



Testing a model to assess women's inclusion and participation in community-based resource management in Solomon Islands

Sheridan Rabbitt^{1,2} · Ian R. Tibbetts^{1,2} · Simon Albert^{2,3} · Ian Lilley^{2,4}

Received: 7 May 2021 / Accepted: 21 August 2022 / Published online: 8 September 2022
© The Author(s) 2022

Abstract

Community-based fisheries management (CBFM) is a standard management framework in Melanesia. Yet, there is increasing evidence that women, among other marginalised groups, experience barriers to inclusion in decision-making processes. Through a case study in three communities in Marovo Lagoon, Solomon Islands, we adapted Agarwal's 2001 participation typology for a Melanesian CBFM context to present a participation model for assessing gender inclusivity in CBFM. We defined six levels of women's participation, including, (1) no participation, (2) nominal, (3) passive, (4) consultive, (5) active, and (6) interactive (empowering) participation, defined as actively participating in all aspects of the decision-making process, and holding leadership roles that increase women's influence and power across the community. The model should be broadly useful throughout Melanesia across many different cultural contexts, though we anticipate that aspects will need adaptation in different contexts, both within and beyond Solomon Islands. We found that the three study communities respectively fell within the passive, consultive, and active levels. Our results show that gender parity, that is equal representation of women and men, is not a reliable indicator of gender equity. The utility of the model lies in its implementation, which requires engagement with gender power structures. This work contributes to the gender, small-scale fisheries, and community-based management literature by assessing women's participation in CBFM decision-making processes through use of a participation model, and providing recommendations to fisheries practitioners on implementation of the model to assess gender equity in a community's CBFM structures.

Keywords Melanesia · Small-scale fisheries · Gender · Equity · Participation · Subsistence

Introduction

Fisheries are social-ecological systems

Small-scale fisheries (SSFs) play a key role in the livelihoods of rural communities around the globe and contribute significantly to nutrition, with estimates indicating that between 90 and 95% of SSF catch is consumed locally

(World Bank, 2012). Despite increasing recognition of the importance of SSFs to livelihoods and local economies, we still lack reliable data on SSFs which provides a challenge to fisheries managers. It is important to consider fisheries as both social and ecological systems (Bennett, 2019), recognising that fishers are critical to addressing fishery collapse (Barclay et al., 2017; Coulthard et al., 2011). Increasingly, the human dimension of fisheries and marine resource management more broadly is referenced in the academic literature (Albert et al, 2015; Coulthard et al., 2011; Fabinyi et al., 2013; Kleiber et al., 2018; Mascia, 2003), in directives from the UN FAO (FAO, 2003, 2015, 2017), and by regional organisations such as the Pacific Community (SPC) (SPC, 2015). Despite these efforts, we currently lack data on how individuals and communities are dealing with environmental crises, making it difficult to offer any informed predictions about how people will respond to policies that aim to address overfishing (Coulthard et al., 2011). The ability and willingness of individuals and communities

✉ Sheridan Rabbitt
sheridan.rabbitt@uqconnect.edu.au

¹ School of Biological Sciences, University of Queensland, St. Lucia, QLD 4072, Australia

² Centre for Marine Science, University of Queensland, St. Lucia, QLD 4072, Australia

³ School of Civil Engineering, University of Queensland, St. Lucia, QLD 4072, Australia

⁴ School of Social Science, University of Queensland, St. Lucia, QLD 4072, Australia

to follow management directives is largely driven by social, cultural, and economic factors including financial status, gender, and power relations, which are regularly overlooked or inadequately incorporated in management (Tilley & López-Angarita, 2016; Walter & Hamilton, 2014). Understanding how people engage with marine resources and with ocean ecosystems is necessary for decision-making to be grounded in evidence (Bennett, 2019).

In the past three decades, there has been an increasing emphasis on inclusion of resource users in management decision-making processes to address this issue. Yet, this community focus often overlooks the fact that not all resource users are able to participate equally. Gender, age, insider/outsider dynamics, and religion, among other factors, influence power relations and individual agency, impacting how individuals and groups are able to participate in natural resource management (NRM) decision-making (Asher & Shattuck, 2017; FAO 2017; Fajber & Vernooy, 2006; Lawless et al., 2019). The intersectionality of these factors often sees women, youth, those with disabilities and other marginalised groups excluded from participating fully in NRM (World Bank, 2013). The exclusion of women in particular from NRM is well documented (Fajber & Vernooy, 2006; Kleiber et al., 2018; Leisher et al., 2018; Rohe et al., 2018; Vunisea, 2008; Westerman & Benbow, 2013), and is exacerbated in fisheries management by the persistent myth that fisheries is a male domain despite a significant effort in recent years to highlight the many and diverse roles women play in fisheries (Bradford & Katikiro, 2019; Chapman, 1987; Harper et al., 2013, 2020; Kleiber et al., 2014; Lambeth et al., 2002; Weeratunge et al., 2010; World Bank, 2012). Research has highlighted the importance of including women in NRM; Farnworth and Jiggins (2003, p. 5) highlighted this for crop management, stating that "... [women and men] relate to the food chain in different ways, and often at different times and places". Climate change literature highlights the need to involve all groups in decision-making, including women and youth, to effectively build resilience to the impacts of climate change in coastal communities (Ravera et al., 2016). In many cases, women and men fish using different gear have spatially different fishing patterns, target different species, and fish for different purposes (De la Torre-Castro et al., 2017; Kleiber et al., 2015; Kronen & Vunisea, 2009; Lambeth et al., 2002; Lentisco & Lee, 2015; Mangubhai et al., 2019; Rabbitt et al., 2019; Ram-Bidesi, 2015). Studies in the Pacific have demonstrated that women can be disproportionately impacted by fisheries management decisions if they are not adequately consulted (Vunisea, 2008), with examples of marine protected areas being established in women's fishing grounds (Rohe et al., 2018). Women play important roles in poverty reduction and nutrition outcomes (Harper et al., 2013; Smith & Haddad, 2000) and are generally in charge of food production and

provision within the household (Randolph & Sanders, 1988). Women have different knowledge from men of both marine and terrestrial ecosystems, owing to their different patterns of resource use and knowledge transfer (De la Torre-Castro et al., 2017; Kleiber et al., 2015; Rohe et al., 2018). Thus, the inclusion of women in NRM is critical for both health and environmental outcomes (Harper et al., 2013), and necessary to achieve sustainable and equitable marine management that addresses the dual challenges of overfishing and food security. Thus, as a large resource-user group, women must be involved in the full management process from consultation to implementation and enforcement.

Women in fisheries in the Pacific

Women are a critical part of the fisheries value chain in the Pacific, engaging in a diverse array of activities across the full chain. Women are directly involved in the harvest of fish and invertebrates, processing of seafood products, marketing, and in fishery-adjacent activities. They account for half of the subsistence coastal fisheries supply chain, through both their role as fishers and their support for fisheries, undertaking activities such as net-mending and fish processing (Kronen & Vunisea, 2009; Krushelnytska, 2015). Estimates suggest that women account for at least half of the annual catch recorded in small-scale fisheries in the Pacific (Harper et al., 2013), and are prominent in the marketing sector, making up between 75 and 90% of all market vendors (UN Women, 2018). In Melanesia, women are heavily involved in subsistence fishing, with estimates suggesting women contribute around 80% of seafood caught for communities' subsistence needs (Kronen & Vunisea, 2009). In Solomon Islands, women are also increasingly involved in fishing for cash income (Krushelnytska, 2015). Several studies have shown that many women now fish at rates far higher than has been seen in the past, and sell their catch in village markets, highlighting the increasingly visible role of women in fisheries in Solomon Islands (Agassi, 2005; Duke et al., 2007; Krushelnytska, 2015; Rabbitt et al., 2019). Despite targeted efforts, it is difficult to get reliable data on the role of women in the subsistence fisheries sector, partly owing to the lack of remuneration for their work (Lambeth et al., 2014).

Women are often more visible in the commercial sector than the informal sphere, as they are reflected in employment statistics. In Solomon Islands, women play a significant role in tuna value chains, including in the commercial tuna industry. Solomon Islands has only one tuna cannery, SolTuna, linked to National Fisheries Development fleets. Women account for two thirds of SolTuna's total workforce are prominent in administrative and technical roles, and make up most of the processing department (Barclay et al., 2020; Harper et al., 2013; Lambeth et al., 2002). Few women have held senior managerial roles, although this is changing

(Barclay et al., 2020). These gender dynamics are similar across tuna industries in other Pacific nations (Barclay et al., 2020; Sullivan & Ram-Bidesi, 2008), and reflect regional gender norms as well as the constraints faced by women owing to their greater domestic and reproductive workloads (Barclay et al., 2020; Lawless et al., 2019).

Women often experience greater demands on their time than men, with domestic duties still generally considered to be “women’s work” (Lawless et al., 2019). In Solomon Islands, the arrival of Christian missionaries in the 1900s further limited women’s opportunities, constraining them to the domestic sphere (McDougall, 2014; Scheyvens, 2003), though such gender norms are increasingly being challenged and dismantled, including through the work of various external organisations (Lawless et al., 2019). Historically, the differences between men’s and women’s workloads have not been adequately considered by facilitators aiming to engage women in development initiatives, further reinforcing gender norms that place men in positions of power and women on the outer (WorldFish Center, 2010; Lawless et al., 2019). Although many island groups in Solomon Islands are historically matrilineal societies (Maezama, 2015), it is a predominantly patriarchal country with entrenched gender norms that facilitate hierarchies of power that elevate the position of men over women (Corrin, 2008; Dyer, 2017; Homan et al., 2019). This disparity impacts upon NRM, particularly at the community level where most decision-making is undertaken by men, with men occupying most positions of power, including management committee and ranger roles (Amos, 2014; Lawless et al., 2019; Rohe et al., 2017, 2018). Despite acknowledgement of women’s many and varied roles within the sector, gender-sensitive approaches to fisheries management are still not widely employed, particularly at the community level (Hilly et al., 2012). This is often compounded by a narrow view of fisheries that usually excludes invertebrate gleaning and does not adequately consider the pre- and post-harvesting sectors, which are traditionally female-dominated workforces (Kleiber et al., 2014; Kruijssen et al., 2013; Schwarz et al., 2014; Weeratunge et al., 2010; Zhao et al., 2013).

