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Participatory video as a tool for co-management in coastal communities: a case study from Madagascar

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Here we examine participatory video (supporting a group to make a film around a specific issue) as a tool to facilitate input of local knowledge and empower communities in stewardship over their local marine resources. We draw from the "Voices of the Vezo" project, where researchers collaborated with a co-management partner organization and local youth to create participatory videos in traditional Vezo fishing communities in southwest Madagascar. The project focused on documenting and sharing local knowledge on shifting social-ecological conditions. Four communities participated in the project with 90 people interviewed and seven short films (7–15 min) created. The films were shared in the communities at public cinema nights and made widely available online. This paper describes the Voices of the Vezo project's process and outputs, examines participatory video's potential as a tool for community co-management, and outlines practical challenges and recommendations for implementing a participatory video project. We found videography to be a powerful tool for synthesizing local knowledge of shifting social and ecological conditions, especially where written records are scarce. We also identified specific examples where gathering and sharing community perceptions of marine ecosystem decline could foster discussion and action toward locally driven management interventions. Youth participants in the Voices of the Vezo project reported gaining knowledge and motivation to address marine management issues, indicating the potential for participatory video processes to cultivate local leadership. Finally, for participatory video practitioners, we found important practical considerations to help minimize biases when supporting communities with a participatory video process.

KEYWORDS

participatory video, participatory research, Madagascar, fisheries, traditional ecological knowledge, local ecological knowledge, co-management, community-based management

1. Introduction

Across the globe, marine coastal ecosystems are declining at an alarming rate (Beddington et al., 2005; Henson et al., 2017; Eddy et al., 2021). For hundreds of millions of small-scale fishers in the coastal tropics, this threatens their livelihoods and food security (Beddington et al., 2005; Barange et al., 2014). Over recent decades, community co-management has been increasingly used in management of small-scale fisheries

(Rocliffe et al., 2014; FAO, 2020). Community co-management moves away from top-down governance and devolves management to local resource users in partnership with other actors. In contrast to the more widely used term "community-based management," community co-management acknowledges that many local communities do not have the financial or technical resources to implement natural resource management independently. Therefore, management initiatives are undertaken in partnership with government and/or non-governmental organizations (NGOs; Cinner et al., 2012). Alongside the co-management partner, co-management can often involve a diversity of other institutional linkages with the community from local to international scales, including the private sector, donors, practitioners, and researchers (Berkes, 2009; Cinner et al., 2012).

In Madagascar, as in many low-income economies, scientifically-derived data of the historic and current conditions of coastal ecosystems and human interactions with these ecosystems are limited (van der Elst et al., 2009). When supporting communities to implement resource management, lack of evidence around ecosystem conditions can hamper ability to make locally-relevant evidenced based decisions (Christie et al., 2021). Furthermore, lack of knowledge of the historical conditions may lead to management decisions that underestimate the recovery potential (or further decline) of the ecosystem (Plumeridge and Roberts, 2017). This can have consequences for biodiversity, but also shift perceptions for the potential services available from the ecosystem, such as food provision (Klein and Thurstan, 2016; Pauly and Zeller, 2016). Alongside ecosystem knowledge, it is critical that co-management plans consider the social-ecological dynamics of the local context: specifically, how people experience ecosystem change in relation to their livelihoods and wellbeing. Gaining an understanding of underlying cultural, economic and nutritional ties to natural resources is fundamental for effective and sustainable management (Bennett and Dearden, 2014; Stephanson and Mascia, 2014).

Local ecological knowledge (LEK) refers to knowledge constructed not by subject-area experts but by local resource users and community managers (Berkes, 2009). It can provide in-depth understanding into both historic ecosystem trajectories (Brook and McLachlan, 2008) and social-ecological dynamics (del Mar Delgado-Serrano et al., 2015). Increasingly, under co-management frameworks, conservation researchers and practitioners are employing methods which engage LEK to help ensure research and interventions are locally relevant and serve on-the-ground needs (McMurdo Hamilton et al., 2021). The collection and incorporation of LEK can also provide opportunities to develop local capacity, sense of agency and conservation ethic, together providing a foundation for resource management in the local community (Granek and Brown, 2005).

