed by results and discussion of women’s adaptive capacity in two specific cases. We conclude with a perspective on the way forward.

2. Materials and Methods

We use three analytical frameworks to understand fisheries’ social–ecological systems: adaptive capacity, livelihoods analysis, and institutional analysis (GIFT 2018). This chapter first sets the context for adaptive capacity, followed by summary analysis of two cases of women in Caribbean small-scale fisheries that illustrate some challenges and adaptations.

A review of the literature provides a practical perspective on the scope for women’s adaptive capacity to climate in Caribbean small-scale fisheries. The review employs a heuristic version of the framework from McClanahan and Cinner (2012) that uses five dimensions of adaptive capacity: assets, flexibility, learning, social organization, and agency. The framework has been applied to fisheries in Africa (Cinner et al. 2015), the Pacific (Cohen et al. 2016), and the Caribbean (Turner et al. 2020). Due to the paucity of Caribbean fisheries’ gender data and information, we focus on broadly thematic capacities and enablers encompassing the dimensions rather than addressing them individually. The two case studies facilitate deeper exploration using more specific analytical frameworks.

Livelihood analyses have long been used in gender studies of fisheries, and a sustainable livelihoods approach (Allison and Ellis 2001) is applied to the sargassum case (Figure 1). Climate is a particularly strong factor in the vulnerability context, but it pervades the entire framework. Slow climate change trends (e.g., sea level rise), more rapid climate variability or chronic seasonality (e.g., extreme weather events), and outright environmental surprises or shocks (e.g., sargassum seaweed influxes) all impact social, ecological, and economic conditions in the fisheries sector. Next are the livelihood capital assets (physical, financial, human, social, and natural). The third as interactions consists of institutional structures (e.g., agencies) and processes (e.g., policies). These exhibit complex interactions with climate, gender, and livelihood variables to determine feasible livelihood strategies (e.g., multi-occupationality) and outcomes (e.g., reliable income). Each provides feedback to all prior components.

Institutional analysis (Ostrom 2011) is applied in the second case. Similar to livelihoods, the first component is context. This includes ecological (e.g., marine resources), socio-economic (e.g., livelihoods), and institutional (e.g., decision making) factors. The second component is an arena comprising patterns of interactions among institutional actors (e.g., fisherfolk and fisheries authorities). Outcomes provide feedback to evolving institutional arrangements (Figure 2).

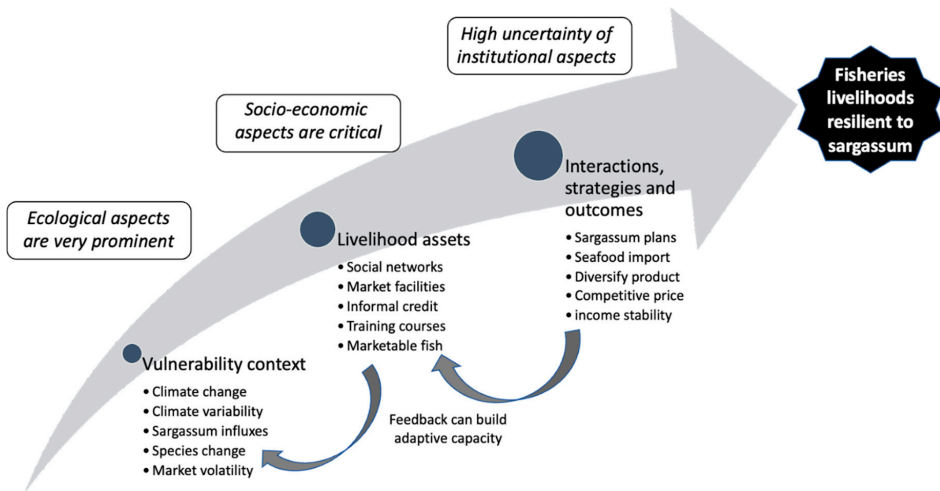


Figure 1. Simplified fisheries livelihoods analysis of sargassum seaweed influx impacts. Source: Figure by authors.