Community-based fisheries management (CBFM) in Solomon Islands

Most coastal fisheries in Solomon Islands are under customary marine tenure and managed at the community level through community-based fisheries management (CBFM) tools (MFMR, 2019). The Solomon Islands National Fisheries Policy 2019–2029 states that over 300 communities within Solomon Islands are engaged in some form of CBFM, many in partnership with external organisations (Govan, 2015; MFMR 2019). As part of their CBFM strategies, many communities have active committees, which make decisions about resource management and

conservation actions, often in conjunction with the community’s Council of Elders or chiefs. Some communities also have teams of rangers that enforce these actions and monitor their efficacy. One of the most frequently employed management strategies is the use of protected areas, locally referred to as *tabu* sites. *Tabu* sites are a common form of traditional management in the Pacific for both marine and terrestrial areas and are usually a type of periodically harvested closure. *Tabu* sites may be areas that are closed for cultural or environmental reasons, and the length of such closures varies markedly. Reasons for opening a *tabu* site may include allowing harvest for celebrations such as weddings, and historically they have been used to manage social relations (Foale et al., 2010). Decision-making around the creation and maintenance of *tabu* sites is usually undertaken by a community’s management committee in consultation with the community, and increasingly under the guidance of external organisations. However, community consultation does not mean that all voices within the community are heard (Vunisea, 2008), and the authors note that the use of processes such as committees are often a way to give credibility to those with power whilst marginalising others (Resurreccion, 2008).

The Solomon Islands government has stated its commitment to fulfilling Sustainable Development Goal (SDG) 14 (Life Under Water), which advocates sustainable marine management, through strengthening CBFM initiatives (MFMR, 2019). The government has also recognised the important roles women play in fisheries, with targets for gender-equitable fisheries management mentioned in its National Fisheries Policy (MFMR, 2019) and goals of gender mainstreaming in fisheries through “improv[ing] access to and ownership of resources... by women in the productive sectors of fisheries” outlined in its National Strategy for the Economic Empowerment of Women and Girls (MWYCFA, 2020). If these goals are to be realised, it is critical to understand women’s current involvement in CBFM for fisheries, to identify barriers to women’s participation, and find ways to address these hurdles. A recent analysis of gendered approaches to CBFM employed by government fisheries staff in Solomon Islands found that approaches to ‘reach’ women (such as aiming for more women attending community meetings) were common, but approaches that were designed to empower women and challenge gender norms were not used (Mangubhai & Lawless, 2021).

The processes that drive decision-making in CBFM are often considered to be participatory and inclusive; that is, because they usually involve community consultation, it is often assumed that all groups participate within the process. Yet as we have outlined, women often do not participate equally in these processes owing to prevailing gender norms.

The exclusion of particular groups, in this case women, from processes considered to be participatory is defined

as participatory exclusions (Agarwal, 2001). This study assesses women’s participation in community-based marine resource management in three communities in Marovo Lagoon, Solomon Islands through the use of a participation model. Our model is based on the participation typology developed by Bina Agarwal (2001) which described levels of women’s participation in community forestry groups in South Asia. We have adapted this typology for a Melanesian CBFM context, including addition of a base level of no participation and removal of the ‘activity-specific participation’ level, to generate a participation model that is relevant to this context.

In this study, we used two methods to examine CBFM gender dynamics in the study communities. First, we used focus group discussions with women to understand their experiences with, and attitudes towards, marine resource management within their communities and specifically within decision-making structures (CBFM committees). Second, we recorded details of the CBFM committee membership in each community. The findings presented here are useful for understanding gender dynamics in CBFM in Solomon Islands, and for highlighting how women themselves want to be involved in CBFM in future.

Methods

We summarise below the site characteristics of the three study communities and why they were selected for inclusion in this study. We also outline the focus group discussions (FGDs) we conducted, and detail the application of a

participation model adapted from Bina Agarwal’s participation typology (2001) to assess women’s participation in CBFM in these three communities.

Study site selection and description

Marovo Lagoon is one of the largest saltwater lagoons in the world, and home to over 50 communities (Hviding, 2005). For this case study, we selected three communities with different demographic and geographic features that could influence gender and CBFM engagement (Fig. 1; Table 1). The three communities were selected to be representative of these different factors, and because of their existing relationships with the research team and their active CBFM programs. Communities located on the “Weather Coast” are subject to high wave exposure, and communities living along these coastlines have access to only a few marine habitats, mostly deep sea and narrow coastal reef, with very limited access to mangrove habitats. This contrasts with “Lagoon” communities sheltered within a barrier reef system that can exploit a large diversity of habitats, including seagrass beds, mangroves, sheltered reef, and deep sea. Because these geographic differences impact fishing behaviours, particularly women’s fishing behaviours, we included communities from both areas in this study; Communities One and Two are on the “Weather Coast” and Community Three is lagoonal. Religious affiliation can also impact fishing behaviours. For example, Seventh Day Adventists (SDA) only consume fish with scales (finfish) and prohibit as a matter of faith the consumption of shellfish, molluscs, crabs, sharks and rays, and sea turtles. Therefore, they harvest comparatively more finfish per capita,

Fig. 1 Map showing location of Solomon Islands, and three study communities within Marovo Lagoon

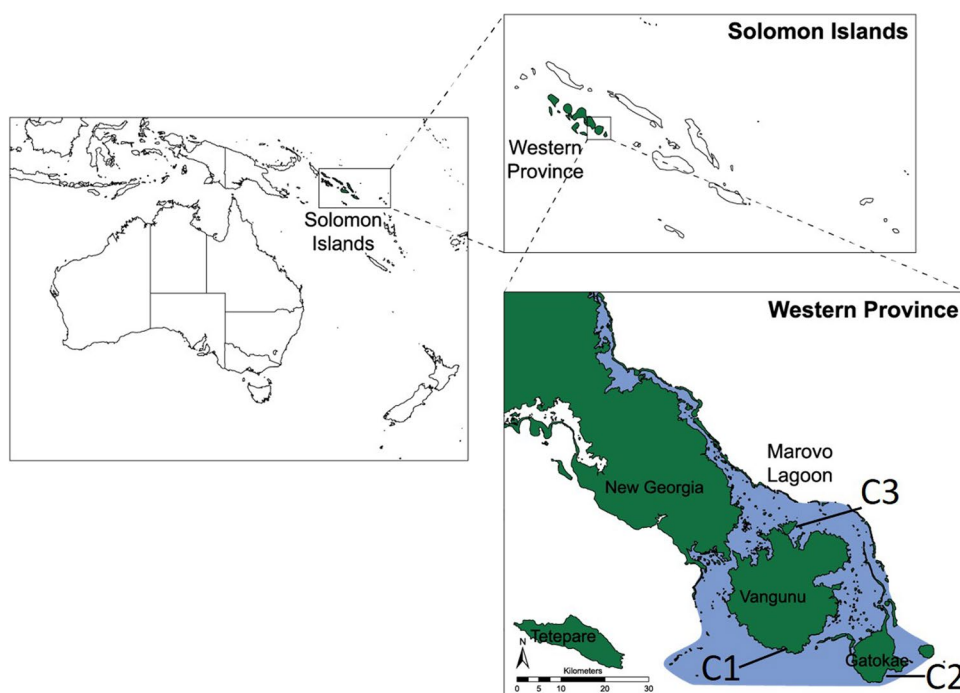


Table 1 Community characteristics

	C1 (Vangunu Island)	C2 (Gatokae Island)	C3 (Marovo Island)
Geographical setting	Weather coast	Weather coast	Lagoon
Telephone connection	No	No	Yes
Reliable maritime transport services	No	No	Yes
Religion	United Church	Seventh Day Adventist	United Church
Number of households	~20 to 30	~20 to 25	~40 to 50
Access to the community	Difficult in rough sea	Difficult in rough sea	Consistent
Access to markets	Limited	Limited	Reliable; regular trade to Honiara and provincial town markets
Community-managed area(s)	Coastal. A large stretch of beach forms a periodically harvested closure (usually opened once a year), where all harvest is prohibited from the high tide mark out past the edge of the reef when closed	Ridge-to-reef. Extractive activities prohibited from the top of the mountains through to the outer edge of the reef	Marine. Extractive activities prohibited around four small islands and surrounding reef, mangrove, and seagrass habitats. Entry requires prior permission from the chair of the conservation committee

and non-targeted species within their traditional areas of governance are relatively protected in comparison to those managed by non-SDA communities. Accordingly, we included communities that are predominantly followers of the major denominations in Marovo Lagoon, United Church and SDA, to reflect these differences; Communities One and Three are United Church while Community Two is SDA.

All communities had active conservation (CBFM) committees and ranger groups at the time of this study. In all study communities, CBFM committees were the leading body for resource management, but often met with the village chief(s), and Council of Elders, when making important decisions regarding resource use and protection. The ranger groups were separate from the CBFM committees but played an important role in the decision-making processes as they undertook the monitoring and evaluation of management, thus making them an important part of the iterative management process. Ranger groups in the study communities acted as the monitoring and enforcement arm of the CBFM committees, monitoring protected areas for poachers, undertaking surveys to gauge biomass of important species and recovery following periods of closure, and enforcing rules introduced by the committee to manage resources. Many rangers were registered with the Solomon Islands Ranger Association, though not all. All three communities have established research partnerships with the University of Queensland, and open lines of communication which facilitated research planning. Community chiefs and elders were consulted prior to commencement of the study and gave approvals.

Focus group discussion structure

Focus group discussions (FGDs) were conducted in the study communities in May 2017. Adult women over the age of 18 participated in the FGDs, and written consent was given. Two

FGDs were conducted in each community. The size of each group varied between five and thirteen women, with similar numbers between the first and second FGDs in each community. In total, there were 25 participants in Community One (C1), 12 in Community Two (C2), 11 in Community Three (C3). All women were from different households. Although work in this space is now moving towards inclusion of both men's and women's voices (Williams et al., 2002), for the present study we were specifically interested in how women viewed their own involvement in CBFM and how they would like to be involved, and therefore men were not included.

FGDs were announced within each community through church and community meetings and spread through word of mouth. Local research assistants also identified specific 'fisherwomen', who were invited directly, with at least one known 'fisherwoman' per community attending a FGD. The term 'fisherwoman' was directly used by people in the communities to refer to women that fished often (several times a week) and were usually very successful in their fishing efforts.

The primary objective of the focus groups was to gain insight into women's attitudes towards fisheries management and conservation decision-making processes within their communities, including their thoughts on how gender-inclusive current structures are. The process was semi-structured, with questions put to the groups to guide the conversation, but response formats left open to facilitate discussion. The lead researcher posed key questions to the participants in the FGDs in Pijin, which were then translated into local language (either Marovo or Vangunu) by a local research assistant. The participants discussed the topics in their local language/s, and responses were relayed to the research assistant who translated these into Pijin for the lead researcher (see Methodological Challenges for further detail). FGDs lasted between half an hour and 2 h.

We asked the participants in the FGDs about three different distinct types of engagement that were relevant to the local context, which were later used to distinguish between different scales of participation. These were:

1. The number of women in CBFM leadership positions
2. The gender ratio of CBFM committees
3. The number of women rangers.