In co-management arrangements, power sharing between local communities and other stakeholders (e.g., NGOs, government or private sector) can pose inherent challenges. Nonetheless, these power imbalances can be alleviated through effective dialogue, knowledge exchange, and open discussions of issues (Borrini-Feyerabend et al., 2007; Berkes, 2009). Participatory video (PV) is a method that promotes the synthesis of community knowledge by supporting a group to create their own film around a specific issue. The visual and oral mode of engagement can encourage marginalized groups to contribute, documenting knowledge and voices of those in society that are often unrepresented in decision-making spaces (Tremblay and Jayme, 2015; Mistry et al., 2016a). New ideas and issues faced by participants in the PV process may challenge local perspectives and inspire agency over local solutions (Tremblay and Jayme, 2015; Cai et al., 2019). The PV process can also cultivate political capacity, empowering participants to "make their voices heard" (White, 2003). PV films are often shared with the wider community, external agencies and decision-makers as a tool to directly communicate local perspectives (Thompson, 2018). This can help inform management actions that are effective and relevant in the local social and ecological context (Beh et al., 2013), as well as the validation and empowerment of local voices and views on managing resources. For example, in Turks and Caicos, a PV process used to gather stakeholder perspectives on the local sea turtle fishery resulted in formal amendments in fishery legislation (Christie et al., 2014). In the context of ecosystem change, PV provides a platform to collate local knowledge and can reveal issues which the researchers may have missed (Calheiros et al., 2000) and/or are not usually shared between different community members or cohorts (Mistry et al., 2016b).

In this paper, we describe the process and outcomes of a pilot PV project titled *Voices of the Vezo* (VOTV), undertaken between October and December 2022 in four traditional fishing communities in southwest Madagascar. We describe engagement with and outputs from the PV process and then consider its potential as a tool in conservation co-management contexts. We also discuss the practical challenges faced during the VOTV project and make recommendations for co-management organizations, communities and/or researchers considering using PV in the future.

2. Materials and methods

2.1. Study context

Madagascar is the fourth largest island in the world and despite considerable natural resources, 81% of people live below the international poverty line and 33% of the population is food insecure (World Bank, 2023). Madagascar's community-based small-scale fisheries are of major importance for the population inhabiting the extensive coastline (Le Manach et al., 2012). Over half of all fishers operate in the Toliara province in the southwest of the country (Laroche and Ramananarivo, 1995). This region is largely populated by traditional Vezo fishing communities whose cultural identity has been strongly tied to the ocean since their arrival in Madagascar some 2000 years ago (Astuti, 1995). Poor transport infrastructure, an arid climate and low agricultural productivity in southwest Madagascar mean there are very few economic or subsistence alternatives to traditional fishing and reef gleaning (Harris, 2007). Therefore, the livelihoods of Vezo people remain highly dependent on the ocean with the small-scale fisheries sector employing 87% of the adult population and providing 99% of protein for household meals (Barnes-Mauthe et al., 2013). In the past two decades, collaborative efforts between

NGOs and commercial companies have been dedicated to reducing dependence on fisheries while creating alternative income sources in the region. This has led to the development of community-based aquaculture (CBA) of seaweed and sea cucumbers (Eeckhaut et al., 2008; Ateweberhan et al., 2015, 2018). The products of the CBAs are sold primarily for international export.

The coastal environment of southwest Madagascar includes extensive areas of seagrass and mangroves with large areas of coral reef including the Grand Récif de Toliara, the third largest reef system in the world. Vezo fishers employ a wide variety of gear and fishing techniques depending on their target species (Gough et al., 2009). In general, line, net and spear fishing from a non-motorized pirogue (open dug-out canoe) is undertaken by men while women glean in the intertidal area. Gleaning in this context is primarily walking the reef around the period of spring low tide to collect marine invertebrates including octopus, sea cucumber and urchins. Unsustainable fishing activity is rapidly degrading Madagascar's coastal ecosystems, driven by both international seafood export demand (Le Manach et al., 2011, 2012) and a growing population (Brenier et al., 2011). Population increase has been attributed to coastward migration of inland communities in response to declining agricultural productivity (Bruggemann et al., 2012) and high birth rates due to lack of access to family planning services (Harris et al., 2012). The adverse effects of overfishing are further compounded by destructive fishing practices such as poison fishing, beach seining and the destructive methods of invertebrate collection (Gough et al., 2009; Andréfouët et al., 2013). Direct pressures are exacerbated by climate disturbances including coral bleaching caused by marine heatwaves (McClanahan et al., 2007; Gudka et al., 2018), and destructive cyclones that reduce coral cover (Carter et al., 2022).