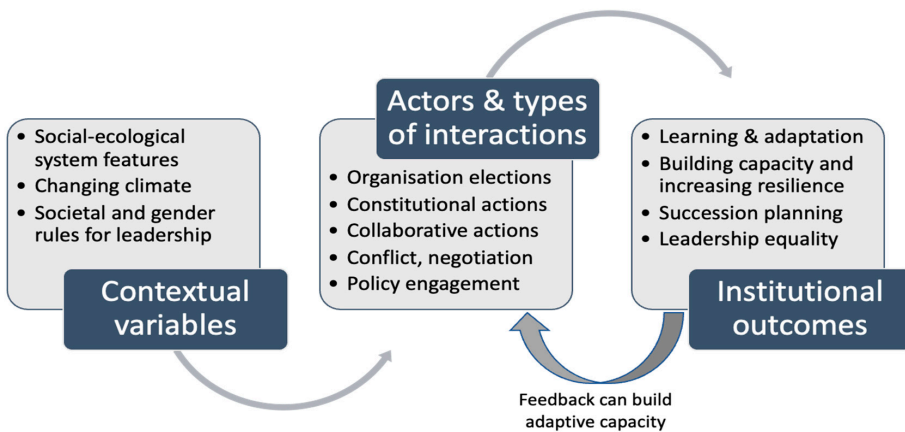


Figure 2. Simplified institutional analysis applied to fisherfolk organization leadership. Source: Figure by authors.

The figures show case-based features of the components as examples. The livelihoods case focuses on how women dealt with sargassum seaweed influxes as climate surprises. The institutional case focuses on women leaders in fisherfolk organizations that must influence policy for climate adaptation in fisheries. Both cases were constructed from several fisheries projects comprising 37 informal interviews, 6 focus groups, and 11 workshops and field observations involving approximately 100 women and the authors. For secondary data, the cases draw upon the unpublished outputs of these projects. The cases illustrate the utility of investigating how women in fisheries cope with climate change and variability. They do not claim to be representative, but they aid understanding. Lessons learned from

the cases on how women in fisheries cope with and adapt to these climate challenges can inform gender mainstreaming.

3. Results and Discussion

The general contextual review is followed by the two specific cases of women’s livelihoods and leadership in Caribbean small-scale fisheries.

3.1. Gendered Adaptive Capacity to Climate in Fisheries

In available documents, the five dimensions of adaptive capacity: assets, flexibility, learning, social organization, and agency (McClanahan and Cinner 2012) were not easily separable. So, the analysis took a broad approach to ensure that all were covered, but not independently, within major themes. In reality, the dimensions are closely interwoven and, consistent with the concept of intersectionality, a reductionist approach to isolate them defeats better understanding.

Ideally, the climate challenges facing women in Caribbean fisheries should be addressed in development, implementation, monitoring and evaluation of adaptation policies, plans and practices within all levels (local, national and regional), and pillars (environmental, economic and social). This should enable women to make progress equal to men, improving resilience to climate change and variability. A close look at what is currently available to build adaptive capacity involves first understanding the gendered impacts of climate change (Figure 3).