We also asked about how CBFM structures operated in their communities, marine resources that were important to them, and gender roles and responsibilities in the household. A full list of topics addressed in the FGDs can be found in the Supplementary Information.

Participation model

Using the information from the FGDs in three communities, we adapted Bina Agarwal's participatory exclusions typology (2001), designed for a South Asian community forestry context, to suit a Melanesian CBFM context. As with Agarwal's participation typology, the model we use outlined six levels of women's participation in CBFM; however, we have modified the levels from Agarwal's typology to include a base level of 'No participation' and remove Agarwal's fourth level of 'Activity-specific' participation to suit the local context. Our model of women's participation in CBFM moves from no participation, to nominal participation, such as being a member of a group, through to interactive (empowering) participation, defined as actively participating in all aspects of the decision-making process, and holding leadership roles that increase women's influence and power in the community more broadly (Fig. 2).

The model should be broadly relevant throughout Melanesia across many different cultural contexts, though we acknowledge that specific aspects will need adaptation in different contexts, including outside of Solomon Islands. Although not seen in the communities included in this study, the model begins from a place of complete exclusion, where there is no participation of women in CBFM. This is seen in some communities, such as in parts of Malaita Province where cultural norms prevent women from even entering the buildings where decision-making occurs (Faye Siota, WorldFish, pers. comm.); see Wate (2020) for a description of ongoing gender avoidance in Malaita Province). The nominal stage of the model was also not seen in the study communities, but nonetheless we consider it an important stage. Research in Vanuatu has shown that social norms can discriminate against women and prevent them from engaging in CBFM (SPC, 2018a). Most communities are first introduced to CBFM through research institutions, non-government organisations, or government programs. Many of these programs now push for 'inclusion' of women in

CBFM (Mangubhai & Lawless, 2021), and NGO programs are considered a significant driver of gender parity, though not necessarily gender equity, in decision-making in Melanesia (Mangubhai & Lawless, 2021; Wallace, 2011). In our observations, the appointment of women to management committees is often done to tick a box on a development agenda and women do not participate in the committee beyond having their names on the membership list.

Participant responses and language used in focus group discussions were used to further contextualize the descriptions of the different levels of participation, as outlined in Fig. 2. The participation model was shared with the community-based resource management division of the Solomon Islands Ministry of Fisheries and Marine Resources (MFMR). In June 2020, the lead researcher held a meeting with the then Deputy Director of the Inshore Fisheries Division of the Ministry to present an early version of the model and discuss how it could be used by the team, including any necessary revisions to the model. This intentional step was used to improve the validity and applicability of the research findings. The model was well-received and appreciated, but it was requested that we present some suggestions of how to move communities through the model towards active or interactive participation. We consider these further in the discussion, but also recommend that existing guidelines for facilitating gender-inclusive meetings (Kleiber et al., 2019) are utilised.

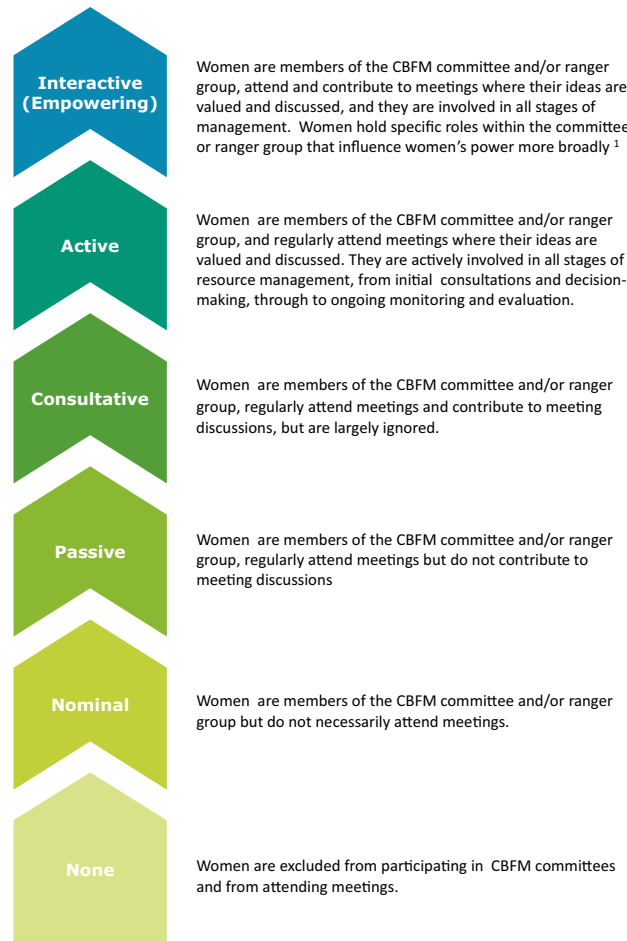
Research team

The research team for this study included all authors on this paper and three local research assistants. None of the authors are from the Solomon Islands, but senior members of the research team have had working relationships with the study communities for approximately 10 years. All fieldwork was conducted by the lead researcher, the first author on this paper, who is female. The lead researcher worked with a different research assistant in each community, and in each case the research assistants were women from the community who assisted with translation and facilitated access to households. The data included in this study were collected in a single fieldtrip in 2017, as part of a larger research project. The lead researcher spent one to two weeks in each community during this fieldtrip and had been working in these communities since 2016.

Methodological challenges

Language barriers created limitations to data collection and analysis. Previous case studies in Solomon Islands have conducted research in Pijin, the national *lingua franca* (Cohen et al., 2016). However, there were a few reasons why this was not appropriate in this case study. The communities

Fig. 2 A six-stage participation model developed to assess women’s engagement in community-based fisheries management committees (adapted from Agarwal, 2001)



¹Holding a specific role on a committee, such as treasurer or secretary, does not necessarily facilitate any greater involvement in the decision-making process than holding general committee membership. However, holding a specific role does often lead to a person being held in higher esteem within their community. Therefore, an increase in women holding specific roles within CBFM committees is likely to lead to a higher level of empowerment for women and may have broader implications for the inclusion of women in community decision-making more broadly, beyond natural resource decision-making. We note, however, that women holding positions within a committee is not in itself interactive participation. The other conditions outlined in the active and interactive participation stages must also be met for this to be seen.

included in this study are remote, and Pijin is used less frequently, particularly by many of the elderly women who only communicate in their local language(s). Furthermore, the complexity of the topics covered and the conversational nature of the focus groups meant that the ease of the participants was the highest priority. To facilitate this, there were multiple points of translation between the lead researcher (conversant in English and Pijin), and the local research assistant (conversant in Pijin and in the local language, either Marovo or Vangunu). First, the lead researcher would ask the questions in Pijin, and these were then translated for the focus group participants into local dialect by a local research assistant. The focus group discussion was in the local language and the collective response/s to each question was then summarised by the local research assistant and relayed to the lead researcher to Pijin. This summary was then

translated to English by the lead researcher and transcribed onto butcher’s paper. Following completion of the field trip, all responses were then typed electronically. Through this process of translation, we compared the responses from the three communities and grouped them into themes that were common across all communities, shared by some communities, and unique to each of the communities. These data were then used in conjunction with the baseline data collected to inform the development of the model. Owing to the complexity of translating through three languages, and the lead researcher not speaking the local dialect, we were unable to transcribe the focus groups verbatim or analyse the conversations in greater detail. The data presented here are summaries of the key points raised by the participants in the focus groups across the three communities, examined along the continuum of participation, adapted from that

outlined by Agarwal (Agarwal, 2001). We believe these data are important, as the perspectives of non-English speakers in remote communities are often missing from the literature owing to issues of translation.

Results

Participants in all FGDs expressed a desire to see a greater inclusion of women in CBFM. These sentiments were echoed by MFMR staff, who supported the model and were interested in how it could be used as a management tool for assessing how women are engaging in CBFM across different communities. The communities included within this study are best described as falling between the passive, consultative, and active stages of the model (Fig. 1). Interactive (empowering) participation was not seen in any of the communities.

We have used this model to characterize women's participation in CBFM in each of the three study communities. Finally, we report on women's management recommendations, which may have been missed in previous CBFM meetings owing to such exclusions.

Community 1—active participation

The CBFM committee in C1 consisted of 15 members, four of whom were women (27%). Of the three leadership positions within the committee, one (treasurer) was held by a woman. The community had nine male and three female rangers registered (Table 2). We note that all three leadership positions in the committee are held by members of the chiefly family, with the chief holding the position of committee chairperson.

Women attending the FGDs in this community were enthusiastic about their role(s) in resource management within the community, and stated they were included in management decision-making. To support this, participants listed a range of activities they took part in, along with men, to support community resource management. Activities listed included contributing to management efforts for marine species by undertaking monitoring of reef and sea-grass areas, turtle monitoring, and recording fish catch data (catch per unit effort). Some participants indicated they would like to be more involved in generating reports on fishery status, and actively contribute to conservation meetings. The participants stated that the community was informed about, and participated in, management with information concerning management decisions, such as changes to fishing regulations, passed on adequately and everyone involved in activities pertaining to the community's protected area.

There are several demographic and ecological factors that may combine to influence women's involvement in marine resource decision-making. These include religion, availability of coastal resources, and women's involvement in coastal resource harvest. Unlike other religions, the United Church, the dominant religion in this community (Table 2), poses no restrictions on eating marine invertebrates, so gleaning is actively undertaken by women in this community. This is further reinforced by the fact that the location of this community on the weather coast means women are largely confined to onshore and nearshore activities. There are fewer barriers to women's involvement in decision-making in this community. Unlike in some communities, women are not excluded from the decision-making process by not being resource users, though there may be other mechanisms affecting their inclusion. The interaction between religion and the fisheries that women are permitted to participate in

Table 2 Women's participation in CBFM in the three communities

	C1 (Vangunu Island)	C2 (Gatokae Island)	C3 (Marovo Island)
% of CBFM leadership roles held by women (N =total number of positions)	33.3% ($N=3$)	0% ($N=1$)	25% ($N=4$)
% total CBFM committee member positions held by women (incl. leadership roles) (N =total number of positions)	27% ($N=15$)	43% ($N=21$)	40% ($N=7.5^a$)
% of ranger roles held by women (N =total number of positions)	25% ($N=12$)	Unknown—no defined team of rangers ^b	5.9% ($N=17$)

^aFor this community, there are six committee members; however, one or two members of the Council of Elders are required to attend all committee meetings and participate in decision-making. We have included the members of the Council of Elders as committee members in our calculations as they heavily involved in the decision-making process. We used the average of 7.5 members to calculate the percentage of women on the committee

^bAt least two female rangers were identified in this community; however, as the community could not provide a list of all active rangers in the community, we were unable to calculate the percentage of female rangers for this community

is a positive interaction in this community, and support from village leaders, including traditional and religious leaders, for the inclusion of women facilitates a greater involvement of women in decision-making processes in this community.

