



Women's experiences of participatory small-scale fisheries monitoring in Timor-Leste

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Abstract

Participatory fisheries monitoring can create many benefits, such as increasing community engagement in marine management, generating data for data-poor fisheries, and empowerment of fishing communities. Although most participatory monitoring studies have focused on men monitoring their own fishing activities, evidence from studies examining women's increased participation in broader fisheries management suggests that monitoring programmes should also incorporate gender-inclusive approaches. Furthermore, the data collectors' perspectives regarding the effects that participating has on themselves or their community are often not included in reporting or evaluating monitoring processes and methodologies. Such gaps in participatory monitoring approaches may overlook different people's participation and experiences of fisheries and their management, and so disregard the general consensus that community-based fisheries are deeply socially embedded. Using the participatory photography methodology, photovoice, this paper explores women's participation in fisheries management, and how this links with various forms of empowerment, as represented by stories and images shared by the participants of a fisheries monitoring programme in Timor-Leste. Their resulting photo stories explore motivations for participating in the monitoring programme, the enabling or constraining conditions which influence participation, and the implications for broader marine management. The participants' photo stories demonstrate the importance of relationships in creating an enabling environment for participatory processes, and how monitoring can be relationship-building, creating a positive feedback loop that leads to awareness-raising, empowerment, advocacy and collective action. This study contributes to the growing body of literature around participatory monitoring as an empowering process by amplifying the voices of women through unpacking their experiences and aspirations.

Keywords Photovoice · Small-scale fisheries · Gender equity · Women's participation · Timor-Leste · Community-based fisheries management

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Introduction

Small-scale fisheries and participatory monitoring

Small-scale fisheries (SSF) are diverse, labour-intensive, multi-species, multi-gear fisheries (FAO et al. 2023; Mills et al. 2011; Smith and Basurto 2019). Their complexity makes it challenging to collect monitoring data and, therefore, manage them sustainably (Kolding and Van Zwieten 2011; Pita et al. 2019). Monitoring is a key attribute of fisheries management success (Gutiérrez et al. 2011), so integrating diverse knowledges and developing alternative participatory methods are needed to inform management (Pita et al. 2019). Whilst there are several forms of SSF, this study focuses on community-based fisheries in the context of subtropical fisheries.

Community-based fisheries management (CBFM) is a form of co-management where communities take a leading role in managing coastal resources, with support or collaboration from the government and other external actors. Community-based fisheries management often takes place in data-poor environments (Wiber et al. 2004, 2009). As such, integrating monitoring into CBFM is essential for ensuring that management is informed by evidence. Incorporating participatory fisheries monitoring in CBFM can enable community members to respond to their own interests and concerns through several parts of the monitoring process: from collecting, analysing and understanding data, through to decision-making (Danielsen et al. 2009; Evans and Guariguata 2008; Fulton et al. 2019; Guijt 2007; Obura 2001; Reis-Filho et al. 2023). This can be an empowering process in and of itself for the community as a whole, or for individuals (Freire 1970) and it can also increase community engagement in CBFM more broadly (Fulton et al. 2019; Obura et al. 2002). Furthermore, participatory fisheries monitoring can present an opportunity to integrate diverse knowledges and perspectives into governance, making it more inclusive and transformative (House et al. 2022; Stephenson et al. 2016). To do so, CBFM needs to address intra-community inequalities shaped by institutions and structures (such as gender, ethnicity, and class), and recognise the messy and mundane ways that power dynamics influence people's everyday lives (Kothari 2001). Communities are not homogenous and consist of people with diverse social characteristics (MacQueen et al. 2001), meaning that the dynamics which exist between community members can shape CBFM and dictate who has the opportunity to participate in it.

Women's participation in fisheries management

The *Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication* (SSF Guidelines) affirm the importance of community participation, gender equity, and monitoring in SSF management (FAO, 2015). However, the contribution of women to SSF and their management has often been ignored or misunderstood (Harper et al. 2017; Kleiber et al. 2015). Women often occupy different parts of the SSF value chain (Lau and Ruano-Chamorro 2021; Overa 1993; Pedroza-Gutiérrez 2019) or fish in different ways than men (Chapman 1987; Kleiber et al. 2015). As such, their perspectives are essential in developing evidence-based, comprehensive, and holistic fisheries management. Women's participation in fisheries management is necessary because it can contribute to the interrelated aims of sustainable and equitable resource use, which are both considered to be valuable end goals (Leisher et al. 2017).

An awareness of women's fishing activities is an essential part of overcoming the marginalisation of women within the fisheries sector (Kleiber et al. 2015), although an increase in women's participation in management activities and decision-making is also needed. Social relations and norms construct an environment that can enable or constrain women's participation in fisheries management and the ways in which they may or may not influence SSF governance (Galappaththi et al. 2022). These constraints can create participatory exclusions that prevent women from playing an active or empowering role (Agarwal 2001; Galappaththi et al. 2022). In addition to these systemic issues, personal motivation is also a key factor in participation (Lawrence 2006) and these motivations may be gendered (Nuggehalli and Prokopy 2009).

However, participation in CBFM is not necessarily enough to create long-term change beyond the fisheries context. To ensure long-lasting women's empowerment, culturally sensitive gender-transformative approaches are needed to address the structural causes of inequality, such as social norms, customs, values, laws, policies and services (Lau and Ruano-Chamorro 2021). Ignoring politics, power, and social justice can relegate terms such as 'participation' and 'empowerment' to generalised buzzwords, but the value and strength of these concepts may be maintained through exploring the nuanced, localised, and specific meanings of such terms (Cornwall and Brock 2005). In this study, this critique is acknowledged, and the term 'empowerment' is used with this in mind, to explore its meaning in the context of gender dynamics and communities claiming their rights and autonomy in marine management, according to the study participants.

Considering gender in participatory fisheries monitoring

Since fisheries monitoring is an important component of fisheries management, increasing women's participation in monitoring has been framed as a possible means to make SSF management more inclusive (Aswani and Weiant 2004; Carvalho et al. 2009; Paul et al. 2016). However, to make participatory fisheries monitoring programmes an empowering experience for participants, they must be designed and implemented with an awareness of power dynamics and social norms (House et al. 2022). Just as women are overlooked in fisheries management, fisheries monitoring programmes often overlook gender dimensions of fisheries management (House et al. 2022). Participatory fisheries monitoring programmes involving women mainly focus on the management of women's fishing activities, rather than capturing both women's and men's fishing activities (Aswani and Weiant 2004; Crawford et al. 2010; Paul et al. 2016). However, by working as data collectors within CBFM, women may increase their participation in fisheries management decisions even if fisheries are male-dominated (Carvalho et al. 2009). Thus, participatory monitoring programmes may address the complexities of intra-community dynamics so that women's participation can move beyond activity-specific participation to create a genuinely empowering or transformative process (Agarwal 2001; Rabbitt et al. 2022). Despite increasing research exploring the potential benefits of participatory fisheries monitoring, much of the literature has focussed on the data collected or the management benefits, rather than on the experiences of the data collectors (House et al. 2022). Even in the academic literature that outlines the potential benefits for the data collectors, these claims are rarely supported by the voices of the data collectors themselves (House et al. 2022).

This paper investigates the linkages between women's participation in fisheries monitoring, participant empowerment, and inclusion in CBFM, according to the stories and images shared by the participants themselves in Timor-Leste. In this study, *Grupú Monitorizasaun Peskas* (GMP; the “*Grupú Monitorizasaun Peskas* and group locations” section) members used participatory photography (photo-voice) to document and share their experiences of conducting participatory fisheries monitoring. This study examines (i) the motivating factors and enabling or constraining conditions that influence women's participation in fisheries monitoring, (ii) the impact of participating in fisheries monitoring or management on the participants, and (iii) how such impacts and the participants' experiences of participatory fisheries monitoring relate to broader fisheries management, as well as the ways in which participatory monitoring may make CBFM more inclusive. This study contributes to the growing global discourse around participatory monitoring

as a potentially empowering process by amplifying the voices of programme participants and exploring some of the nuances these perspectives can illuminate. This paper argues that such approaches are valuable for integrating a wider variety of perspectives into monitoring and evaluation, and applying a more process-oriented lens to impact assessment.