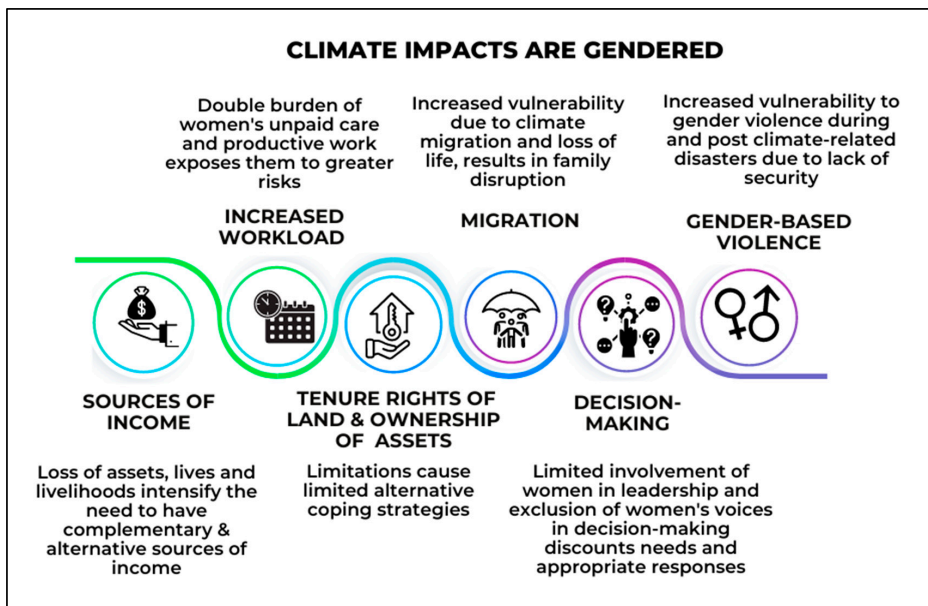


Figure 3. Climate change impacts are gendered. Source: Figure by authors.

Diversity is key to adaptive capacity. Most roles in fisheries are established by the activities, rights, and responsibilities of men (Kleiber et al. 2014). Women's roles are diverse in Caribbean fisheries as actors in the value chain and as leaders (GIFT 2018). Gender-disaggregated data are scarce and seldom capture all of women's contributions. Where such data exist, they are not incorporated into fisheries management planning, but diversity is known (GIFT 2018). In recent years, women have reported interest in diversifying their financial assets derived from within the industry.

Although present throughout fisheries' value chains, women dominate postharvest (Figure 4), participating in value-added processing, marketing, distribution, and food service (Pena et al. 2019; Romeo and McConney 2022). Caribbean women report being little constrained by their formal education, which is usually on par with or superior to men, for any work in the fishing industry (Pena et al. 2019). However, women in Barbados who take up male harvest sector roles say violating gender norms comes at a social cost. Women fishers are ridiculed, particularly by other women, for what is seen to be delinquency in household care-giving responsibilities, as fishing may keep a woman at sea for prolonged periods. Social sanctions endured by women fishers include reputation damage from being falsely accused by other women fisherfolk of intimate relations with male fishers (Pena et al. 2019). Women reinforce gender norms that constrain their own agency and flexibility.



Figure 4. Some roles of women in Caribbean small-scale fisheries Source: Figure by authors.

Regarding social organization and agency, women fisherfolk tend to be underrepresented in state-led fisheries' decision-making processes, but informally, they have been at the forefront of sustainable fisheries (e.g., refusing to buy undersized fish) and climate adaptation (e.g., promoting social security and livelihoods diversification to cope with sargassum influxes). Though less so than men, women are becoming involved in fisherfolk associations and cooperatives across the region. Increasing numbers of women occupy leadership positions, are accepted as leaders, and manage fishing industry organizations at all levels (CERMES 2020a). The extent to which they shape fisheries' policies to champion women's issues by mobilizing fisherfolk to collective action is an undocumented aspect of agency. Caribbean fishing industry women have held posts potentially strategically positioned in governance to assist women (and men) to influence policy decision making. These include positions as a senator in Saint Lucia, a chairperson of the Caribbean Network of Fisherfolk Organizations, and a co-chair of the World Forum of Fisher Peoples.

Regarding learning, within the region, progress is being made to co-develop strategies, plans, and policies integrating a gender perspective (CRFM 2020a). However, a gender-sensitive rather than a gender-responsive approach is still being applied; acknowledging gendered impacts of climate change but not establishing strategies or actions to address them (ECLAC 2019, p. 26). The situation of women and gender inequalities that are reproduced and strengthened by this deficiency continue to be treated as a side issue (Revelo 2021). Integrating a gender perspective and identifying concrete, evidence-based strategies tailored for the specific needs of women and girls will empower them to act as change agents contributing to evidence-based solutions for climate change challenges (GIFT 2018). Where plans and policies exist, limited interlinkages are made between gender, climate change, and disaster risk reduction, "demonstrating a siloed approach to policy-making and a need to renew gender mainstreaming efforts across ministries, departments and agencies responsible for climate change adaptation and disaster management" (ECLAC 2019, p. 25) to build women's resilience to climate-change impacts.