Based on the information offered during the FGDs and the involvement of women in formal management structures, we consider women in this community to be actively participating in CBFM. Women had joined both the committee and ranger team, attended meetings on a regular basis, and were involved in the decision-making process as well as ongoing monitoring and evaluation. Although one of the leadership positions in the community was held by a woman, we do not believe the criteria for interactive participation were met. Interactive participation in CBFM would mean that women's engagement in CBFM was the catalyst for broader gender change, improving gender equity and women's empowerment in the community more broadly, beyond just CBFM issues.

During the FGDs, the women made the following recommendations for improving resource management within their community:

1. Current tabu site [periodically harvested closure] to be opened once a year only (no additional openings for Church events)
2. Ban fishing in the pool at the end of the community [an easily accessed and popular site]
3. Change permitted harvest times and species for shell harvest, as different shells are available in different numbers in different seasons
4. Shift fishing grounds each year (to allow areas to recover) (cropping rotation)
5. Implement strategies to minimise overharvest, including minimum size limits for *deo* [mangrove clams—*Polymesoda* spp.], reef fish, and *hulumu* [boring clams—*Tridacna crocea*]
6. Restrict allowed fishing gear types to those that are least destructive, for example banning of gillnets
7. Ban smaller hooks, with only sizes from #1/0 to 8/0 allowed, and use lighter lines, test #30–50 lb allowed.

Community 2—passive participation

At the time of the study, C2's CBFM committee comprised 12 men and 9 women (43% female; Table 2). No leadership positions were held by women. We were unable to obtain firm numbers of rangers in the village but were informed that there were at least two female rangers.

From the near-equal representation of men and women in the committee membership, it is tempting to assume that women's perspectives are likely to be voiced and heard in the decision-making process. However, while initial responses offered up by the women in the FGDs were that women

felt they were included in management as several women had joined the committee and ranger team, further probing indicated that decisions were made by the lead (male) rangers, and the women, “agree to conserve [close] areas for the next harvest”. This is another indicator of women's limited involvement; although there were women rangers, they were not involved in the leadership.

The interaction between religion and ecological factors combines to limit women's involvement in decision-making in this community. The dominant religion in this community is Seventh Day Adventist (SDA) (Table 2), and so the community is prohibited from consuming shellfish. Combined with the location of this community on the weather coast where wave action is strong and often unsuitable for fishing from dugout canoes, women in the community are limited to onshore or nearshore fishing (for finfish), and seaweed harvesting. Women in both FGDs agreed that although (fin) fish were the most important resource to the community at large, seaweed was the important resource to women as it was an important source of their income. Seaweed, predominantly *Caulerpa* spp., is a common food source in the region and is predominantly harvested for consumption or sale to local food markets. Seaweed harvesting is almost exclusively conducted by women in Solomon Islands (SPC, 2018b; Vunisea, 2016), and is not often given consideration in resource management plans. For this community, monitoring programs were in place for some fish populations, but there was no monitoring or active management of seaweed, despite its importance to the women. This highlights the need for gender-equitable CBFM to ensure sustainable management of all resources, not just those targeted by men.

Considering both the involvement of women in the community's formal management structures and the descriptions of engagement provided in the FGDs, women's engagement in CBFM in C2 can best be described as passive participation. Although women were on the committee and ranger team, responses indicated decisions were mostly made by men, with women consulted for support after decisions had already been made. The women in this village were reluctant to speak or offer any opinions during the FGDs, even though committee members were in attendance. Not long after the completion of this study, this village overturned its management efforts and allowed logging in its previously protected areas. It may be that CBFM was experiencing a downturn in support at the time of this study.

The women in the FGDs offered the following management measures that they would like to see implemented in their community:

1. Restrict allowed fishing gear types to those that are least destructive, for example ban gillnets
2. Ban smaller hooks, only size #1/0–8/0 allowed, and use lighter lines, only test size #30–50 lb allowed.

3. Ban harvest of small fish for bait [usually undertaken by children]
4. Control night diving [where men dive at night using snorkel gear, torches, and spears to target sleeping fish] and limit this to once a month
5. Implement strategies to minimise overharvest, including minimum size limits for reef fish

Community 3—passive and consultative participation

The CBFM committee in C3 consisted of six permanent members, with an additional one to two representatives from the Council of Elders (not fixed) taking part in committee meetings. Three of the six committee members were female, and the representatives of the Council of Elders were always male (40% female representation in committee meetings). Of the four leadership positions within the committee, only the vice chairperson was a woman. Eighteen rangers were registered, only one of whom was a woman (Table 2).

During the FGDs, participants said that they did not feel their voices were being heard by current management processes, with all indicating they would like to be more involved but felt there was little opportunity to do so. One woman noted that she would, “prefer to join the rangers [over the committee]... I wasn’t here. It started before I came back [or I would have joined]”. Another noted that, “everyone [here] would like to join fisheries management... looking forward to future generations, people [here] are increasing so it is a good idea to look after our sea resources”.

Discussing their experiences with management structures in their community, the participants stated that there had not been enough awareness and education about management decisions. Discussions touched on the community’s tabu site, with participants indicating they did not feel they had been adequately consulted in the decision to close this area to harvesting. In relation to the decision to create the tabu site, one woman stated, “[there are] only conversations in the kitchen or talking in the kitchen, [that is how] people know about this [tabu site]. But not the whole community too... [just] sit down underneath the tree and talk only... men understand because they join the business types”. During the second focus group, attended mostly by younger women, one woman stated that she had attended an awareness meeting held about the tabu site (facilitated by an NGO), but not many people had attended. Other women stated they had fished in the tabu site since its closure, as they did not understand its purpose, and were not satisfied with the limited consultation during its inception. Participants indicated that the decision to close the area had been made by the Council of Elders and CBFM committee, with limited community consultation. The tabu site was located close to the community; as women are usually responsible for household duties, including child rearing

and cooking, they often focus their fishing efforts closer to shore than men (Kleiber et al., 2014, 2015). The participants stated that women fished more often than men in their community, and owing to the location of this tabu site, it is likely that its implementation affected women more than men.

Although the women in this community expressed their dissatisfaction with the location of the tabu site, they also expressed their desire to increase protection for the site (see below). Whilst the women in our FGDs were unhappy with the consultation process for the establishment of the site, they also understood the need for a tabu site to safeguard fish populations and were aware that the location of the tabu site would not be changed. They were therefore interested in increasing protection for the tabu site, to maintain fish stocks for future generations.

The interaction between ecological factors, including availability of coastal resources, and demographic factors, primarily religion, should provide increased opportunity for women’s involvement in this community. The dominant religion is United Church (Table 1), and thus, unlike SDA communities, this community was not limited by their faith in the range of marine resources they could eat. The geographic location of the community within a lagoonal area where conditions are generally favourable for fishing from dugout canoes, with easy access to mangrove, reef, and sandy bottom lagoonal habitats, likely contributes to an increased visibility of women’s participation in fisheries harvest in this community. Women in this community glean and fish extensively in the surrounding areas and are a large resource-user group.

Despite their high participation in marine resource harvest within this community, the narrative provided during the FGDs combined with the committee and ranger team profiles indicates that women’s participation in CBFM in this community is best described as a mix of passive and consultative participation. Although women are on the committee, they rarely contribute their perspectives to decision-making, and the perspectives and needs of women in the community more broadly have not been adequately considered in decision-making processes, leading to the implementation of management decisions that have likely impacted women more than men, such as the location of the current tabu site.

A number of management measures were offered by the women in the FGDs that they would like implemented in their community. Most women suggested various forms of harvest and gear restrictions, with discussions highlighting that women were concerned about the current state of resources. One woman said, “When I was a small girl... [there were] lots of fish at this island here. You throw your line, you will catch a big fish. This time, no. Now, too many people and [we are] overharvesting so it’s not the case”. The suggestions are summarised below:

1. Implement strategies to minimise overharvest, including minimum size limits for *deo* [mangrove clams—*Polyymesoda* spp.], reef fish, and *hulumu* [boring clams—*Tridacna crocea*]
2. Control night diving [where men dive at night using snorkel gear, torches, and spears to target sleeping fish] and limit this to once a month
3. Female rangers on separate shifts to male rangers, checking the tabu site at night for poachers. Male rangers checking day and night*
4. No engine [outboard motors] in the tabu site—no oil to enter the site
5. Increase the number of female rangers
6. Check the tabu site regularly for illegal poachers
7. Increase community awareness and education about conservation and management decisions

*Women are generally unavailable during the day owing to their domestic responsibilities but expressed a desire to be involved in monitoring the tabu site. Working a ‘night shift’ monitoring the tabu site was suggested by the women as a way of facilitating their greater participation in management.

Discussion

Sustainable resource use cannot be achieved without the inclusion of all resource users in management decisions and planning. This is particularly true for small-scale fisheries, owing to strong traditionally ascribed gender roles within many coastal communities and fisheries value chains (Barclay et al., 2018; Kleiber et al., 2015; Kruijssen et al., 2013; Pollard, 2000; Rohe et al., 2018). As well as issues of equity and fairness in management, women use different spaces in coastal and marine environments than men (De la Torre-Castro et al., 2017), and engage with different parts of the value chain, such as processing and marketing (Harper et al., 2013). Thus, exclusion of women from marine resource management leads to an incomplete picture of the spatial distribution of fishing activities, and a lack of consideration of sectors which tend to be female-dominated, such as processing and marketing (Harper et al., 2020).

In a case study of three communities in Solomon Islands, we found that women were involved, in different ways, with CBFM, but that there was desire, and room for improvement. We discuss below women’s participation in the two decision-making mechanisms pertinent to this study, participation in CBFM committees and holding leadership roles, as well as their participation in ranger groups, and the implications of our findings for work on gender in the CBFM space in Melanesia. We provide some recommendations for fisheries practitioners intending to use our model to assess women’s participation in CBFM.