Study sites and monitoring programme context

Fisheries management and monitoring in Timor-Leste

In Timor-Leste, SSF are an important part of many people's livelihood strategies (López Angarita et al. 2019), which tend to be quite diverse, with a strong agricultural component. Coastal communities rely heavily on SSF, and on Atauro, a small island off the north coast of Timor-Leste, 41% of households fish, with more than half of these considering fishing as their primary livelihood (Mills et al. 2017). Women fulfil various roles within Timor-Leste's fisheries sector, including fishing and postharvest activities, such as fish processing and selling (López Angarita et al. 2019; Tilley et al. 2020). Recently, several efforts have been made to document the nature and value of women's fishing activities in Timor-Leste, as their role within the sector has been overlooked (Grantham et al. 2020; Mills et al. 2017; Tilley et al. 2020).

Fisheries management, and the monitoring which it encompasses, can be implemented concurrently on both a national level and a community level, with each addressing different concerns and potentially having different objectives. In Timor-Leste, national fisheries monitoring programmes have been established (Needham et al. 2013; Tilley et al. 2020), with efforts made to document the names and classifications of fish species that are used by fishers, which vary across the country (Hunnam et al. 2021). PeskaAS (a pseudo-acronym for fisheries [*peskas*] in the Tetun language and the phrase “Automated Analytics System”) is a system for monitoring SSF in Timor-Leste that was established in 2016 through a partnership between *Ministeriu Agrikultura no Peskas* (Ministry of Agriculture and Fisheries, hereafter MAP) and WorldFish Timor-Leste. It was adopted as the official national fisheries monitoring system in 2019 (Tilley 2020). Although PeskaAS data are available online, at present the data are stored and analysed on a national scale by MAP and WorldFish Timor-Leste. No mechanism currently exists for local communities to easily access and interpret these data. A system for data that can be collected, understood, and used by fishing communities on a local scale is still needed for local decision-making. To make informed decisions at the community level, data from monitoring

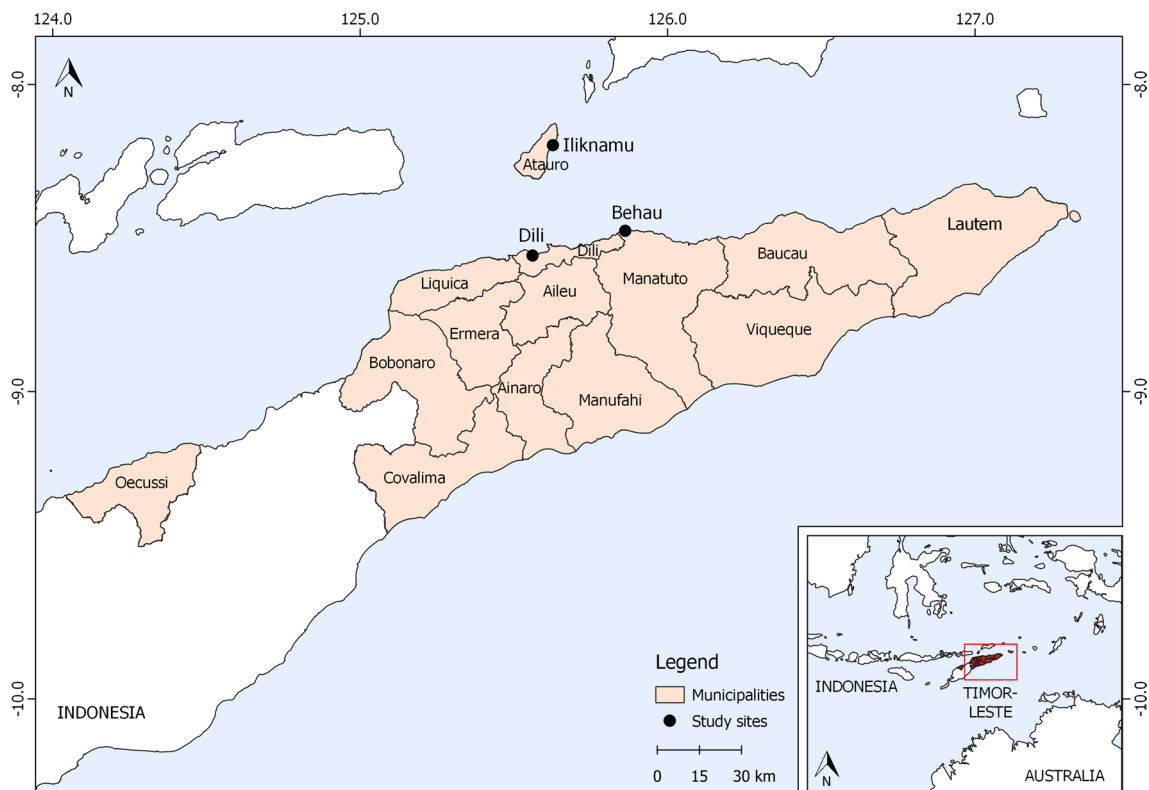


Fig. 1 Map of Timor-Leste showing the locations of the GMP groups that participated in this study; Ilik-namu on Atauro Island and Fatumeta, which is located in Behau

programmes must be regularly presented to decision makers in an accessible and useful way.

Fisheries management in Timor-Leste is often implemented at the community level through co-management (Tilley et al. 2019), so local-scale community-led monitoring may be a more relevant method than PeskaAS for decision-making at this level. One of these community-scale management measures involves utilising the customary practice of the prohibition of resource access known as *Tara Bandu*. In its most basic form, *Tara Bandu* regulates the relationship between people and their environment (Alonso-Población et al. 2016). The contemporary use of *Tara Bandu* for managing coastal fisheries began in 2010 and is becoming more widespread (Alonso-Población et al. 2012; Tilley et al. 2019). Typically, *Tara Bandu* is implemented at the administrative unit of either *suco* (village) or *aldeia* (subvillage). As these vary significantly in size, each community decides which scale of management is appropriate for them.

Grupu Monitorizasaun Peskas and group locations

GMP consists of a network of women's groups located across five communities (Fig. 1), supported by an international marine conservation non-governmental organisation, Blue Ventures. The pilot group was established in 2018

in Ilik-namu, shortly followed by the group in Fatumeta. Both groups were established whilst consultations for community-based fisheries management were conducted (House et al. 2021). Subsequently, three more groups have been established, from 2019 to 21. GMP members were recruited based on word-of-mouth or invitation by existing group members or community leaders (House et al. 2021). During this period, data collectors were volunteers and the costs (e.g., phone credit and equipment) of the programme were covered by Blue Ventures (House et al. 2021). Each group has up to eight members at a time.

In the GMP programme, each community is defined by the geographical scale at which fisheries management is occurring (or consultations are being conducted at) because many CBFM interventions in Timor-Leste are organised on a *suco* (village) or *aldeia* (sub-village) level. This study only focuses on the first two GMP groups (Ilik-namu and Fatumeta), because they have been running the longest and were well established prior to the disruption caused by the COVID-19 pandemic. The pilot phase of the project was conducted in Fatumeta, whilst the main data collection was conducted in Ilik-namu.