There has, however, been recent headway in regional gender mainstreaming with the development of the unpublished Caribbean Community Regional Gender Equality Strategy (CRGES) that emphasizes commitment to strengthening gender equality and empowerment of women and girls. Recent fisheries initiatives such as the Caribbean Community Common Fisheries Policy (CCCFP) (CRFM 2020b) and Caribbean Regional Fisheries Mechanism (CRFM) Gender Analysis Strategy and Action Plan (Gender ASAP) (CRFM 2020a) can contribute to gender mainstreaming in Caribbean small-scale fisheries. Gender equality, equity, and human rights-based approaches are incorporated through a CCCFP protocol on Securing Sustainable Small-scale Fisheries for Caribbean Community Fisherfolk and their Societies (SSF Protocol), which has not yet been widely implemented. The five-year Gender ASAP supports,

gender mainstreaming in fisheries through gender-responsive approaches to address, overcome and remove inequalities, contributing to the realisation of human rights for all people in all their diversity ... and ensuring their full, equal and effective participation in fostering transformative solutions in Caribbean fisheries. (CRFM 2020a, p. ix)

The implementation of the comprehensive Gender ASAP promises transformative outcomes in Caribbean fisheries, as does the CCCFP protocol on Climate Change Adaptation and Disaster Risk Management in Fisheries and Aquaculture. This protocol looks to “ensure development of a regional Fishery Sector that is resilient to climate change and ocean acidification, and enhanced through comprehensive disaster management, and sustainable use of marine and other aquatic living resources and ecosystems” (CRFM 2020b, p. 21).

3.2. Case 1: *Sargassum Seaweed and Fisheries’ Livelihoods*

The massive influxes of floating sargassum seaweed that have impacted countries in and bordering the Caribbean Sea since 2011 have been an unpleasant surprise not only to women in fisheries, but to everyone else in the region as well (Johnson et al. 2020). Extending at its peak over 8000 km and containing up to 20 million tons wet weight of seaweed, the “Great Atlantic sargassum belt” has no precedent in recorded history (Wang et al. 2019). After a decade of applied research, uncertainty surrounds both the complex climate drivers of the influxes (Skiris et al. 2022) and finding practical solutions to the many challenges posed by sargassum influxes (Oxenford et al. 2021).

In this case, we are particularly concerned with the challenges faced by women working in and supporting the small-scale fisheries value chains of Caribbean small island developing states (SIDS). Women fisherfolk are especially concentrated in the postharvest stages of the value chains for several species of pelagic fishes (GIFT 2018; McConney et al. 2019). They buy the fish from boats and then process, market, and distribute the seafood. Few harvest fish at sea, but some are boat owners. Others supply goods and services such as fishing gear, fuel, and ice, while a growing number prepare seafood for locals and tourists at seaside eating establishments or stalls. Several female fisheries officers and marine scientists also participate in sargassum science and management. However, in this livelihood analysis, the women involved in postharvest take center stage, drawing mainly on document analysis, field observation, and informal interviews by the authors.

3.2.1. Vulnerability Context

For everyone dealing with sargassum, the vulnerability context is dominated by marine environmental and ecological uncertainty (Johnson et al. 2020). For women in fisheries postharvest, much of this is mediated through men (mainly boat owners and fishers) working in the harvest sector. The harvest sector’s ability to cope with the timing, frequency, spatial extent, and severity (amount) of sargassum determines

the initial flow of fish into the value chain and all subsequent stages. Not only does this concern the quantity and seasonality of fish, but also the species composition of catches and the size of fish of various species. There are major commercial pelagic fisheries in the eastern Caribbean for four-wing flyingfish (*Hirundichthys affinis*) and the common dolphinfish (*Coryphaena hippurus*). Gender aspects of their value chains are described in Pena et al. (2020a) and Simmons and McConney (2022), respectively. These fisheries have been among the most severely negatively impacted by sargassum influxes.

Other vulnerabilities include economic (such as intersectoral) links with tourism, which is impacted by sargassum reducing visitor numbers and closing hotel properties, thereby reducing the pool of buyers for women who market seafood. Governance vulnerabilities are also a factor, as much uncertainty surrounds how fisheries and other state authorities do or do not manage sargassum influxes once they inundate coasts. The accumulations of seaweed hamper harvest as well as postharvest coastal infrastructure, perhaps directly affecting men more than women in fisheries. An exception is in coastal communities where sargassum inundation release of hydrogen sulfide and other noxious gases during decay becomes a health hazard in which women bear the brunt of family care, especially for young children. There is also early evidence that sargassum can be a direct threat to women's health (de Lanlay et al. 2022).