2.2. Study sites

The PV workshops took place in four villages located between 135 km and 150 km north of the regional capital of Toliara (Figure 1). Three of the villages: Ampasilava, Tampolove and Andavadoaka (estimated populations 300, 500, and 2,200 respectively) were in the Velondriake Locally Managed Marine Area (LMMA). The Velondriake LMMA was established in 2006 and now includes 32 villages along a 45 km stretch of coastline. Velondriake operates in a co-management arrangement, governed by the Velondriake Association (VA), an elected association of community members, with support and technical backstopping provided by marine conservation NGO Blue Ventures. Initially, the LMMA operations were financed by ecotourism activities however in recent years this has been replaced by donor funding (Gardner et al., 2020). The VA manages temporary fishery closures, seven permanent no take zones and gear-based prohibitions (see Gardner et al., 2020 for further information on Velondriake). The fourth village, Ambatomilo (estimated population 700), was in the Manjaboake LMMA, directly south of Velondriake. Manjaboake was established in 2010. It is managed under a similar co-management arrangement as Velondriake and includes temporary fishery closures and gear-based prohibitions. A permanent no- take zone was implemented in 2023 in Manjaboake LMMA, after the VOTV workshops (Blue Ventures, personal communication).

2.3. Community partnerships and co-production

Establishing trust between participatory video practitioners and the community is essential in participatory video projects (Harris, 2009; Wheeler, 2009). VOTV was undertaken in collaboration with the NGO Blue Ventures. Blue Ventures has been working in the southwest Madagascar since 2003 with a local headquarters in Andavadoaka employing around 25 local residents. Blue Ventures maintained an uninterrupted presence has allowed it to become an enmeshed and active constituent within Velondriake, fostering trust and acceptance with the local communities. The partnership also provides the VA a vehicle to pursue legal procedure (e.g., ratification of local by-laws—the *dina*) and overcome social norms and dynamics (e.g., family ties, fear of retribution or witchcraft) which otherwise may prevent them from applying rules (a detailed assessment of the co-management partnership between the VA and BV can be found in Gardner et al., 2020).

The Blue Ventures Andavadoaka office has a dedicated outreach team responsible for building community connections and creating educational materials around health and environmental issues, often using film and radio. Blue Ventures' long-standing relationship with the communities was vital to the success of the project. The community members' familiarity with Blue Ventures and pre-existing level of trust was instrumental in obtaining permission for the PV workshops from the village chief (the *fokotany*) in each of the participating villages and finding participants willing to take part in the project.

The VOTV project team comprised both researchers and local employees of Blue Ventures and was co-led by authors A. Carter and S. Maniry Soa. The project was initiated by A. Carter following 2 years of social ecological research focused on the region. The idea was subsequently developed through a series of consultations with Blue Ventures staff including S. Maniry Soa, which involved refining research questions, selecting sites, and adapting the participatory video process to the local context. All participatory video workshop activities were conducted in the Vezo dialect and later translated into English.

2.4. Ethical considerations

PV raises complex questions around confidentiality, data ownership and gaining consent from anybody filmed as part of the participatory process (Bali and Kofinas, 2014; Mistry et al., 2015). We endeavored to be adaptive and reflective in our approach in the context of different communities facing varying issues and challenges which may intersect the PV process (Mistry et al., 2015; Fisher et al., 2021).