Leadership roles

Few women held leadership positions in CBFM committees in the communities included in this study. This is consistent with findings of other studies, which point to cultural norms (*kastom*) as a barrier to women’s leadership in Solomon Islands, and in the Pacific more broadly. There is a strong ‘culture of silence’ in fisheries management in Melanesia, which discourages women from speaking out in management settings (Vunisea, 2008). Studies of how female political leaders are perceived in Solomon Islands highlights another barrier, with many men indicating that women should remain firmly in the domestic sphere rather than engage in politics if they want to be respected (Batalibasi et al., 2019). Other research highlights that female political candidates are treated more harshly than their male counterparts, with similar views held by both women and men (Wiltshire et al., 2019). These attitudes likely apply beyond politics to other forms of leadership as well. Cultural norms in many parts of Solomon Islands dictate that in a group setting, men will lead discussion and women should only speak when spoken to (Dyer, 2018), making it challenging for women to rise to and maintain leadership positions. Although not specifically mentioned by participants in this study, other research has indicated that women prefer women-only spaces (Lawless et al., 2017), or clear establishment that the meeting space is a ‘women’s meeting space’ (Dyer, 2018). Creating women-only spaces that are equal to men-only spaces, and then bringing these two sets of ideas together with equal value can assist in increasing women’s voices in the decision-making space. In Rwanda, gender quotas were an effective mechanism for increasing the number of women in politics, but the interaction between gender and ethnicity had significant implications for power relations (Guariso et al., 2018), while a recent review paper found the use of quotas in decision-making processes was unlikely to produce gender-equitable outcomes in isolation (Lau et al., 2021). There is no single model that will work in every community to guarantee women’s full and equal participation, hence the need to work closely with local communities.

Committee participation

Many women in this study felt that resource management was the domain of rangers and CBFM committee members and not something in which they could participate, suggesting that women felt these formal structures were created for men. Women stated that although they could join the committee or rangers (and indeed some women had), they did not really feel they could (actively) participate. This suggests that women feel the CBFM

committees and ranger groups are not very welcoming for women, and that they do not feel that there is a way to take part in resource management without being in these committees, indicating a lack of consultation with women in the broader community in decision-making. It is possible that the limited numbers of women on CBFM committees have led to less opportunity for facilitating a space for women in the broader community to voice their opinions. Increasing the number of women on committees is necessary to create a platform for championing all women's voices in management discussions. However, from our results, we do not believe setting quotas would be a useful measure as the intersectionality of factors other than a person's sex, and local contextual factors, play a greater role in determining how women's voices are included. If quotas were to be used, careful consideration of the barriers to meaningful participation should be considered, as well as how equitable distribution of benefits is defined (Lau et al., 2021).

While it remains important to increase the numbers of women on committees, fishery managers should work towards improving women's meaningful engagement on CBFM committees, beyond just targeting gender parity in committee membership. Women's voices need to be heard, and their ideas valued and debated equally without their communities to see fisheries resources managed in a way that is fair and equitable for all community members. This will necessitate challenging the underlying gender norms that see women's voices marginalised in management discourse, through the use of gender-transformative approaches. Such approaches remain uncommon, but practical guidelines on their implementation for aquatic agricultural systems exist (Promundo—US & CGIAR, 2016), and there are some examples of their successful application (Cole et al., 2015). Specific guidelines for employing more gender-inclusive approaches to CBFM in the Pacific have also been developed (Barclay et al., 2019; Kleiber et al., 2019), and training has been developed for some regional organisations on how to employ them (Makhoul & Morris, 2019; Makhoul, 2020).

Gender parity

From our results, we find that gender parity, that is equal representation of women and men on a committee, is not a reliable indicator of gender equity. This has important ramifications for how government and non-government organisations deal with gender in CBFM in Solomon Islands, as gender parity is widely used as a marker for gender equity, with recent research finding most gendered approaches to fisheries management in Solomon Islands only aim to reach women, with increasing the number of women attending meetings and sitting on committees a

common goal (Mangubhai & Lawless, 2021). This form of 'participation' has been criticised for the tendency to view women as objects, and their attendance a form of box-ticking exercise to increase legitimacy (Cornwall, 2003).

Although some work has suggested that there is a "critical mass" of women required to see increased participation of women (Agarwal, 2010; Leisher et al., 2018), our findings contradict this. One study proposed a "critical mass" of women holding 25–33% of CBFM committee memberships would lead to their increased participation (Leisher et al., 2018), while another found a gender quota of 50% women led to more equitable sharing of conservation benefits (Cook et al., 2019). However, our results show that even when these gender quotas are met, it does not necessarily lead to increased participation of women. Near-equal representation of women and men was seen within the committee in Community 2, but this community only saw women passively participating in management. In contrast, women held just over a quarter of all committee membership within Community 1 but were actively participating in management. The proposed "critical mass" thus seems somewhat arbitrary, with cultural norms that dictate how women should act and engage in decision-making, combined with the intersection of gender and age, marital status, links to chiefly families and many other factors driving how women are able to engage in CBFM. Another research in Solomon Islands has also challenged the "critical mass" notion, showing that cultural norms and power relations drive how women are able to engage in decision-making processes such that even in instances where women dominate meeting attendance, they do not actively participate in discussion in mixed-gender meetings, though have robust discussions in women-only meetings (Dyer, 2018).

The complexities of gendered interactions are hidden by simply recording gender parity within committees, as noted above. Although some research has found that compliance and enforcement of regulations tends to be higher and access to resources more equitable in communities where management groups have increased gender parity (Leisher et al., 2018), it is important to note that looking only at gender parity obscures the impact of other interacting factors. The intersectionality of other factors likely plays an important role; in Community 1 in this study, two of the four women on the committee were members of the chiefly family, including the only woman in the committee leadership (though we note that all three committee leadership roles were held by members of the chiefly family). As marine resources are under customary tenure with chiefs acting as custodians for these resources (Hviding, 1998), relatives of the chief, including women, are afforded a higher social status and may therefore be more likely to have the opportunity to engage in the

management of these resources. However, caution must be exercised not to assume that women of higher social status necessarily represent the views of all women; including only ‘elite’ women can widen the equity gap and further marginalise less well-off women, and men (Cornwall, 2003; Resurreccion, 2008). It is important to note, though, that many studies have shown that the best-maintained ecosystems are generally under strong customary marine tenure, and this includes strong respect within the community for traditional leaders (Costello et al., 2016; Herrera et al., 2016; Walter & Hamilton, 2014; Warren-Rhodes et al., 2011; Weeks & Jupiter, 2013). For this study, we also note that those communities which saw lower levels of engagement in marine resource management were those that had the greatest divisions within the community, and the weakest governance, particularly Community 2.

Implications of limited consultation

Many of the women who took part in this study felt that their voices were not being heard, and that fisheries management structures in their communities did not include them, a trend common across Melanesia (Bennett et al., 2014; Kruijssen et al., 2013; Macintyre, 2008). In Solomon Islands, as throughout most of the Pacific, decisions are generally reached through communal consensus, but not all opinions within the community are valued equally, with women and youth voices often absent or undervalued (Vunisea, 2008). Fewer women than men attending meetings regarding marine management, and voicing less opinions within those meetings, has been documented in Polynesia (Walker & Robinson, 2009) and Solomon Islands (SPC, 2018b; Lawless & Teioli, 2015). This ‘culture of silence’ (Vunisea, 2008) is a significant barrier to women’s effective engagement in management.

During the focus groups in Community 3, some women stated that they had fished in the community’s tabu site since its closure. Women were dissatisfied with the limited consultation during the inception of the tabu site, leading to a feeling of exclusion and some confusion around the purpose of the site and reasons for its closure to all harvest, which drove their non-compliance. A previous study in neighbouring Roviana Lagoon (Rohe et al., 2018) found a similar management failure where women (and some men) continued fishing in a protected (tabu) site after its designation. The site had been an important fishing ground for women, and this lack of compliance was attributed to a lack of consultation and distrust of managers. Other studies (Ogden, 2017; Westerman & Benbow, 2013) have also reported on the greater impacts on women of protected areas, highlighting a common issue of protected areas being established in fishing grounds that are easily

accessible and important to women, stemming from inadequate consideration of women’s fishing and needs. Restricting women’s access to fishing grounds can have flow-on effects for household food security and nutrition (Vunisea, 2008), as women primarily fish to feed their families (Kronen & Vunisea, 2009). Changes in women’s access to fishing grounds can therefore impact the type and quantity of fish that women are able to provide for their families.

Local context

The women in our focus groups all noted they would like to see increased implementation of management actions to improve resource management, and a greater community resolve to work together towards improved management. Management suggestions were broadly similar across the communities, with fish size and catch limits mentioned in all communities, but many responses were community-specific, relating to the unique set of challenges each faced. This highlights that although there are many similarities in the way communities may manage their resources, it is imperative to consult each community and understand their specific concerns and needs for management actions to be effective. In addition, community-specific gender considerations should also be considered including the impact that demographic factors, such as religion, and ecological factors, such as access to coastal resources, can have on creating barriers to women’s involvement in marine resource management. This is an excellent argument for the inclusion and engagement of all resource users in the decision-making process from conception to develop resource management plans that are locally appropriate and balance trade-offs between human need and conservation, or ecosystem function (Bozec et al., 2016). Our study highlighted the impact that demographic and ecological factors can have on how women engage with fisheries, and therefore with CBFM. Communities 1 and 2, both located on the weather coast, saw generally less favourable conditions for fishing from dugout canoes, which are commonly used by women when fishing, and access to fewer habitats. In comparison, Community 3, located within the calm lagoonal system had more favourable conditions for fishing from dugout canoes and access to a greater variety of habitats, leading to increased women’s fishing in this community. Religion was also seen to have an impact, as those communities that are predominantly Seventh Day Adventist are prevented from harvesting shellfish, an activity generally dominated by women. In these communities, such as in Community 2, women will engage differently with fisheries and may be more heavily involved in the harvest of finfish or may be less involved in fishing overall. How women engage with the fisheries value

chain will impact how they engage in CBFM and changes the value they place on different habitats and species, such that women's priorities and aspirations for management will differ between even closely located communities. This highlights the importance of meeting with local communities to understand the local context, including barriers to women's inclusion in CBFM.

Ranger groups

Ranger groups in the three communities had even fewer female members than the CBFM committees. As the remit of rangers is more time-intensive, dealing primarily with monitoring and compliance with management decisions, the low numbers of women rangers may reflect women's higher domestic workload impacting their ability to take part in these more time-intensive activities. The interplay between gender and other factors such as age, religion, and inequitable distribution of reproductive work impacts upon women's ability to participate in meetings and discussions (Albert & Bogard, 2015; Bennett et al., 2014; Vunisea, 2008), such that merely extending an invitation to women to participate is not enough (Lawless et al., 2017). This may also reflect gender norms around what is and is not appropriate work for women—even within fisheries organisations in Solomon Islands, female staff have reported being told that activities such as enforcement and diving were “men's work” owing to the physicality of the work (reported in Mangubhai & Lawless, 2021), reflecting the dominance of patriarchal attitudes in Solomon Islands society. The role of NGOs working in these communities often further reinforces these problematic attitudes. There is a large push for NGOs to work within local traditional management structures, and to some extent this is understandable, but this does little to push against gender norms that continue to exclude women. The lead researcher notes that during her time working in these communities, a number of NGOs were active in assisting the communities to manage their marine resources. As an example, there were several observations of NGOs training local community members to monitor their reefs, but only men and male youth took part in the monitoring activities.