3.2.2. Livelihood Assets

Women in fisheries postharvest use their livelihood assets to deal with sargassum as well as other climate hazards that threaten both their fisheries and household work. The latter must be factored in, as the additional domestic duties of women often cause their livelihood assets, interactions, and strategies to differ from those of men. Regarding natural capital, the impacts of sargassum are mostly negative, and highlight vulnerabilities. However, a positive impact has been the sargassum-associated increase in catches of the formerly scarce almaco jack (*Seriola rivoliana*), which has proven highly marketable at a good price. Human capital comes into play here, as women vendors have received practical training in fish handling, processing, and marketing that assists their ability to deal with changes in catch seasonality, quantity, and species composition. Social capital is also relevant, as women collaborate in fisherfolk associations and cooperatives to act collectively. They also use social capital to acquire financial capital through kinship and institutions such as rotating credit associations (e.g., meeting turn, susu, box) which are common at landing sites among women. Their access to physical capital is primarily dependent on the state at medium-to-large fish landing sites that provide buildings with water and electricity for low or no fees. However, women fish vendors also invest in domestic refrigeration to store fish at their homes and reduce sargassum-induced variability.

3.2.3. Interactions, Strategies, and Outcomes

Livelihood interactions with various governance and commercial structures and processes such as state agencies, private firms, legislation, policies, management practices, and transactions do not differ much by gender in the case of sargassum issues. This is largely because there are still very few initiatives that directly address sargassum. Similar to men, women are mostly left on their own to devise strategies for dealing with sargassum. Very few institutions have been built by fisherfolk around adapting or coping with sargassum through collective action, but it is a concern of at least one group comprising women postharvest (Pena et al. 2020b). The main livelihood strategies involve reducing the uncertainty and fluctuations in revenue due to sargassum. This can be attempted through social networking, multi-occupationality, and generally becoming more innovative and adaptive in outlook. Resorting to selling imported fish is a short-term strategy that women postharvest can employ, but which cannot be employed by men in the harvest sub-sector. Despite reduced supplies of some fish, it is also important that the women maintain their seafood prices within a window of market competitiveness against other foods, both local and imported. The livelihood outcomes in relation to sargassum are not yet easy to determine, as they vary due to the experimentation with no clear solutions to the wicked problem of sargassum.

3.2.4. Lessons Learned

While most attention in sargassum science and management has been paid to the male-dominated harvest sector of fishers and ecology, there are clearly impacts on the livelihoods of women along pelagic fisheries value chains, particularly concerning postharvest livelihood socioeconomics. The wicked problem of sargassum influxes features uncertainties about both causes and solutions. Communication among regional actors about sargassum has improved, but much more is needed to support adaptation (McConney and Oxenford 2020). Well-informed adaptation innovation is required from within the industry, as well as from the state. Gender mainstreaming is necessary to engage all actors along entire fisheries value chains, including the women engaged in postharvest (FAO 2017). The women are vulnerable to climate change and variability due to their dependence on natural ecosystems and the male-dominated harvest sub-sector. They have demonstrated their capacity to cope without extensive support, but longer-term adaptation for resilience to sargassum remains elusive.

3.3. *Case 2: Organizational Leadership and Resilience*

Although leadership has been studied extensively across disciplines, it is a recent fisheries research topic. Globally, research on women's leadership of fisherfolk organizations is growing (Alonso-Población and Siar 2018; Dasig 2020; Galappaththi et al. 2022; Torre et al. 2019). In the Caribbean, the limited data on gender and leadership in fisheries were recently addressed through fisherfolk organization leader

assessments to assist in understanding capacities and gaps for informing Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) implementation (FAO 2015, 2017). These fisherfolk organization leadership profiles contribute to knowledge on leaders useful for coping with and adapting to the impacts of climate change. With these data and information, we analyze institutions in women's leadership of fisheries challenged by adaptation to climate change.