In each village, the *fokotany* was approached and presented the project to get their consent. Each PV workshop started with a discussion of ethical issues with agreement that the participants would have access to the raw footage, own copies of the film

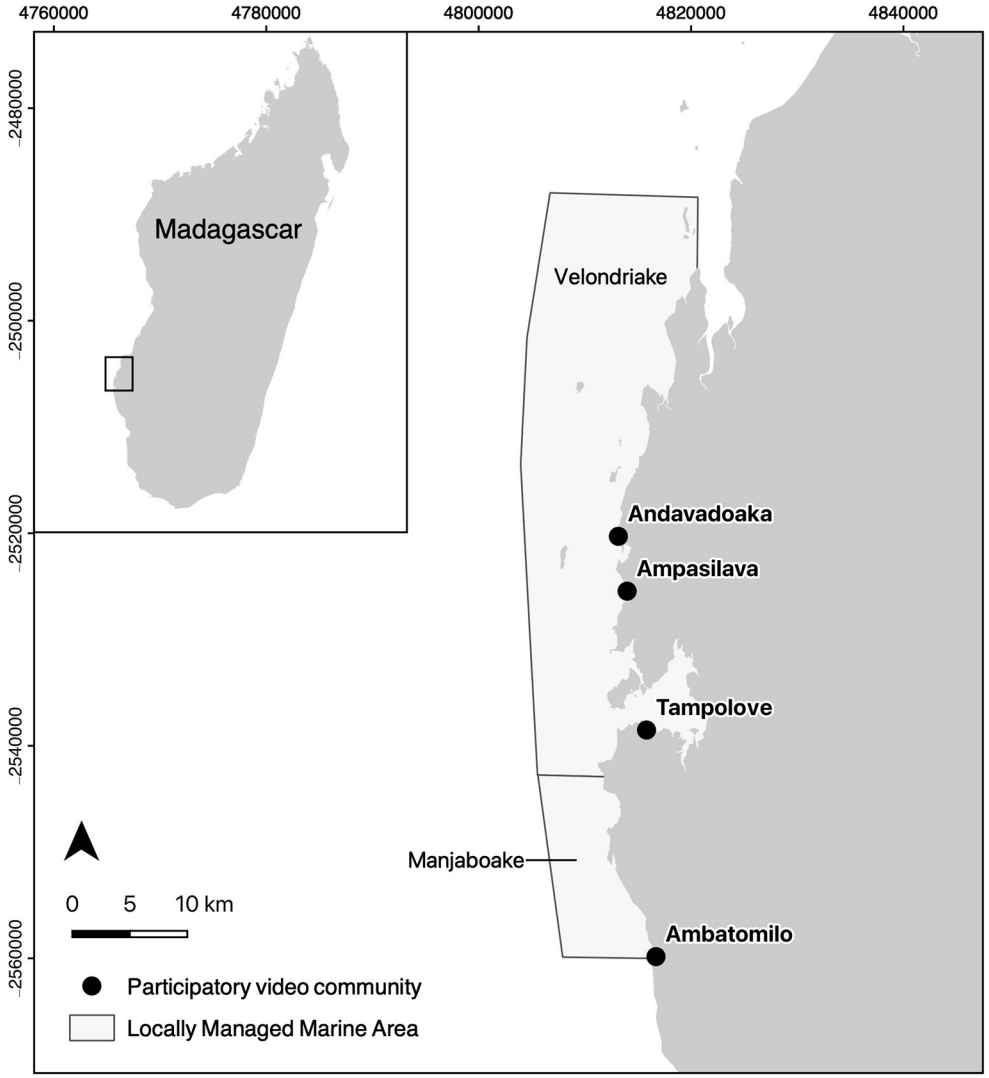

FIGURE 1
The location of the communities which took part in the Voices of the Vezo participatory video project and the boundaries of the Locally Managed Marine Area in the region. Inset shows the location of the study region in southwest Madagascar.

and that all films would be available in the public domain. It was also emphasized to the participants that they were free to fully or partially withdraw from the activity at any time (Mistry et al., 2015). The ethical discussion was delivered verbally and confirmed with a signature from the participants. Before filming, participants were trained in the importance of consent when conducting interviews, ensuring the interview subjects were fully aware of the projects goals and outcomes and of the public dissemination of the material (Bali and Kofinas, 2014). Participants were directed to obtain verbal consent for each interview.