The GMP members collect data regularly from fishers at local landing sites using a smartphone application called Open Data Kit (ODK) to conduct catch surveys,

an application which had been used in a pilot for similar surveys by Blue Ventures in Madagascar (Jeffers et al. 2019). Each group established their own survey schedule based on their availability and the locations of the landing sites, usually planning several days of data collection per week, though monitoring effort has varied considerably, especially during the COVID-19 pandemic (House et al. 2021). The data is then uploaded to a Blue Ventures server and is then cleaned, analysed, and presented back to the community (House et al. 2021). The survey questions focus on the demographics of the fishers, the fishing grounds, gear choice, catch composition and mass, and whether the fish will be sold (House et al. 2021). Several target fishes and invertebrates (selected by the data collectors and fishers as part of co-designing the survey tool) are identified (to family level or using local classifications), weighed, and photographed, whilst the rest of the catch is grouped as ‘other’. The catch survey was co-designed by data collectors, fishers, and Blue Ventures staff, and has been revised and adapted as new monitoring groups have been established, ensuring it remains relevant for each community by identifying the important target species. The question and response options were designed to be compatible with the PeskaAS database. A detailed explanation of the catch survey methodology is beyond the scope of this paper, but the methodology at the time of writing is outlined in a report by House et al. (2021).

Ilik-namu, Atauro

Consisting of 107 fishing households (as per village authorities in 2023), Ilik-namu is an *aldeia* (subvillage) that covers 8.85 km², and is part of the village of Biqueli (General Directorate of Statistics (Timor-Leste) et al., 2019). Fishing is the primary livelihood for the majority of Biqueli households, which has the largest fleet in Timor-Leste, including several large boats that can accommodate groups of up to 20 fishers each (Alonso-Población et al. 2012). Though Biqueli’s relative wealth is the highest on Atauro (Mills et al. 2017), it is one of the few communities on Atauro that has not yet implemented a locally managed marine area (LMMA). The coral reefs surrounding Atauro are home to some of the greatest biodiversity in the world (Erdmann et al. 2013), yet several limited surveys conducted near Ilik-namu in 2004 suggested that the abundance of reef fish has been impacted by fishing pressure (Wong and Chou 2004).

During marine management consultations by Blue Ventures in 2017, there was much discussion about the lack of relevant local-scale catch data. It was also reported that in the meetings, the discussion was often dominated by men. A community-based fisheries monitoring programme, GMP, was therefore piloted with the goals of (i) collecting the

necessary catch data, (ii) increasing community engagement in fisheries management, and (iii) creating opportunities for women to participate in fisheries management and governance (House et al. 2021). The Ilik-namu GMP, consisting of eight women, has been collecting catch data with local fishers since 2018, with some interruptions due to the COVID-19 pandemic. The conversation about whether to implement an LMMA is ongoing within the community at the time of writing.

Fatumeta, Behau

Fatumeta, which is where the pilot phase of this project was carried out, is part of Ilimanu *aldeia* (located in Behau, Fig. 1) and includes 52 fishing households (as per village authorities in 2023). Due to the large area covered by Ilimanu *aldeia* (66.44 km²; General Directorate of Statistics (Timor-Leste) et al., 2019), fisheries management and monitoring has been implemented on a sub-*aldeia* scale. An LMMA was established in Fatumeta by the local community with the support of Blue Ventures in 2018. This LMMA, which covered 225 m², was implemented using the mechanism of *Tara Bandu*, which has been used to establish fisheries co-management elsewhere in Timor-Leste (Tilley et al. 2019), and the fisheries monitoring group was set up concurrently. Due to the impact of the COVID-19 pandemic, the closed area of the LMMA was opened again for fishing on September 15, 2020. A women’s representative signed the *Tara Bandu* regulations in 2018 and the role of the monitoring group was recognised as part of the management structure, alongside the *Tara Bandu* management group. The GMP members had participated in a variety of activities associated with the *Tara Bandu* (House et al. 2021).

Methodology

This study used the photovoice methodology to examine women’s experiences of participating in a fisheries monitoring program. This method involves participants creating photo stories by taking photos in response to a series of prompts (in this case focused on their perspectives and experience of fisheries monitoring and management) and participating in interviews to develop accompanying captions that explain the message of each photo, before participating in a group discussion to develop the preliminary analysis conducted by the researchers (the “**Photovoice activities conducted**” section). Photovoice is a participatory action research technique developed so that “people can identify, represent and enhance their community through a specific photographic technique” (Wang and Burris 1997). This technique is based on the principles of documentary

photography, feminist theory and constructivism (A. Simmance et al. 2016). The research process can be empowering to participants because they control what they record, what conclusions are drawn, and how this can be used to bring about change (Wang and Burris 1997). Since it was initially developed in the context of rural health promotion, photovoice has been adapted for a variety of contexts, even multi-site use (Chew 2020). Simmance et al. (2016) produced a modified version for exploring gender in the context of fisheries, which incorporates modifications from other topic-related studies (Bennett and Dearden 2013; Castleden et al. 2008), whilst various studies have used photovoice to investigate experiences of aquaculture or fisheries (Funk et al. 2022; Gomese et al. 2019; Power et al. 2014; F. A. Simmance et al. 2022). In this photovoice project, photovoice is used as a form of participatory action research, intended to understand and improve the situation (Reason and Bradbury 2008), as well as a participatory evaluation tool to explore the impact of the GMP programme.

The photovoice methodology was developed using feminist theory and incorporates feminist principles such as ‘giving a voice’ to groups that have been marginalised and creating positive social change or empowerment for the participants (Coemans et al. 2019). However, the ideological aspirations and impact of photovoice projects “relates not only to the voices they give rise to but the kind of listening they enable” (Fairey 2018). Given the gendered aspects of the research questions (i.e. enabling and constraining factors to women’s participation in fisheries management), the social relations approach supported the analysis of the fisheries monitoring programme, the context within which it occurs, and the gendered power dynamics involved. Kabeer (1994) suggests that gender relations and inequalities can be understood by examining five institutional aspects: people, power, rules, resources, and activities. These institutional aspects highlight the issues, norms, behaviours, and power dynamics that the participatory monitoring programme is trying to influence, to achieve greater empowerment and women’s participation in fisheries management. For example, a key issue being explored in this program, which touches on all five aspects, is how much influence different groups of people have over decisions about marine resource management and what their involvement in marine management activities should be. Empowerment and participation are often objectives of participatory fisheries monitoring and are integral to the photovoice methodology. In this study, these are understood as the direct result of the dynamics and norms that result from social relations. This study explores concepts of individual women’s empowerment and community-level empowerment.

In addition to the epistemological underpinning of photovoice, this methodology was chosen for practical reasons.

Firstly, the activity-based approach facilitated discussion and elicited information from people who would not naturally speak up in a focus group discussion. Secondly, the topics being explored in this research are represented in the mundane everyday aspects of life. When asked about these directly, it can be easy to overlook the social relations and ordinary moments that shape lived experience, but photovoice allows these moments to be captured and highlighted. The methodology for this study was developed by drawing on the works of Simmance et al. (2016) and Chew (2020), and incorporated a collaborative process with members of GMP in two coastal communities, Ilik-namu and Fatumeta (the “*Grupu Monitorizasaun Peskas* and group locations” section), and Blue Ventures colleagues who support the fisheries monitoring programme.

Photovoice activities conducted

This photovoice study was conducted in several stages between November 2021 and August 2022 (Fig. 2), and included stages of (i) co-design, planning, and preparation; (ii) the pilot; (iii) the main data collection; and (iv) initial planning of some outreach and advocacy activities. The conceptualisation and planning stage (Fig. 2; Stage 1) involved consultation with Blue Ventures to develop shared research objectives and a written collaboration agreement. The research team was determined during Stage 1, then training was conducted by the lead author, and the content and plans for the data collection activities were collaboratively developed. The term “research team” refers to the authors involved in conducting the photovoice activities in-person (the facilitators—NMSA, JSdJ, JG) and the lead author, who did not attend activities in-person due to travel restrictions. The facilitators are Blue Ventures staff who were selected based on their skills and lack of direct involvement in the GMP programme (the “[Positionality statement of authors, partners, and participants](#)” section discusses the positionalities of the research team members). Ethical clearance was obtained from Charles Darwin University Human Research Ethics Committee (H21025). Approval was also provided by the Government of Timor-Leste, *Ministério da Agricultura e Peskas* (32/GDDP/I/2020 & *Registo de entrada* 513/VI/2021), as well as from community leaders at each study site prior to the beginning of the activities. The data collection phases (Fig. 2; Stages 2 & 3) involved group training, photography, interviews, and preliminary analysis. Stage 2 was a pilot conducted in Fatumeta, whilst Stage 3 was the main data collection, which was conducted in Ilik-namu.