3.3.1. Contextual Variables

The Caribbean is on the front line of climate change. Fisherfolk have been observing and are coping with increased intensity and frequency of storms and hurricanes; less predictable weather; changes in species distribution, availability, catch composition and yield; increased coastal erosion; rising sea levels; and influxes of invasive species (Oxenford and Monnereau 2017). These effects are threatening Caribbean fisherfolks' livelihoods, and the well-being of their households and communities. The differences between women and men in exposure to risk and vulnerability in the face of climate change—due to the intersection of gender with characteristics of power and social identity (IDB 2020; Intergovernmental Panel on Climate Change (IPCC) 2007; Tovar-Restrepo 2017)—create a complex challenge for fisherfolk organization leaders in the region.

Addressing climate change in Caribbean fisheries requires committed and sustained collective action guided by strong leadership. Usually, however, leaders arise to mobilize temporary collective action based on crises. This fleeting cohesion for informal collective action among men and women in the fishing industry is only useful for coping with impacts in the short term, but it is ineffective for long-term adaptation (McConney 2007; Pena et al. 2021a). Women leaders complain about low cohesion and the individualistic nature of fisherfolk within the region (Pena et al. 2020b). They, however, believe in the value of organizations and are eager to take on leadership roles to assist in further strengthening to improve governance and the contribution to fisheries policy and decision making (Pena et al. 2020a, 2020b). Commitment from women in the fishing industry to promote collective action and cohesion augurs well for the industry's responses to climate change.

Societal and gender rules for leadership are parts of the social structure of organizations. While there appear, on the surface, to be few systemic barriers to fisherfolk organization leadership by women, and men say that they would support women, the growing gender in fisheries literature on collective action implores researchers to dig deeper. This is critical for exploring fisherfolk leadership at the climate change nexus. Issues of representation and inclusivity of women in taking up leadership positions or joining organizations are attributed to traditional male dominance in the fishing industry, societal stigma associated with fishing, distrust of fisherfolk organizations that have historically been mismanaged, conditionalities or prerequisites for membership (e.g., boat ownership), and cultural norms (e.g., in

Guyana, men prefer that women not be involved in these positions). These constrain participation of women as members or leaders of organizations. However, without exception, board and executive members of fisherfolk organizations said they wanted to see more women in leadership roles and as members of these organizations, contributing to their adaptive capacity. Men know that mechanisms must be created to increase and improve inclusivity of women and for gender responsiveness to be realized (Pena et al. 2021a).

Leaders (i.e., presidents or chairs) are expected to guide decision making irrespective of gender but established hierarchies shape decision making in fisherfolk organizations. Most leaders are men, but a participative approach to leadership and decision making tends to be attempted in fisherfolk organizations, whether led by women or men (Pena et al. 2021a). Such an approach is likely to give a voice to women's climate change challenges and can strengthen gendered outcomes when women are empowered to be effective stewards of fisheries for climate resilience.

3.3.2. Actors and Types of Interactions

There are many more men than women in Caribbean fishing industry leadership roles. Women tend to occupy the posts supporting leaders, such as secretarial positions, but some serve in the top leadership posts of president and vice president across all levels (local, national, and regional) of fisherfolk organizations (CERMES 2020a). Leaders tend to be mature women and men between the ages of 50–59 years old. Both women and men first take up leadership positions in their mid- to late forties, but women assume top posts sooner than men, after being in the fishing industry for under ten years. On average, men spend twice as long in leadership posts than women. Shorter leadership durations for women could be attributed to their need to balance domestic work and caregiving responsibilities with leadership commitments, but this needs to be further investigated (CERMES 2020a). With succession planning, more women could eventually secure a greater share of leadership posts in the future, contributing more to climate decision making in the sector at all levels (CERMES 2020a). Women's participation in climate change adaptation, mitigation, and resilience building can lead to extensive conservation impacts, improved community responsiveness, and successful advocacy for and implementation of climate-related policies.

Fisherfolk organization leaders cannot achieve adaptation and resilience to climate change in silos. Collaborative and coordinated action is needed to tackle the multi-dimensional problem of climate change. Some view this as a role fit for women. Collaboration provides beneficial climate change adaptation outcomes through stakeholder participation and buy-in; climate financing; knowledge generation; and information sharing. Limited collaboration may result in maladaptation (Burton 2016). Networking to include more civil society and private sector support for the fishing industry can diversify organizations to build resilience.