In Community 3, women indicated that they would like to see more female rangers in their community and specifically mentioned posting female rangers on separate monitoring shifts of their tabu site to men, with women monitoring during the night, and men monitoring both day and night. Women tend to be unavailable during the day owing to their domestic and reproductive responsibilities, but still want to be involved in CBFM and having women rangers work night shifts to monitor a protected area is one way to increase women's involvement. This is an example of a gender accommodation framework, working within gender norms to find ways to allow women to participate as fully as possible.

Utility of the model and recommendations for fisheries practitioners

We believe the process of determining where a community sits on this model is a useful tool for assessing gender equity within CBFM processes in Solomon Islands, and in other Melanesian contexts, and can assist fisheries practitioners, and government agencies in particular, to move beyond using gender parity as a measure of gender equity. The model would be best deployed in tandem with existing recommendations on how to best mainstream gender in fisheries in Melanesia (SPC, 2018a,b), and guidelines on how to facilitate gender-inclusive meetings in CBFM (Kleiber et al., 2019). Although we believe the model provides a useful scaffolding to consider gender-inclusive approaches to CBFM, the real utility of the model is in the process users must go through to determine where a community fits within the model. Fisheries practitioners, particularly in government agencies, must develop a deeper understanding of gender, beyond being able to facilitate greater inclusion of women in CBFM. Gender inclusivity needs to be considered within these agencies themselves, to improve gender inclusivity and attitudes internally, as noted by Mangubhai and Lawless (2021). We hope that the undertaking the process we have outlined in the present study to improve gender inclusivity within CBFM may prompt broader reflection on gender inclusivity within agencies themselves.

The process of determining where a community lies along the continuum of participation we outline in our model necessitates that external actors working in the community meet with women to discuss their needs, priorities, concerns, and aspirations for their engagement in CBFM within their communities. From these conversations, data can be gathered on how women are currently engaged in CBFM, where the gaps lie, what their aspirations for change are, and what they perceive the barriers to greater engagement to be. Practitioners should be looking to collect a suite of data, including community profiles, monitoring trip reports, and focus group discussions, that when assessed together will paint a picture of women's engagement in CBFM within a given community.

Community profiles will provide baseline data at a community scale such as: the gender ratio of (1) the CBFM committee, (2) leadership positions with the CBFM committee, and (3) rangers (in communities that have active ranger groups working in enforcement of and compliance with management). Other important information that can be included in these reports include site geography and dominant religion in the community, as these often affect how women engage with fisheries, as we have demonstrated above. These indicators of women's participation and inclusion are not universally applicable; however, they include things already being collected by many agencies. Trip reports can be used to record meeting

specific information such as the number of women present in CBFM meetings and the number of times women speak in the meetings. These data are already being incorporated into field trip reports in this study system, for example the field trip reports developed for WorldFish Center (Gomese et al., 2020). These reports were developed to provide consistent data for monitoring and evaluation. For more in depth understanding of the women's participation in a specific community CBFM process, focus group discussion with women-only should be held. Ideally these focus groups would comprise a mix of women who are on the CBFM committee and women who are not, asking questions designed to understand how women are included in CBFM, how they would like to participate more, and what they perceive are barriers to increased participation and inclusion. Conducting focus groups or interviews with individual women is necessary to undertake a deeper assessment of their feelings of inclusion.

It is important that practitioners record the language and tone used in these discussions, which can be used in conjunction with the baseline data to interpret women's engagement. For example, if women share that they feel included in CBFM, but later indicate that it is men who make the decisions and women simply agree with those decisions, this indicates a very low level of participation by women, even if there is gender parity on the committee. We believe the use of the model we present here by state and non-state actors across Melanesia will strengthen practitioners' engagement with gender in CBFM and promote gender-equitable management practices.

Conclusion

In many cases, the failure of management actions can be attributed to a failure to involve all stakeholders in the decision-making process, leading to ill-fitting management plans. By not actively seeking to engage women in all stages of decision-making, a key group of resource users with important skills and knowledge is being left out of fisheries management.

As many marine resources in the Pacific are under customary marine tenure, community-based resource management continues to be an important part of maintaining and sustaining marine resources. However, given the gendered differences in the way women and men engage in resource management (Kleiber et al., 2014, 2015; Kruijssen et al., 2013; Lawless et al., 2017; Rohe et al., 2018; Vunisea, 2008), and the positive outcomes seen when women and men are jointly engaged in management (Leisher et al., 2018), it is imperative that women are equally involved if management is to be successful in securing the sustainability of resources into the future.

We recommend all organisations working with communities on CBFM take the time to understand how the many facets of gender and associated power relations impact on how men and women can engage with management at the local level, and

employ gender-inclusive approaches to CBFM that are aimed at addressing some of the underlying gender norms that prevent women from engaging fully in CBFM. This paper is an example of the process of assessing women's engagement. While the model provides a useful assessment metric, it is the process of collecting data to make the assessment that provides value, because that process includes listening to women, and understanding their roles in management, and their priorities and aspirations for themselves and their communities. We intend to work with the Ministry of Fisheries and Marine Resources to develop guidelines for the specific study system in this paper, noting that there is no "one size fits all" approach to increasing women's participation and inclusion in CBFM.

Acknowledgements The authors wish to acknowledge the members of the three study communities for their participation in this study, and for welcoming the lead researcher into their communities. We thank the research assistants involved, Jully Belavaqara, Melissa Alwin, and Betsy Kivo, for their time and patience in assisting with this research. We also thank Danika Kleiber for reviewing several drafts of this paper and for her assistance in elucidating the different levels of the model, and Robyn James for providing her thoughts on a draft of this paper, and its potential utility in the Solomons context. We wish to thank staff at the Solomon Islands Ministry of Fisheries and Marine Resources for their sharing their expertise and feedback in refining the model presented within this paper. Finally, we would like to thank the two anonymous reviewers for their comments, which have greatly improved the paper.

Funding Open Access funding enabled and organized by CAUL and its Member Institutions This study was funded by The University of Queensland.

Data availability De-identified data can be made available on request.

Declarations

Ethics approval Ethics approval for this study was granted through the School of Social Science Human Ethics Committee at The University of Queensland.

Consent to participate Written consent was granted by all participants in this study.

Consent for publication All participants in the study consented to de-identified data being published as part of this study.

Conflict of interest The authors declare no competing interests.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Agarwal, B. 2001. Participatory exclusions, community forestry, and gender: An analysis for South Asia and a conceptual framework. *World Development* 29 (10): 1623–1648.
- Agarwal, B. 2010. Does women's proportional strength affect their participation? Governing local forests in South Asia. *World Development* 38: 98–112. <https://doi.org/10.1016/j.worlddev.2009.04.001>.
- Agassi, A. S. (2005). Fishing in rural Solomon Islands. In I. Novaczek, J. Mitchell, & J. Veitayaki (Eds), *Pacific Voices. Equity and Sustainability in Pacific Island Fisheries*. Suva, Fiji: Institute of Pacific Studies, University of the South Pacific.
- Albert, S., S. Aswani, P.L. Fisher, and J. Albert. 2015. Keeping food on the table: Human responses and changing coastal fisheries in Solomon Islands. *PLoS ONE* 10 (7): e0130800. <https://doi.org/10.1371/journal.pone.0130800>.
- Albert, J., & Bogard, J. (2015). Planning a nutrition-sensitive approach to aquatic agricultural systems research in Solomon Islands. *Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems. Program Brief: AAS-2015–15*.
- Amos, M. 2014. Growing and empowering women in fisheries work in the Pacific region. *SPC Women in Fisheries Information Bulletin* 25: 3–5.
- Asher, K., and A. Shattuck. 2017. Forests and food security: What's gender got to do with it? *Social Sciences* 6 (1): 34.
- Barclay, K., M. Voyer, N. Mazur, A.M. Payne, S. Mauli, J. Kinch, and G. Smith. 2017. The importance of qualitative social research for effective fisheries management. *Fisheries Research* 186 (2): 426–438. <https://doi.org/10.1016/j.fishres.2016.08.007>.
- Barclay, K., N. McClean, S. Foale, R. Sulu, and S. Lawless. 2018. Lagoon livelihoods: Gender and shell money in Langalanga. *Solomon Islands. Maritime Studies* 17 (2): 199–211.
- Barclay, K., N. McClean, D.S. Adhuri, R. Sulu, and M. Fabinyi. 2020. Gender in tuna value chains: Case studies from Indonesia and Solomon Islands. *SPC Women in Fisheries Information Bulletin* 31: 4–14.
- Barclay, K., Leduc, B., Mangubhai, S., & Donato-Hunt, C. (2019). *Pacific handbook for gender equity and social inclusion in coastal fisheries and aquaculture*. In: Nouméa, New Caledonia: Pacific Community.
- Batalibasi, C., Bero, L., Boso, P., Kingmele, A., Maetala, R., Makini, D., . . . Walker, G. (2019). *Public perceptions of women as political leaders: views on women's leadership and temporary special measures in Solomon Islands*. Available at: <https://iwda.org.au/assets/files/Public-Perceptions-of-Women-as-Leaders-in-Solomon-Islands.pdf>
- Bennett, N.J. 2019. Marine social science for the peopled seas. *Coastal Management* 47 (2): 244–252.
- Bennett, G., Cohen, P., Schwarz, A.M., Albert, J., Lawless, S., Paul, C., Hilly, Z. (2014). *Solomon Islands: Western Province situation analysis*. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2014–15.
- Bozec, Y.-M., S. O'Farrell, J.H. Bruggemann, B.E. Luckhurst, and P.J. Mumby. 2016. Tradeoffs between fisheries harvest and the resilience of coral reefs. *Proceedings of the National Academy of Sciences* 113 (16): 4536–4541.
- Bradford, K., and R.E. Katikiro. 2019. Fighting the tides: A review of gender and fisheries in Tanzania. *Fisheries Research* 216: 79–88.
- Chapman, M.D. 1987. Women's fishing in Oceania. *Human Ecology* 15 (3): 267–288.
- Cohen, P.J., S. Lawless, M. Dyer, M. Morgan, E. Saeni, H. Teioli, and P.J.A. Kantor. 2016. Understanding adaptive capacity and capacity to innovate in social–ecological systems: Applying a gender lens. *Ambio* 45 (3): 309–321.
- Cole, S. M., Kantor, P., Sarapura, S., & Rajaratnam, S. (2015). *Gender-transformative approaches to address inequalities in food, nutrition and economic outcomes in aquatic agricultural systems*: WorldFish.
- Cook, N.J., T. Grillos, and K.P. Andersson. 2019. Gender quotas increase the equality and effectiveness of climate policy interventions. *Nature Climate Change* 9 (4): 330–334. <https://doi.org/10.1038/s41558-019-0438-4>.
- Cornwall, A. 2003. Whose voices? Whose choices? Reflections on gender and participatory development. *World Development* 31 (8): 1325–1342. [https://doi.org/10.1016/s0305-750x\(03\)00086-x](https://doi.org/10.1016/s0305-750x(03)00086-x).
- Corrin, J. 2008. Ples Bilong Mere*: Law, gender and peace-building in Solomon Islands. *Feminist Legal Studies* 16 (2): 169–194.
- Costello, C., D. Ovando, T. Clavelle, C.K. Strauss, R. Hilborn, M.C. Melnychuk, and A. Leland. 2016. Global fishery prospects under contrasting management regimes. *Proceedings of the National Academy of Sciences* 113 (18): 5125–5129. <https://doi.org/10.1073/pnas.1520420113>.
- Coulthard, S., D. Johnson, and J.A. McGregor. 2011. Poverty, sustainability and human wellbeing: A social wellbeing approach to the global fisheries crisis. *Global Environmental Change* 21 (2): 453–463.
- De la Torre-Castro, M., S. Fröcklin, S. Börjesson, J. Okupnik, and N.S. Jiddawi. 2017. Gender analysis for better coastal management—increasing our understanding of social-ecological seascapes. *Marine Policy* 83: 62–74.
- Duke, N.C., J. Udy, S. Albert, M. Love, A. Ross, I. Tibbetts, and P. Dart. 2007. *Conserving the marine biodiversity of Marovo Lagoon: Development of environmental management initiatives that will conserve the marine biodiversity and productivity of Marovo Lagoon*. Solomon Islands: The University of Queensland.
- Dyer, M. 2017. Growing down like a banana: Solomon Islands village women changing gender norms. *The Asia Pacific Journal of Anthropology* 18 (3): 193–210.
- Dyer, M. (2018). Transforming communicative spaces: the rhythm of gender in meetings in rural Solomon Islands. *Ecology and Society*, 23(1). <https://doi.org/10.5751/ES-09866-230117>
- Fabinyi, M., S. Foale, and M. Macintyre. 2013. Managing inequality or managing stocks? An ethnographic perspective on the governance of small-scale fisheries. *Fish and Fisheries* 16: 471–485. <https://doi.org/10.1111/faf.12069>.
- Fajber, L., and R. Vernooy. 2006. From voice to choice: Lessons from a regional capacity development initiative to strengthen social and gender analysis in participatory natural resource management research. *International Journal of Agricultural Sustainability* 4 (2): 143–153.
- FAO. (2003). *The ecosystem approach to fisheries FAO Technical Guidelines for Responsible Fisheries*. No. 4, Suppl. 2. Rome, FAO. 2003. 112p.
- FAO. (2015). *Voluntary guidelines for securing sustainable small-scale fisheries in the context of food security and poverty eradication*. <http://www.fao.org/3/i8347en/i8347EN.pdf>. Accessed 9 Sept 2016
- FAO. (2017) *Towards gender-equitable small-scale fisheries governance and development – a handbook*. In support of the implementation of the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication, by Nilanjana Biswas. Rome, Italy.
- Farnworth, C. R., & Jiggins, J. (2003). *Participatory plant breeding and gender analysis*. Participatory Plant Breeding Monograph No. 4. Cali, Colombia: CGIAR Systemwide Program on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation.
- Foale, S., P. Cohen, S. Januchowski-Hartley, A. Wenger, and M. Macintyre. 2010. Tenure and taboos: Origins and implications for fisheries in the Pacific. *Fish and Fisheries* 12: 357–369.