The study participants were all members of GMP (seven women from each of the two communities included in this study), providing group sizes aligned with photovoice best practices (F. A. Simmance et al. 2022; Suprpto et al.

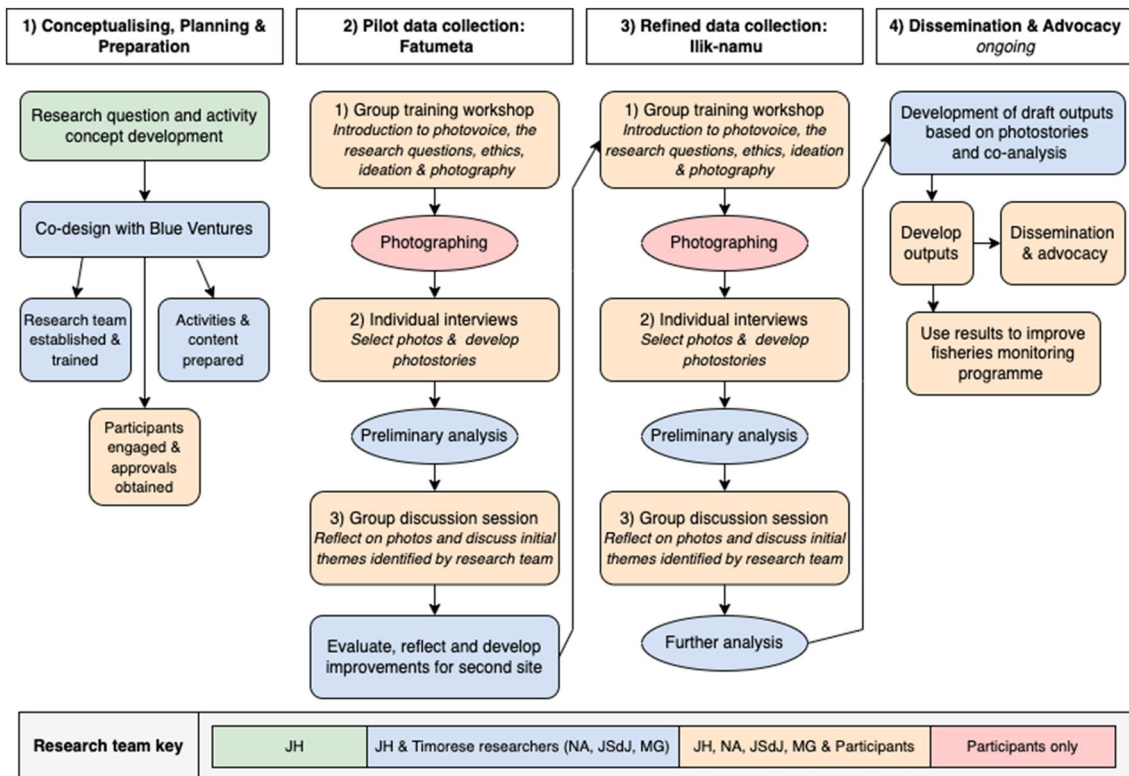


Fig. 2 Process map of the multi-stage photovoice activities and the roles of the research team members and study participants

2020; Wang and Burris 1997). All GMP members in each community were invited to participate in the study. The participants from Ilik-namu ($n = 7$) ranged from 23 to 30 years old and, at the time of the study, were all unmarried. Several group members were enrolled in English courses and some are involved in seaweed farming. The participants from Fatumeta ($n = 7$, after one withdrawal) were aged 20–35 years and six of them were married with children. In addition to working to support their families in the home, some members gain income through selling items at their small kiosks. The participants were not remunerated for the photovoice project and all gave informed consent prior to the data collection activities and sought informed consent from everyone they photographed. The photo stories are credited to the photographers, who gave permission to use their names.

Each data collection stage (Stages 2 and 3) consisted of three activities (workshops, interviews, and group discussions about preliminary results) involving the research team and the participants, with activities such as photographing or analysis taking place in between. After an initial group training workshop, which included training and discussion about photography, research ethics, and the research themes, the participants used their GMP-provided smartphones to take photographs in response to four prompts:

- What are the things which make it easier or harder for you to participate in fisheries monitoring and/or management?¹
- What impact has participating in the fisheries monitoring programme had on you?
- What impact has the programme had on your community?
- How would you like to participate in fisheries monitoring and/or management in the future?

During the group workshop, the participants discussed the questions and concepts and developed their photography ideas. The questions were open-ended, and it was explicitly stated that responses could be positive or negative examples. Participants had several weeks to take photos that addressed all four questions, whilst keeping a diary of the photos and the consent provided by the people in them (Appendix 1.1).

¹ The original prompt was an open-ended question (i.e., what influences your ability to participate in fisheries monitoring and/or management) but after translation and piloting, this was found to be too confusing for participants. After testing, this question was broken down into two sub-questions (i.e., what makes it easier and what makes it harder?). These prompts were extensively discussed and explained in the training workshop, to ensure that participants were aware that answers could be positive, negative, or neutral, and that there was no right answer.

A WhatsApp group and regular communication from facilitators was used to support the participants during the photography stage.

The second activity was one-on-one semi-structured interviews in which participants selected 1–3 photographs for each question and discussed the images to develop captions and explain the links to the various photography prompts (Appendix 1.2). Each photograph and its accompanying text is referred to hereafter as a ‘photo story’. Participants were also asked to reflect on the photovoice process, whilst the facilitators conducting the interviews kept notes about their observations and impressions during the activities, thus enabling iterative development of the method and reflexivity throughout the process (Fig. 2). In addition, the research team held a debrief after each activity to reflect and develop the method, and to record any relevant observations. After evaluating the pilot phase, it was found that the photo stories produced during the pilot stage in Fatumeta were often too far removed from the photography prompts and the participants could not always articulate the content and meaning of their photo stories; therefore, these photo stories were not included in the final analysis. As a result of these observations, improvements were made to the initial training workshop to clarify the photography prompts and assist with ideation. Also, the interview questions used to develop the captions were modified to highlight the links between the images and the GMP programme and its impacts. Rather than stating why they took each photo for practical reasons (e.g., because it was close to their house), the changes ensured that participants explained clearly why they chose to photograph a particular message or meaning. As a result, the method was significantly more effective for the Ilik-namu group (Stage 3), which increased the relevance of the stories and the connection to the programme and/or research questions.

Audio recordings of the interviews were made and written up as detailed notes. The interviews were primarily conducted in Tetun (an official language of Timor-Leste), though Rasua’a (a local language) was also used in Ilik-namu (translation was carried out by JG and participants). The third activity, group discussion about the preliminary results, was part of the analysis process.

The facilitators observed that many participants were nervous or shy about participating in interviews or afraid of saying the wrong thing, but gained confidence and mostly gave clear, thoughtful, and relevant answers, even if some were a bit unclear. One person was brand new to the programme, so her answers were less connected to the programme, however, this provided a useful comparison. The facilitators noted that the photovoice process helped deepen the participants’ understanding of the monitoring programme (the “[Photovoice reflections from participants](#)”

section) and, overall, the participants understood the questions and shared many ideas for improving the programme. The facilitators observed that the group felt proud of their photo stories when they held the group discussion, which had all the photographs collated for discussion:

When you look at these photos, it’s easy for us to share stories about our work... We feel really proud because through the GMP we can understand our own community better

Data analysis

Preliminary analysis was conducted by the lead author, with input from the facilitators, using inductive coding and a list of follow-up discussion topics or questions was produced. These materials were used to facilitate the final data collection activity of Stages 2 and 3, a group discussion session, during which the participants and facilitators used the preliminary analysis and associated collages of selected photographs to explore the initial interpretations and prompt deeper discussion or explanation about some of the photo stories or issues raised. This was the first time for participants to see other people’s photo stories, which allowed discussion of overarching themes. The facilitators also gathered more contextual information and verified the analysis with the participants both individually and as a group. Although data was collected across two sites, the final analysis presented in this paper was conducted using photo stories from Ilik-namu due to the quality and relevance of the data (which was a result of methodological improvements following the pilot stage).