The Caribbean Network of Fisherfolk Organizations (CNFO) has a mandate to sustain leaders in the region by strengthening and facilitating networks (McConney and Medeiros 2014). From its inception in 2016 until recently, it was headed by a woman. Gatherings of women in fisheries, particularly the Belize Women in Fisheries Forum (WIFF), help to foster collaboration among women fisherfolk, managers, and policy makers to understand gender and climate change links. This informs gender mainstreaming in fisheries and climate policy.

Over the past 20 years, female and male fisherfolk leaders have pursued policy engagement on the SSF Guidelines, CCCFP, and its protocols (Pena et al. 2021b). Strengths of fisherfolk organization policy engagement are associated mainly with the leadership of the CNFO administrator and former chairperson, both women. Fisherfolk leadership encompasses fisherfolk understanding the link and interactions between policy and livelihoods and their need and willingness to be engaged in the policy discourse; capacity; and skills building (Pena et al. 2021b). Opportunities for women to lead fisherfolk policy engagement are diverse and include projects and programs that address capacity and resource gaps for addressing climate (Pena et al. 2021b). Given the pervasiveness of climate change impacts in fisheries, women will need to take on new roles of negotiating and advocating for a space in which attention is paid to the intersecting climate issues across the value chain.

Women fisherfolk leaders in various high posts, as well as women floor members, need to press for acknowledgement of their climate challenged situations and accompanying responses. This is already happening in Barbados, for example, where a core group of women leaders and members of an all-women fisherfolk organization is using Popular Theater as a technique to identify the issues they face in the industry, raising awareness about them through poetry, song, and role play to solve their problems and transform the industry. A shortened 2021–2022 flyingfish season due to influxes of sargassum, with its significant impact on their small-scale processing livelihoods, is one such issue that has been highlighted by the women for climate action.

3.3.3. Institutional Outcomes

There is a diverse range of capacity amongst women fisherfolk leaders in the Caribbean. Most capacity lies in general fisheries training in areas of navigation and safety at sea, fish handling, gear building, and types of fishing, as well as first aid training. Leaders would have been exposed to this training in their fisheries' livelihoods. Most of this training is geared towards men in the harvest sector, but more women now seize training opportunities, irrespective of topic, whenever available (CERMES 2020a). Leadership deficiencies exist in fisheries governance, business operations, proposal or grant development, administrative and financial management, computer use and information technology, climate change knowledge, and climate-smart ecosystem approaches. All need to be addressed by women and

men to strengthen leadership for improved fisheries viability, sustainability, and overall resilience to climate change (CERMES 2020a).

Women fisherfolk leaders have benefited from training in gender mainstreaming and digital technological innovation (Cox et al. 2021; Cox and Nembhard 2021). This training, however, needs to be ongoing to promote climate-smart fisheries practices. As they are affected by climate change, women fisherfolk leaders should also play a role in implementing climate-smart fisheries practices. Being primary caretakers of many households, women also have critically valuable views on sustainable management of natural resources (UNDP 2018).

The newly formed CNFO Leadership Institute is well positioned to develop capacity building opportunities for women leaders. The Institute's online delivery has been well accepted by fisherfolk (a large proportion being women and potential leaders) since its launch in April 2020 (CERMES 2020b). The Institute should develop leadership competencies for fisherfolk on how to integrate climate-smart approaches and practices. "Building capacity is essential in developing fisherfolk organizations and preparing them for playing a more meaningful role in fisheries governance" (McConney 2007, p. 14). A woman is the administrative head of the Institute.

Succession planning is uncommon in fisherfolk organizations in the region. Leaders believe there are no promising individuals to fill the roles; fisherfolk are thought to be unmotivated to lead; there is no capacity development for potential leaders; and current leaders are not making way for new leaders (CERMES 2020a). Given the vulnerability of fisheries to climate change, fisherfolk leaders cannot afford to take a laissez-faire approach to organizational culture. They need to be "leaderful", where each organization member gains experience in being a leader concurrently and collectively regardless of gender (CERMES 2020a). This is one of the primary ways women leaders will be able to help fisherfolk communities adapt to and cope with climate changes in the industry. There are women who view themselves as fishing industry leaders and who could benefit from mentoring to lead (Pena et al. 2020b).