- Gomese, C., Siota, F., Ride, A., & Kleiber, D. (2020). Reflections on integrating gender-sensitive facilitation techniques in fieldtrip reports. *SPC Women in Fisheries Bulletin*, 32 (28–30).
- Govan, H. (2015). Area-based management tools for coastal resources in Fiji, Kiribati, Solomon Islands, Tonga and Vanuatu. *Marine and Coastal Biodiversity Management in Pacific Island Countries (MACBIO) project, Suva, Fiji*, 2.
- Guariso, A., B. Ingelaere, M.J.D. Verpoorten, and Change. 2018. When ethnicity beats gender: Quotas and political representation in Rwanda and Burundi. *Development and Change* 49 (6): 1361–1391.
- Harper, S., D. Zeller, M. Hauzer, D. Pauly, and U.R. Sumaila. 2013. Women and fisheries: Contribution to food security and local economies. *Marine Policy* 39: 56–63. <https://doi.org/10.1016/j.marpol.2012.10.018>.
- Harper, S., M. Adshade, V.W. Lam, D. Pauly, and U.R. Sumaila. 2020. Valuing invisible catches: Estimating the global contribution by women to small-scale marine capture fisheries production. *PLoS ONE* 15 (3): e0228912.
- Herrera, G.E., H.V. Moeller, and M.G. Neubert. 2016. High-seas fish wars generate marine reserves. *Proceedings of the National Academy of Sciences* 113 (14): 3767–3772. <https://doi.org/10.1073/pnas.1518509113>.
- Hilly, Z., A.-M. Schwarz, and D. Boso. 2012. Strengthening the role of women in community-based marine resource management: Lessons learned from community workshops. *SPC Women in Fisheries Information Bulletin* 22: 29–35.
- Homan, S., T. Honda, L. Leung, E. Fulu, and J. Fisher. 2019. *Transforming harmful gender norms in Solomon Islands: A study of the Oxfam Safe Families Program*, 2019. The Equality Institute: Monash University, and Oxfam Australia, Melbourne, October.
- Hviding, E. 1998. Contextual flexibility. *Ocean & Coastal Management* 40 (2–3): 253–269. [https://doi.org/10.1016/s0964-5691\(98\)00042-8](https://doi.org/10.1016/s0964-5691(98)00042-8).
- Hviding, E. (2005). *Reef and rainforest: an environmental encyclopedia of Marovo Lagoon, Solomon Islands / Kiladi oro vivineidira tingitonga pa idere oro pa goana pa Marovo. Knowledges of Nature 1*. UNESCO: Paris. 252 pp. (revised and expanded second edition of a book originally published in 1995)
- Kleiber, D., L.M. Harris, and A.C. Vincent. 2014. Improving fisheries estimates by including women's catch in the Central Philippines. *Canadian Journal of Fisheries and Aquatic Sciences* 71 (5): 656–664.
- Kleiber, D., L.M. Harris, and A.C. Vincent. 2015. Gender and small-scale fisheries: A case for counting women and beyond. *Fish and Fisheries* 16 (4): 547–562.
- Kleiber, D., Harris, L. M., & Vincent, A. C. (2018). Gender and marine protected areas: a case study of Danajon Bank, Philippines. *Maritime Studies*. <https://doi.org/10.1007/s40152-018-0107-7>
- Kleiber, D., Cohen, P.J., Teioli H., Siota F., Delisle A., Lawless S., ... McDougall, C. (2019). *Gender-inclusive facilitation for community-based marine resource management. An addendum to "Community-based marine resource management in Solomon Islands: A facilitators guide" and other guides for CBRM*. Penang, Malaysia: CGIAR Research Program on Fish Agri-Food Systems. Program Brief: FISH-2019–08.
- Kronen, M., and A. Vunisea. 2009. Fishing impact and food security—gender differences in finfisheries across Pacific Island countries and cultural groups. *SPC Women in Fisheries Information Bulletin* 19: 3–10.
- Kruijssen, F., Albert, J., Morgan, M., Boso, D., Siota, F., Sibiti, S., & Schwarz, A. (2013). *Livelihoods, markets, and gender roles in Solomon Islands: case studies from Western and Isabel Provinces*. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia. Project Report: AAS-2013–22.
- Krushelnytska, O. (2015). *Toward gender-equitable fisheries management in Solomon Islands (English)*. Washington D.C.: World Bank Group. Available at: <http://documents.worldbank.org/curated/en/467721468187800125/Toward-gender-equitable-fisheries-management-in-Solomon-Islands>. Accessed 27 Feb 2019
- Lambeth, L., B. Hanchard, H. Aslin, L. Fay-Sauni, P. Tuara, K.D. Rochers, and A. Vunisea. 2014. An overview of the involvement of women in fisheries activities in Oceania. *SPC Women in Fisheries Information Bulletin* 25: 21–33.
- Lambeth, L., Hanchard, B., Aslin, H., Fay-Sauni, L., Tuara, P., Rochers, K., & Vunisea, A. (2002). *An overview of the involvement of women in fisheries activities in Oceania*. Paper presented at the Global Symposium on Women in Fisheries. Penang, Malaysia: ICLARM – The WorldFish Center.
- Lau, J.D., D. Kleiber, S. Lawless, and P.J. Cohen. 2021. Gender equality in climate policy and practice hindered by assumptions. *Nature Climate Change* 11 (3): 186–192. <https://doi.org/10.1038/s41558-021-00999-7>.
- Lawless, S., P. Cohen, C. McDougall, G. Orirana, F. Siota, and K. Doyle. 2019. Gender norms and relations: Implications for agency in coastal livelihoods. *Maritime Studies* 18 (3): 347–358.
- Lawless, S., & Teioli, H. (2015). *Aquatic agricultural systems benchmarking in Malaita and Western Provinces: key findings*. 50pp. WorldFish, Honiara, Solomon Islands.
- Lawless, S., Doyle, K., Cohen, P.J., Eriksson, H., Schwarz, A., Teioli, H., Vavekaramui, A., Wickham, E., Masu, R., McDougall, C. (2017). *Considering gender: practical guidance for rural development initiatives in Solomon Islands*. Penang, Malaysia: WorldFish. Program Brief: 2017–22.
- Leisher, C., Booker, F., Agarwal, B., Day, M., Matthews, E., Prosnitz, D., . . . Wilkie, D. (2018). A preliminary theory of change detailing how women's participation can improve the management of local forests and fisheries. <https://doi.org/10.31235/osf.io/rgakw>
- Lentisco, A., & Lee, R. U. (2015). *A review of women's access to fish in small-scale fisheries*. FAO Fisheries and Aquaculture Circular No. 1098. Rome, Italy.
- Macintyre, M. (2008). Matrilineal structures and patriarchal attitudes: Lihirian women's health. In M. Jolly & V. Lukere (Eds), *Women's health in the Pacific*. Canberra: Australian National University Press.
- Maezama, S. 2015. Shifting leadership out of the backyard: Expanding opportunities for women leading in higher education in the Solomon Islands. *Journal of Educational Leadership, Policy and Practice* 30 (1): 51.
- Makhoul, N. 2020. Training on gender, social inclusion and human-rights based approaches in oceanic fisheries at the Forum Fisheries Agency. *SPC Women in Fisheries Information Bulletin* 32: 39–45.
- Makhoul, N., and C. Morris. 2019. Training on gender, social inclusion and human rights-based approaches at the University of the South Pacific. *SPC Women in Fisheries Information Bulletin* 31: 44–46.
- Mangubhai, S., and S. Lawless. 2021. Exploring gender inclusion in small-scale fisheries management and development in Melanesia. *Marine Policy* 123: 104287. <https://doi.org/10.1016/j.marpol.2020.104287>.
- Mangubhai, S., M. Tabunakawai-Vakalalabure, M. Fox, L. Leweniqila, I. Meo, M. Naleba, and A.S. Thomas. 2019. Fiji's Northern Division hosts its first Women in Fisheries Forum. *SPC Women in Fisheries Information Bulletin* 28: 17–18.
- Mascia, M.B. 2003. The human dimension of coral reef marine protected areas: Recent social science research and its policy implications. *Conservation Biology* 17 (2): 630–632. <https://doi.org/10.1046/j.1523-1739.2003.01454.x>.