Though the photo stories were documented and analysed in Tetun, they are presented here in English, following translation by the lead author and a translator. These 57 photo stories were grouped into themes by the lead author using an inductive approach (Appendix 1.3), then analysed further using a combination of deductive and inductive coding methods to explore the textual data. Although these codes were directed at the text, these stories would not have been elicited without the accompanying images. The images became sites of discussion and elicitation tools in the individual interviews and group sessions, producing data that would not be provided if the photography prompt questions were asked directly. Furthermore, limiting detailed coding to the photo stories with text ensured that the researchers did not project their voice onto the stories by making assumptions about the photographers’ intent based on image content alone. Rather, the analysis endeavoured to stick to the voice and intent that was conveyed verbally in the interviews.

To dig deeper into the portrayal of the impact of GMP, and the context surrounding it, the social relations approach

(Kabeer 1994) was used when examining the photo stories to consider the less visual aspects of programme, such as the power dynamics and relationships involved, and the implications for empowerment and women's participation in CBFM. The concepts and aspects used in the social relations approach provided a lens which was compatible with the inductive analysis of the participants' photo stories. For example, using the social relations approach helped to explore the significance of the relational perspectives of the participants, or to tease out the components of the photo stories. The social relations approach was not used as a deductive coding framework, but it was used to bring together and interpret the relationships, ideas, and dynamics represented in the photo stories. The initial analysis was conducted by the lead author, with the facilitators providing comments and additional interpretation.

Finally, following this analysis, various outputs are currently being developed for advocacy work and for use by the participants and Blue Ventures, however, these have not yet been finalised (Fig. 2). The participants intend to share these results with their family, friends, fishers, community, and the public through a book, exhibition, and website. One of the main themes of the photo stories was their desire for change and they, together with the research team, are planning how they can use their photovoice work to contribute to this mission.

Positionality statement of authors, partners, and participants

This study was designed to amplify the voices and experience of Timorese women involved in fisheries monitoring. The research was conducted during the COVID-19 pandemic, with the research team spread across Timor-Leste and Australia. The COVID-19 pandemic necessitated the modification of the qualitative research methods (Santana et al. 2021), as well as consideration of several complex issues regarding justice and ethics in qualitative research (Otto and Haase 2022). Although qualitative researchers often seek to classify themselves as 'insiders' or 'outsiders', this research team represents a combination of 'insiders', 'outsiders', and 'in-betweeners' researchers (Chhabra 2020). It is recognised that such intersecting identities and affiliations influence the research process and the study participants. By critically reflecting on this throughout the study, the research approach has been adapted to mitigate any problematic consequences of these dynamics, where possible.

The lead author, JH, is a White British woman, a PhD candidate at an Australian institution, and was a Blue Ventures Timor-Leste employee from 2017 to 2022. JH was involved in establishing and facilitating the GMP programme from 2017 to 2018. She subsequently shifted to a remote technical support role at Blue Ventures during her PhD, but no longer

worked directly with the GMP programme. The Timorese authors of this paper — NMSA, JSdJ, and JG — are Blue Ventures staff members who did not work directly with the GMP programme prior to the commencement of this study in 2021. Originally from Biqueli, JG has close relationships with many of the study participants from Ilik-namu but did not work with the GMP group before. The other authors are non-Timorese researchers with expertise in participatory research, gender, or SSF management. The research team acknowledges pre-existing relationships with the participants and the dynamics that were brought to the research as Blue Ventures staff. The nature of participatory action research means that the established relationships with the participants made them feel more comfortable and invested in the research, and the results of the study can be immediately used to improve the GMP programme, thus embodying the photovoice goal of creating positive change and the values of respect and reciprocity.

To reduce any potential problematic dynamics in the research or perceived pressure to participate or give certain responses, the Blue Ventures staff usually involved in the GMP programme did not conduct photovoice activities, although they did contribute to the consultation and planning phase. The voluntary nature of the project was explained as part of the consent process and it was made clear that participants could withdraw at any time (which did happen for one member of the Fatumeta group). Throughout the process, it was repeatedly stated that critical statements were welcome and that everyone's opinions were valid and wanted. In addition to the authors themselves, photovoice views the photographers as researchers in their own right, rather than treating them as passive subjects of this study. As a result of these dynamics, there were various participation interfaces which had to be navigated throughout the study, all of which were opportunities for collaboration and reflexivity throughout the project.

Results

The findings are presented in three sections: (1) the motivations expressed by participants, and the enabling and constraining factors for participating in fisheries monitoring; (2) the impact that participating in the programme has had on participants and how they would like the programme to develop in the future, including the implications for marine management, beyond the monitoring itself; and (3) the participants' reflections on the photovoice process. The insights shared by the participants are presented here with the authors' interpretation presented in the "Discussion" section). The photo story captions presented here have been summarised, however, Appendix 2 contains translations of the participants' original captions.

Motivation, enablers, and constraints for participating in fisheries monitoring

Although personal motivations were not explicitly stated, the participants' photo stories contained several positive impacts which they had experienced as part of the monitoring groups, or aspirations they had for their future participation. These motivating factors included individual benefits, such as learning new skills (which were said to improve employability and self-confidence) and having new experiences (Fig. 3A, C). In addition, altruistic motivations, such as being able to serve the wider community through an improved understanding of marine resources and marine management measures (Fig. 3C, D), were seen as a way of supporting the environmental, economic, and social aspects of the community. The latter are explored in more detail in the “Impact of participating in the programme and the desire to create more change” section.

Despite their personal motivations, various enabling factors are needed to allow women's participation in fisheries management, and for fisheries monitoring to take place. In response to the first sub-question of the first photo prompt, “What makes it easier to participate in fisheries monitoring



Fig. 3 (A) [This data collector] is collecting data using her new skills to measure the fish, by Alfansina; (B) I want to learn to use the computer to prepare graphs of our catch data, and it would be useful at work, by Meret; (C) A selfie with a fisher who always helps me with the data collection, by Hiana; (D) I have learned how to make graphs that show the fishers if catches are increasing or decreasing, by Ermelita. See Appendix 2.1

or management?”, the participants' responses fell into three themes: (i) their relationship with the fishers, (ii) other enabling relationships, and (iii) accessibility of the survey method and tools. Relevant information was mentioned in photo stories that were responses to all the photography prompts, so those photo stories were also included in the themes. Generally, participants' relationships with fishers were positively characterised, emphasising the collaborative relationship between the fishers and the data collectors, as well as a sense of respect and gratitude (Fig. 3C). The fishers gave the data collectors access to the fish, allowed the monitoring to take place, and provided additional support by consistently participating (Fig. 4A) or sharing knowledge about the fish (Fig. 3C). Some participants mentioned assisting the fishers with their activities and sympathised with their struggles or suggested ways of supporting the fishers (Fig. 4B). Participants stated that the fishers were supportive of the monitoring programme and that many of them went out of their way to support the monitors. In addition to these attitudes, easy access to the fishers was mentioned as an enabling factor for monitoring (e.g., living nearby, or it being easy to find them at certain times; Fig. 4C). In the group discussion of the preliminary results, one participant told the story of building these relationships through the programme:

Before our relationship with the fishermen wasn't very good, ... because they didn't understand about our work with the fisheries monitoring group yet. But now the fishers already know about our activities, ... every day we always go to collect data from them... Our relationships with the local authorities are also very good... Whenever there is some activity in the suco they invite us to participate, and each month we present our data.²

In addition to the supportive relationships with the fishers, the participants also mentioned supportive family members who helped them monitor the fisheries (e.g., fishers who completed surveys with their nieces, or family members who assisted with livelihood activities so that participants could conduct monitoring; Fig. 4D). Several photo stories also portrayed supportive relationships within the monitoring group (Fig. 4E) or group activities relating to marine management or environmental stewardship. In the group discussion of the preliminary results, participants shared examples of how they work together and support each other:

When a friend's phone isn't working, we always help them with entering their data, when someone has run

² All quotes and photo captions were originally provided in Tetun or Rasua'a and are presented here translated into English.