Small-scale fisheries must attract ambitious, innovative, and entrepreneurial women to support sustainable resource use. The limited involvement of girls and young women in leadership threatens the intergenerational sustainability of fisherfolk organizations and Caribbean fisheries. Youth are creative, innovative, energetic, and more inclined to adopt new technologies and techniques. Their involvement in fisheries can promote development. Youth can stimulate and lead improvements in digital literacy across fisheries value chains that will, among other things, improve fisherfolks' access to climate information, improve the use of early warning systems, and aid in the implementation of climate-smart technologies (CERMES 2020a). Most fisherfolk leaders identify a successor based on their leadership qualities; loyalty to the organization and expressed interest (CERMES 2020a). Women and youth must be among emergent leaders for climate change adaptation.

3.3.4. Lessons Learned

Gender influences leadership in fisherfolk organizations, but overall, there is still insufficient information for understanding gender dynamics. Further investigation is needed. The situation is complex and intersects, in some cases, with pervasive governance issues. Leadership is perceived as personalized and is indicative of different roles and expectations for men and women (Pena et al. 2021a).

Organizational leadership is one of the most important roles for both women and men in the fishing industry. The future of fisherfolk organizations with core groups of women as leaders and members appears to be bright, as many successful current leaders possess a range of attributes that afford them their leader role. The variety of skills leaders have brought to fisherfolk organizations in the region includes administrative and management capacity/skills; business/financial acumen; communication skills; research and project/grant development expertise; and technical expertise. These, in addition to leadership skills (e.g., professionalism, open-mindedness, accountability, patience, willingness to listen, etc.) are what fisherfolk organizations need to cope with the changing climate in small-scale fisheries (McConney et al. 2003). The vested interests women fisherfolk leaders have in guiding their organizations can be capitalized on to strengthen fisherfolk participation in climate planning and decision-making for the industry.

Perch et al. (2020) show that gender in Caribbean fisheries is more complex than it first appears, differing by fishery and country. Comparing fisheries to other natural resource industries could be informative once gender-disaggregated data become more available. Key goals for small-scale fisheries can be better achieved when women “are engaged as constituents and leaders for sustainable fisheries management; are empowered as effective stewards of fisheries and their associated ecosystems; and are engaged to become drivers towards sustainable fisheries markets” Siles et al. (2019, p. 27). The main barriers to some women taking on the role of leadership are structural (e.g., preconditions for membership), attributed to stigma attached to deficient fisherfolk organizations and related to disregard for governance processes and procedures (with respect to term limits, organization elections, etc.) rather than systemic (intrinsic). Eliciting and explaining gender patterns in Caribbean fisherfolk leadership based on our exploratory research into fisherfolk organization leadership is difficult given the limited amount of data and intersectional information available on women fisherfolk leaders. The data on gender in fisherfolk organization leadership are currently insufficient. More robust investigation is required based upon exploratory qualitative research, such as in this case.

4. Conclusions

The situational analysis and two cases confirm the utility of the GIFT research framework that addresses livelihoods (in the sargassum case) and institutional analyses (in the organization leadership case). The notion of adaptive capacity, the third area of the research framework is useful for synthesizing the other two.

Adaptive capacity relies on building institutions with diversity, resources, and a reasonable level of productivity through mechanisms such as social networking, collective action, and enabling interactive governance (Pena et al. 2020a, 2020b).

Barriers against and opportunities for women's leadership of Caribbean fisherfolk organizations need further investigation. A major inequality is that women's household work is not factored in by them or others as an explicit constraint that men seldom face. Equality in leadership, irrespective of who is leading, is important for gender mainstreaming and the incorporation of women's and men's interests, needs, and priorities are taken into account in climate change policy and practice.

Gender mainstreaming supports women's participation in policy and decision-making processes. The current and future impacts of climate change require women in Caribbean fisheries to be considered in strategies and policies that will assist their adaptation and resilience across the fisheries value chain. Deeper analysis of women's livelihoods, coping strategies, power, and gender relations, among other things will inform gender-responsive and transformative climate policy across the region, ensuring that women in fisheries are no longer sidelined in the response to this harsh phenomenon.

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