- McDougall, D. (2014). "Tired for nothing"? Women, chiefs, and the domestication of customary authority in Solomon Islands. In *Divine Domesticities: Christian Paradoxes in Asia and the Pacific* (pp. 199–224): ANU E Press.
- Ministry of Fisheries and Marine Resources. (2019). *Solomon Islands National Fisheries Policy 2019–2029: A policy for the conservation, management, development and sustainable use of the fisheries and aquatic resources of Solomon Islands*. Honiara, Solomon Islands: Ministry of Fisheries and Marine Resources.
- Ministry of Women, Youth, Children and Family Affairs. (2020). *A National Strategy for the Economic Empowerment of Women and Girls*. (2020). Honiara, Solomon Islands. Available at: <https://solomons.gov.sb/wp-content/uploads/2020/02/A-National-Strategy-for-the-Economic-Empowerment-of-Women-and-Girls.pdf>
- Ogden, L.E. 2017. Fisherwomen—the uncounted dimension in fisheries management: Shedding light on the invisible gender. *AIBS Bulletin* 67 (2): 111–117.
- Pollard, A. (2000). *Givers of wisdom, labourers without gain: essays on women in the Solomon Islands*. A. Walker (ed.) Suva: Institute of Pacific Studies, University of the South Pacific.
- Promundo-US & CGIAR Research Program on Aquatic Agricultural Systems. (2016). *Promoting gender-transformative change with men and boys: a manual to spark critical reflection on harmful gender norms with men and boys in aquatic agricultural systems*. Washington DC: Promundo-US and Penang: CGIAR Research Program on Aquatic Agricultural Systems.
- Rabbitt, S., I. Lilley, S. Albert, and I.R. Tibbetts. 2019. What's the catch in who fishes? Fisherwomen's contributions to fisheries and food security in Marovo Lagoon. *Solomon Islands. Marine Policy* 108: 103667.
- Ram-Bidesi, V. 2015. Recognizing the role of women in supporting marine stewardship in the Pacific Islands. *Marine Policy* 59: 1–8.
- Randolph, S., and R. Sanders. 1988. Constraints to agricultural production in Africa: A survey of female farmers in the Ruhengeri prefecture of Rwanda. *Studies in Comparative International Development* 23 (3): 78–98.
- Ravera, F., I. Iniesta-Arandia, B. Martín-López, U. Pascual, and P. Bose. 2016. Gender perspectives in resilience, vulnerability and adaptation to global environmental change. *Ambio* 45 (3): 235–247.
- Resurreccion, B. 2008. Gender, legitimacy and patronage-driven participation: Fisheries management in the Tonle Sap Great Lake, Cambodia. In *Gender and natural resource management: Livelihoods, mobility and interventions*, ed. Bernadette P. Resurreccion and Rebecca Elmhirst, 151–174. London: Earthscan.
- Rohe, J.R., S. Aswani, A. Schlüter, and S.C. Ferse. 2017. Multiple drivers of local (non-) compliance in community-based marine resource management: Case studies from the South Pacific. *Frontiers in Marine Science* 4: 172.
- Rohe, J., A. Schlüter, and S.C. Ferse. 2018. A gender lens on women's harvesting activities and interactions with local marine governance in a South Pacific fishing community. *Maritime Studies* 17: 155–162.
- Scheyvens, R. 2003. Church women's groups and the empowerment of women in Solomon Islands. *Oceania* 74 (1–2): 24–43.
- Schwarz, A., James, R., Teioli, H.M., Cohen, P., & Morgan, M. (2014). *Engaging women and men in community-based resource management processes in Solomon Islands*. Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems. Case Study: AAS-2014–33.
- Smith, L. C., & Haddad, L. J. (2000). Overcoming child malnutrition in developing countries: past achievements and future choices, 2020 vision discussion papers (30). *International Food Policy Research Institute*.
- SPC. (2015). *A new song for coastal fisheries - pathways to change: the Noumea strategy*. Noumea, New Caledonia: Pacific Community (SPC). <https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/d4/d4d82dc170e9b227de87876357e75393.pdf?sv=2015-12-11&sr=b&sig=dTH4JOBHJ060%2BOVC18S3HyKGZmC7%2BoOyvr7r2h4RCzQ%3D&se=2019-02-23T03%3A43%3A05Z&sp=r&rsc=public%2Cmax-age%3D864000%2C>
- SPC. (2018a). *Gender and fisheries in Vanuatu. Summary of key issues*. Noumea, New Caledonia: Pacific Community (SPC). Available at: https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/86/8695f4f8499fde324dbb2b5778edbf0e.pdf?sv=2015-12-11&sr=b&sig=wgSCFkGONv0HEqCRXNDKfMesHuPColvhymRBryKJjDg%3D&se=2023-02-12T00%3A43%3A10Z&sp=r&rsc=public%2C%20max-age%3D864000%2C%20max-stale%3D86400&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22Anon_19_Genderandfisheries_Vanuatu.pdf%22
- SPC. (2018b). *Gender analysis of the fisheries sector - Solomon Islands*. Noumea, New Caledonia: Pacific Community (SPC). Available at: https://www.spc.int/sites/default/files/resources/2018b-05/Anon_18_Gender_analysis_in_fisheries_SI.pdf. Accessed 17 July 2017
- Sullivan, N., & Ram-Bidesi, V. (2008). *Gender issues in tuna fisheries: case studies in Papua New Guinea, Fiji and Kiribati*. Honiara, Solomon Islands: Forum Fisheries Agency. FFA Report 08/14. 61p.
- Tilley, A., and J. López-Angarita. 2016. Predicting vulnerability to management changes in data-limited, small-scale fisheries. *Marine Policy* 72: 211–218. <https://doi.org/10.1016/j.marpol.2016.05.034>.
- Vunisea, A. 2008. The 'culture of silence' and fisheries management. *SPC Women in Fisheries Information Bulletin* 18: 42–43.
- Vunisea, A. 2016. The participation of women in fishing activities in Fiji. *SPC Women in Fisheries Information Bulletin* 27: 19–28.
- Walker, B.L.E. & Robinson M.A. 2009. Economic development, marine protected areas and gendered access to fishing resources in a Polynesian lagoon. *Journal of Feminist Geography* 16 (4): 467–484.
- Wallace, H. 2011. Paddling the canoe on one side: Women in decision-making in Vanuatu and the Solomon Islands. *Development* 54 (4): 505–513. <https://doi.org/10.1057/dev.2011.89>.
- Walter, R. K., & Hamilton, R. J. (2014). A cultural landscape approach to community-based conservation in Solomon Islands. *Ecology and Society*, 19(4). <https://doi.org/10.5751/es-06646-190441>
- Warren-Rhodes, K., A.-M. Schwarz, L.N. Boyle, J. Albert, S.S. Agalo, R. Warren, and N. Duke. 2011. Mangrove ecosystem services and the potential for carbon revenue programmes in Solomon Islands. *Environmental Conservation* 38 (04): 485–496. <https://doi.org/10.1017/s0376892911000373>.
- Wate, B. (2020). Negotiating the sacred space: a comparative study of the impact of the dynamics of culture and Christian theology on women in the South Sea Evangelical Church, and in the Anglican Church of Melanesia, Small Malaita, Solomon Islands (Thesis, Doctor of Philosophy). University of Otago. Retrieved from <http://hdl.handle.net/10523/10006>
- Weeks, R., and S.D. Jupiter. 2013. Adaptive comanagement of a marine protected area network in Fiji. *Conservation Biology* 27 (6): 1234–1244.
- Weeratunge, N., K.A. Snyder, and C.P. Sze. 2010. Gleaner, fisher, trader, processor: Understanding gendered employment in fisheries and aquaculture. *Fish and Fisheries* 11 (4): 405–420.

- Westerman, K., and S. Benbow. 2013. The role of women in community-based small-scale fisheries management: The case of the southern Madagascar octopus fishery. *Western Indian Ocean Journal of Marine Science* 12 (2): 119–132.
- Williams, M.J, Chao-Liao, N.-H., Choo, P.S., Matics, K., Nandeesha, M.C., Shariff, M., Siason, I., Tech, E., & Wong, J.M.C (eds). (2002). From women in fisheries to gender and fisheries. *Global Symposium on Women in Fisheries. Sixth Asian Fisheries Forum, 29 November 2001, Kaohsiung, Taiwan*, 13–18.
- Wiltshire, C., Batley, J., Ridolfi, J., & Rogers, A. (2019). *Attitudes towards women's political participation in Solomon Islands*. Program Brief: 2019/27. Available at: https://www.pacwip.org/wp-content/uploads/2020/04/dpa_in_brief_Solomons-2019_27_final.pdf
- UN Women. (2018). *Women's economic empowerment*. UN women markets for change. Available at: https://unwomen.org.au/wp-content/uploads/2015/12/UNW-Fiji-MCO-Programme-2-pagers_WEE_Oct2018.pdf
- World Bank. (2012). *Hidden harvest : the global contribution of capture fisheries (English)*. Washington, D.C.: World Bank Group. Available at: <http://documents.worldbank.org/curated/en/515701468152718292/Hidden-harvest-the-global-contribution-of-capture-fisheries>. Accessed 9 Sept 2016
- World Bank. (2013). *Inclusion matters: the foundation for shared prosperity. New Frontiers of Social Policy*. Washington, D.C.: World Bank Group. <https://openknowledge.worldbank.org/handle/10986/16195> License: CC BY 3.0 IG
- WorldFish Center (2010). *Gender and fisheries: do women support, complement or subsidize men's small-scale fishing activities? Issues Brief 2108*. Available at: http://pubs.iclarm.net/resource_centre/WF_2711.pdf. Accessed 9 May 2016
- Zhao, M., M. Tyzack, R. Anderson, and E. Onoakpovike. 2013. Women as visible and invisible workers in fisheries: A case study of Northern England. *Marine Policy* 37: 69–76.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.