Fig. 4 (A) This fisher is my favourite because he does the survey every day. I want him to rest at home when the sea is too rough, by Elmanda; (B) The time in the morning when the fishers go fishing with canoes, but it would be good if they had motorboats and life-saving equipment, by Samsi; (C) A group of fishermen that live close to me are about to go diving. They usually catch big fish and I think it

could be improved by having Tara Bandu, by Hiana; (D) Me and my family tying the seaweed. When I'm doing the fisheries monitoring, they take over for me, by Alianca; (E) We are always together, which makes it easy to collect the data. It can be hard waiting for the fishers so I would like to change how we do it, by Hiana. See Appendix 2.2

out of internet credit, we hotspot each other, and when someone's equipment isn't complete, we lend them what they need.

The final group of enabling factors was the fact that the survey method was achievable, the participants were able to learn the monitoring skills, and the survey schedule was compatible with their other activities (Fig. 4D). The method, itself, was co-designed with the participants and several of the photo stories suggested additional improvements.

In response to the photo prompt, "What makes it harder to participate in fisheries monitoring or management?", the photo stories demonstrated social, technological, and logistical or pragmatic constraints. The main challenges

related to interacting with the fishers (Fig. 5A, B), technological issues (Fig. 5C), or problems related to the timing or schedule of data collection activities (Fig. 5D). An additional constraint mentioned was that ocean conditions can be poor, and that fishers do not go fishing then (Fig. 5E). Although this prevents participants from completing full surveys, data about non-fishing days should still be considered a successful survey rather than a failure to complete monitoring (as was implied in some of the photo stories) because the seasonal decrease of fishing activity is a valid finding, rather than a flawed gap in the data. Several of the constraints mentioned related to enabling factors, suggesting they can be a help or a hindrance depending on the situation. For example,

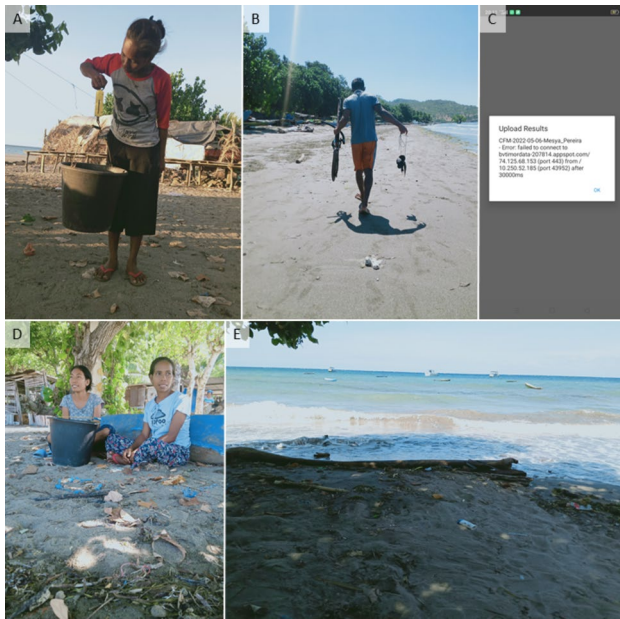


Fig. 5 (A) I'm weighing fish in a bucket, but it can be hard to do data collection because I don't know all of the fishers, by Meret. (B) This fisherman did not provide his fish for data collection, by Alfansina; (C) An ODK error message due to poor internet, by Samsi; (D) Our challenge is that we have to wait for the fishers for up to 1 or 2 hours, so we should develop a better schedule, by Alfansina; (E) Fishers can't go fishing due to rough seas at the moment, so we can't collect data. We should clean the beach, so the rubbish doesn't impact the ocean, by Meret. See Appendix 2.3

the fishers usually enable the monitoring but can also obstruct it, and methods are effective but can become a barrier when phone signal is poor.

Impact of participating in the programme and the desire to create more change

A dominant theme throughout the photo stories was the idea of creating change, whether it was how the programme could be improved, how the participants wanted to change their community, or personal growth. Although one of the photography prompts explicitly referred to the participants' vision for the future of the monitoring programme and marine management, many people included suggestions, aspirations, and calls for change in other photo stories (as is encouraged by the photovoice methodology, which incorporates advocacy and seeking social change). These photo stories explored the impact of the programme thus far, as well as the impact they would like it to have in the future, both within the programme and in marine management more broadly. This project includes photovoice activities aimed at advocacy, such as sharing the photo stories with the wider community. Much of the content of the photo stories was also advocacy-related, with that also being a focus of the

GMP programme. According to their photo stories, for many of the participants, their desire to create change in their community was part of their motivation for participating in the fisheries monitoring programme. The desire to create change often extended beyond the monitoring programme itself, whilst being encouraged and facilitated by participating in the monitoring programme. These suggestions and aspirations fit into the categories of (i) personal goals, (ii) fisheries monitoring and management, and (iii) the wider community. Many of the photo stories contained themes of advocating for others, environmental stewardship, and investing in the future, with participants often exploring different aspects of an important issue through several photo stories (e.g., one of the participants, Ermelita, discussed data visualisation across three photo stories [including Figs. 3D, and 6E]). Participants stated that their suggestions and calls for change in their community were often connected with the skills or knowledge they had learned as part of the fisheries monitoring programme, for example, public speaking or leadership, technical concepts about fisheries or marine conservation, or confidence to interact with fishers. Although the participants may have had an interest in these topics before the programme, they shared stories of how they had learned new skills and gathered new ideas and opinions about how they would like their community and marine management to develop in the future (Figs. 3, and 6).

The photography prompts asked about the impact of the programme and, in many of the photo stories, these areas of impact overlapped with aspirations regarding positive social change impacts that participants desired the programme to have in the future. The interviews suggested that many of these impacts have begun to occur, which had immediately led to the desire for bigger and better goals amongst the participants. For example, several photo stories mentioned skills they have already learned and why these skills are needed to create change (Fig. 3C, D). Several participants also mentioned specific personal or skill development goals. When asked what they would like to do as part of the programme in the future, participants mentioned learning to use a computer, speaking English, and learning to snorkel (Figs. 3D and 6A, B). Soft skills were also mentioned (Fig. 8B), as well as an interest in deepening their knowledge about fisheries monitoring, photovoice, or related activities (Figs 3C, D and 8B). In the group discussion of the preliminary results, participant statements included, "Before working in the fisheries monitoring group, I was afraid of speaking at the front, but now I can do it," and "Before learning about how to organise a group I was scared to do it, but now I already believe in myself to organise the group and communicate with the Blue Ventures team in order to organise our activities".

Numerous photo stories included recommendations or ideas about how to improve the fisheries monitoring



Fig. 6 (A) I am learning English and I'd like to speak with foreigners as part of the GMP programme, by Ermelita; (B) Until now we always worked on land, but now I want to learn snorkelling so I can see the fish underwater too, by Samsi; (C) These are some fish which should be included in the ODK survey so that we can photograph them, collect more detailed data and know if they are declining or increasing, by Samsi; (D) My father is interested in implement-

ing *Tara Bandu* because it could increase the fish and if we don't, but continue fishing often, then we won't find fish in the future, by Alfansina; (E) Fishers can use the graphs of the catch data to establish *Tara Bandu*, and cause these trends to change, by Ermelita; (F) Women in the community cleaning up the road, just as we should clean the beach. Men should be doing it too, by Ermelita. See Appendix 2.4

programme, itself. These photo stories discussed (i) the survey method and schedule, (ii) marine conservation/management activities that participants desired to undertake, and (iii) larger goals for marine management and fishery development in Ilik-namu. Although the participatory fisheries monitoring survey method itself was considered to be accessible overall, participants suggested improvements such as including more fish species interest — specifically *Melichthys niger* (Fig. 6C), *Lethrinus* sp., and *Lutjanus gibbus* — and reducing the time spent waiting for fishers at the beach (Fig. 5D, E). Beyond the data collection itself, many photo stories contained messages around marine management or conservation, often suggesting that the fisheries monitoring group could work together with other groups, such as fishers or the wider community, to spread awareness or conduct activities like beach cleans (Figs. 5E, and

6F). The only explicit mention of gendered activities in the photo stories involved these community activities (Fig. 6F), however, some gendered activities and norms were portrayed in the photo without being specifically discussed or framed as gendered issues by the participants.

Several photo stories explored how the data that the group collects should be visualised, shared, and used for implementing *Tara Bandu* or other marine management activities (Fig. 6D, E). Numerous references were made to how technology and new skills could be used in this endeavour (Figs. 3B, and 6E). In terms of marine management, several photo stories discussed how many fishers were already limiting their fishing to large fish rather than juveniles due to ongoing conversations within the community (Fig. 7B). However, they also stated that more education on these topics was needed, especially regarding



Fig. 7 (A) My sister and family tying seaweed. In the future I'd like the monitoring group to collect data about seaweed too, by Alfansina; (B) A fisherman who knows to catch the big fish and who participates in the catch monitoring daily, by Elmanda; (C) Through our data sharing with the fishers, they now understand that they should only catch the big fish, not the juveniles, by Samsi; (D) A house that I

want to turn into a homestay for the tourists who may come for swimming and diving, by Ermelita; (E) I want this younger brother, who is holding what he caught today, to focus on school. When he goes diving, he should go with older family members, not alone, by Alianca. See Appendix 2.5

the benefits and need for *Tara Bandu*, which was said to lead to ecological, economic, and social benefits (Figs. 4C, 6D, E, and 7D). The livelihood benefits of *Tara Bandu* mainly related to ensuring sustainable fisheries in the future, as well as tourism opportunities. Although many photo stories advocated for the need to implement *Tara Bandu*, none of them explicitly stated why this had not yet happened, instead focussing on those who already want *Tara Bandu* to be implemented, the need to conduct more awareness raising, and the value of sharing data as for evidence-based decision-making (Figs. 6D, and 8A).

In addition to these marine management topics, participants also created photo stories on themes of other livelihood activities, youth, advocacy for fishers, and collective action, which all related to the overarching topics of marine natural resources and nature-based livelihoods.

The participants characterised marine management and fisheries monitoring as a necessary part of safeguarding their natural resources and the fishers' livelihoods for the future

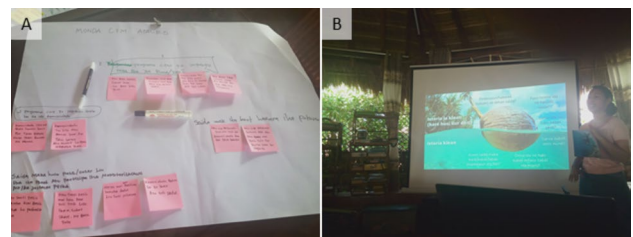


Fig. 8 (A) I want to learn more about the fisheries monitoring activities, like we have done through photovoice, by Elmanda; (B) I want to learn more about photovoice, have a good mindset, and be able to stand up and speak at the front, by Elmanda. See Appendix 2.6

(Fig. 6D). Several photo stories described how implementing marine management or conservation activities could lead to tourism opportunities (Fig. 7D), or how photography from the monitoring surveys or photovoice could be used to sell fish or seaweed, or to promote the local area to tourists (Fig. 7A, D). Numerous photo stories also suggested means to better support fishers or described their vision for the sector in the future, including references to safety at sea (especially for youth), fishing equipment or boats, better storage or facilities, and market access (Fig. 4B, and 7E).

Photovoice reflections from participants

In the interviews, the participants were asked to comment on their thoughts about photovoice or any challenges they encountered when developing their photo stories. One participant reflected on her participation in the photovoice study in two of her photo stories because of the connection with some of her other aspirations (Fig. 8B). Overall, the participants found photovoice to be a positive experience, and for many, it was their first time participating in this type of study (i.e. interviews, research, or photography). Several participants valued the photovoice process because it helped them understand more about their participation in GMP and allowed them to think deeply about their achievements and future aspirations (stated by 4 of 7 participants). They commented that they enjoyed learning about photography and storytelling. The challenges regarding the photovoice process itself mainly related to a poor internet signal or technology issues, or the fact that the sea was quite rough during the study period so they could not take the photos they envisaged with fishers, as there was much less fishing taking place. Nevertheless, this envisaging was a valuable exercise in developing ideas, even when the photos could not be produced.

Discussion

The aim of this study was to explore the links between women's participation in fisheries monitoring, empowerment, and inclusion in CBFM. The nature of photovoice means that concepts that are easily visualised and photographed are included the most, as presented in the results. However, the photo stories can still hint at some of the less visual phenomena that occur as a result of participation in the fisheries monitoring programme, which are explored here. This discussion argues for the facilitation of 'critical and careful listening' by the researchers and practitioners of marine management to the participants' voices, whilst acknowledging that these findings are only

a small part of some of those voices (Fairey 2018). These voices will be re-negotiated many times as the photovoice project and the participatory fisheries monitoring programmes continue.

Empowerment through participatory fisheries monitoring

The overarching takeaway from the photo stories is the participants' sense of community and the personal and collective empowerment which they describe, focussing on how individuals and groups are working to pursue their goals, manage their marine resources, and create change. Though participants described personal benefits, and the changes they experienced as a group, they mainly focussed on the impact on the community, which is consistent with Timor-Leste's collectivist culture (Askland 2014). The participants' stories constructed a narrative of personal learning and growth, alongside increased community education and autonomy to manage marine resources, with these two processes continually strengthening each other. As the participants became more knowledgeable and confident, for instance, they influenced and educated the fishers and wider community, just as when the community became more engaged in marine management, the community members supported the participants and their involvement with the monitoring programme. As such, the participants' characterisation of the impact of the participatory monitoring programme was consistent with work by Jentoft (2005) on fisheries co-management as empowerment, in which "empowerment is both a condition and a goal of fisheries co-management". This occurs on both the individual and collective levels, where these processes become "mutually dependent and reinforcing" (Jentoft 2005). However, Jentoft's (2005) framework was gender-blind, not acknowledging the gender relations, power dynamic, or inequities within communities that may shape this process (Rabbitt et al. 2022). For example, a common topic in the photo stories was the idea of the women's GMP being supported and enabled by predominantly male fishers, who were viewed as an end-user of the data, without whom the programme would not be possible. Many of the young women who participated in this project described being afraid of standing up to speak in front of the community, a reflection of their social norms and personal capacity, which determined their ability to participate in community meetings on fisheries management. As such, the dynamics between the genders and people involved in the different elements of the fisheries management process influenced how CBFM occurred in reality. There were aspects of participation and empowerment which specifically related to the dynamics of participatory monitoring being carried out by women. The social relations approach views development as wellbeing, so that

dimensions such as autonomy and security are not overlooked in favour of economic development (Kabeer 1994). This is consistent with the holistic view of the participants, whose photo stories emphasise the importance of changes in confidence, decision-making power, and conflict, alongside the importance of economic opportunities and sustainability. Such integrated approaches to fisheries governance allow room for “the material, relational and subjective dimensions” of wellbeing at various scales (Weeratunge et al. 2014), which should be considered to address the complexities of SSF governance.

In participatory fisheries monitoring, data collectors could be treated as active agents with decision-making power, or as instruments who were merely there to fulfil an existing goal (House et al. 2022). In this study, the participants positioned themselves as agents of change, who were working to improve their community and realise their goals through participatory fisheries monitoring as part of CBFM. In the GMP programme, increasing participants’ capacity and expanding their horizons has intrinsic value and was not just a means to the end goal of implementing marine management. However, the nature of data collectors’ participation, and their relationship with the data, varied during different stages of the programme, for example when the data feedback mechanism was disrupted during the COVID-19 pandemic. Thus, consistent with the observations of Paul et al. (2016), the participation oscillated on a spectrum between being extractive and empowering depending on the situation and how the programme staff and wider community related to their work. The risk in participatory fisheries monitoring is that the monitoring will remain just an additional task for women (i.e., activity-specific participation), and that it will not translate into empowering participation (Agarwal 2001; Rabbitt et al. 2022). Nevertheless, the participants also discussed how they could empower the fishers in their community to manage their own marine resources and improve their livelihoods, and the opportunities and power which they had as a result of the programme. This contrasts with the marginalisation narratives often perpetuated in discussions about women’s participation in fisheries management (House et al. 2022), as well as the assumption that women are a vulnerable and homogenous group (J. D. Lau et al. 2021). The participants emphasised their growth in a form of power easily overlooked by Western framings of women’s empowerment — the power to help others (as demonstrated by the photo stories about how they have already, or hope to, improve their community). However, the power to make decisions and work towards collective goals is part of the shifting power relations involved in empowerment (Cornwall 2016). This analysis demonstrates that there were various forms of empowerment happening concurrently that impacted people of all genders inside and outside of the GMP programme. These empowering processes appeared

to be interrelated, occurring at different speeds, and were based on individuals’ openness to learning, collaboration, and action. Just as previous work using the social relations approach has found (Hillenbrand et al. 2014), this analysis supports the finding that development programmes must consider metrics of change in relation to the aspirations or definitions of people in their own context.

Relationships, participation and influencing marine management

This analysis found that participants empowered themselves and others through participating in fisheries monitoring, as a result of their collaborative approach and advocacy for others. The participants’ photo stories explored various relationships that directly or indirectly enabled or constrained their participation in fisheries monitoring, as well as those which shaped broader marine management, and how this changed as a result of their monitoring activities. An enabling environment for participatory processes in resource management was created by contextual or procedural factors, including institutional factors (Jiménez et al. 2019). As Kabeer (1994) explains, institutions and the way that people experience them are both the result and cause of gender relations. In this study, participants mainly focussed on the procedural elements of fisheries monitoring and management. This may be because these aspects were easier to show visually in photographs, or because they were the most striking examples. The support of male fishers and family members was clearly an important part of enabling the fisheries monitoring to take place. As mentioned in the “[Motivation, enablers, and constraints for participating in fisheries monitoring](#)” section, the positive relationships between the fishers and the participants are integral to women’s participation in CBFM. Such expressions of fisher masculinity can accept and support women’s participation in fisheries (Salguero-Velázquez et al. 2022), in contrast to those expressions of masculinity that reinforce barriers to women’s participation in fishing or management (Fabinyi 2007; Gustavsson and Riley 2020; Salguero-Velázquez et al. 2022; Siegelman et al. 2019). According to the participants, the participatory monitoring process had helped to build these collaborative relationships, which thereby created a more enabling environment. Though the participants faced significant resistance at the beginning of the GMP programme, there is now a more open information flow, with fishers sharing their knowledge with the data collectors, and the data collectors sharing their findings, whilst being respected and listened to by both fishers and community leaders. This is normalising women being in a role that was previously considered a male domain. The relationships and shifts in power or participation which were described

in the photo stories the most, occurred at the household/family level and community levels, two of the nested levels identified by Kabeer (1994), alongside the state and the market. The changes described by the participants shape their experiences and relations within their families and communities, both as individuals and as a group. The extent of these changes for women who are not members of the GMP remain to be seen.

In terms of how the fisheries monitoring programme has influenced wider marine management, the relationship-building, which has taken place between the data collectors, fishers, wider community, and external organisations, has facilitated collective learning and behaviour change, making local CBFM more inclusive and sustainable. The participants' photo stories suggest that the combination of collecting data that can support conversations about marine management, along with the relationship building aspect of the monitoring programme, could lead to the implementation of *Tara Bandu* in the future. Thus far, they have already seen changes, such as women from GMP being invited to meetings related to marine management, increased community engagement with the ongoing marine management discussion, and fishers modifying their fishing to avoid catching juvenile fish. The participants' views are consistent with many of the assertions found in the literature regarding social learning in natural resources management, for instance, that ongoing fisheries monitoring will lead to improved decision making, changes in perceptions and norms, collective action, and may direct the fishery towards a path that is more desirable to the various stakeholders (Cundill and Rodela 2012). The findings suggest this learning began within the GMP and now includes the fishers who interact with the programme, as well as the family members and others who support the data collectors.

In addition to the behaviour change, education, and informal shifts which have already occurred, many participants discussed their desire for formal marine management measures, such as *Tara Bandu*. Despite growing interest and support for implementing such measures amongst both fishers and the wider community, *Tara Bandu* has yet to be implemented. Although it was found that participatory fisheries monitoring has shaped this conversation and increased support for *Tara Bandu*, this study did not determine what the barriers to implementation were, since all the participants are already supportive. However, the findings demonstrated the numerous changes that had already occurred as a result of participatory fisheries monitoring and CBFM. This emphasises the value of participatory monitoring and evaluation methods that can identify unexpected or gradual changes, rather than focussing on formal marine management measures or quantifiable indicators as the metrics of success.

Conclusion

In this photovoice project, participants explored their experiences of participating in fisheries monitoring, including the impacts of these activities, the enabling and constraining factors to their participation, and their hopes for the future of fisheries monitoring and management within their community of Ilik-namu, Atauro. This study found that the various forms of empowerment were demonstrated (i.e. individual, community-level, or women's empowerment), with the participants' photo stories pulling together several theoretical perspectives and showing how these interact and play out in real life within their cultural context. For example, the view of fisheries monitoring and management the photo stories express shares similarities with Jentoft's (2005) characterisation of fisheries "co-management as empowerment", but they also incorporated a relational lens that highlights intra-community relations and gender dynamics (Kabeer 1994). The photo stories reflect some views of marine management and livelihoods that reflect the influence of international NGOs, but they also frame everything in a more process-oriented and collective way than the way that development NGOs tend to apply concepts such as empowerment or participation (Cornwall and Brock 2005).

The participants' photo stories emphasised the enabling relationships that shape their participation in fisheries monitoring, as well as how these relationships are strengthened through participatory monitoring, and thereby contribute to social learning, collective action, and an increased awareness and engagement in the discussion around marine management. Where classic monitoring and evaluation approaches treat the data collection method and process as an impartial and objective means to reach an assessment outcome, these findings demonstrate the value of process-oriented approaches in monitoring and evaluation, as well as in fisheries monitoring and management. Such approaches can capture the experiential and relational aspects of gender dynamics and women's empowerment, and can capitalise on the lessons of participatory monitoring and evaluation by enabling a process of reflecting on the past and envisaging the future.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s40152-024-00352-6>.

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Declarations

Ethics approval Ethical clearance was obtained from Charles Darwin University Human Research Ethics Committee (H21025).

Conflict of interest The authors NMSA, JSdJ, and JG are current employees of Blue Ventures Conservation, Timor-Leste, and JH is a former employee (see the positionality statement in Section 2.3 for more details). The remaining authors (MC, DK, DJS, and NS) have no competing interests to declare that are relevant to the content of this article.

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