The VOTV process was reviewed internationally (School of Geosciences, University of Edinburgh; Reference Number 2022-666) and in-country (Blue Ventures). Institutional ethics guidelines do not exist in Madagascar; however, Blue Ventures has its own established ethics review process developed from a community ethics committee and two decades of experience working in the region. Blue Ventures has a Memorandum of Understanding with the VA that permits it to collate and share results related to the LMMA and an Accord de Siège with the Madagascar Government permitting it to carry out research.

2.5. Equipment

Filming was carried out exclusively with the iPhone 12 Max Pro using the application Filmic Pro. The choice of a smartphone was deliberate as, although technology access in the study region is generally low, a considerable number of community members own smartphones. This enabled the participants to quickly understand the camera controls due to their familiarity with the technology. The large size of the smartphone screen made it possible for all participants to view it simultaneously. In addition, each group was provided with a tripod and rig to hold the smartphone, a directional microphone with a windscreen, and a pair of over-ear

headphones. Large paper and sticky notes were used during the group editing stage.

2.6. Participants

We refer to the youth that took part in the PV training and made the films as "participants." In each village, six to eight participants (aged between 20 and 30) took part in the workshop. Those chosen to participate was determined by the leader of the local youth group and/or the village president. A total of thirty-one participants took part in the workshops, including eight men and 22 women. In the study region, youth group is a term used to describe a community group made up of the younger generation (around 30 and under) engaged in outreach and education activities around community issues. All participants received an honorarium based on local norms as compensation for their time.

2.7. Participatory video workshop

We held a PV workshop in each of the four participating villages. The PV workshops took place over 3 to 5 days. Workshops included training the participants in camera and interview skills, recording footage for the film, footage reviews, group editing and feedback session where participants reflected on the PV activity.

2.7.1. Training and filming

The workshops started with a brief overview of the project, which was followed by training in camera and interview techniques, facilitated through various games and role-play activities. Camera training commenced with basic instruction on camera and microphone controls, and subsequently focused on framing techniques (Figure 2A). Participants were also taught the role of "B-roll" (cutaway footage) in providing visual interest and contextualization for the interviews. The camera equipment was deliberately handed over to the participants at the outset of the session to promote a sense of ownership of the project (Lunch and Lunch, 2006).

Prior to commencing the filming, the PV workshop facilitators engaged the participants in a discussion on the topic of marine ecosystem change and how this is impacting Vezo communities. While the VOTV team had an *a priori* interest in environment change, the participants were encouraged to discuss any issues of interest to them within this topic. This approach helped support the participants to construct their own narrative on the issue, highlighting what they deemed important and interesting. To promote a comprehensive understanding of community perspectives and knowledge, we encouraged participants to interview different social groups in the community, including community elders, youth, and an equal number of men and women. Interviewees were selected by the PV participants though a combination of targeted key informant interviews (for example, where the group identified a community leader, elder or resource user they wanted to include in the film) and opportunistic selection, as the group walked around the village.

For the filming in each village, the workshop participants were divided into two groups of four to five individuals and filmed for 2 days (Figure 2B). A facilitator provided support to each group during the initial interviews, assisting the participants whilst they became familiar with the equipment and filming techniques. During the 2-day workshop, both groups met for regular footage review sessions. These sessions allowed the facilitators and participants to evaluate the footage and encourage peer-review within and between groups, promoting a sense of community ownership while also improving video and interviewing skills. Additionally, the facilitators utilized these sessions to identify areas where further training and guidance could enhance the quality of the videos and interviews.

2.7.2. Editing

The PV groups began the first stage of editing the films using a storyboard technique on a large sheet of paper (Figures 2C, D). Unlike editing on a computer, this approach allowed and encouraged the entire group to participate in the editing process without requiring knowledge of editing software. Through this technique, the PV participants determined the sequence of the interviews and selected the parts of the interviews that should be included in the film. They also determined which B-roll footage should accompany the interviews. The authors completed the final stage of editing by using the storyboards created by the participants as a guide to edit the films on a computer. Adobe Premier Pro software was used for all editing.

2.7.3. Workshop feedback

After each workshop, we held a feedback session with the participants to gather their thoughts on their main learnings and takeaways from the PV process. The discussion was open-ended, with no strict format, and each participant was encouraged to share their opinion.

2.8. Translation and analysis

We transcribed and translated 90 interviews that were filmed during the VOTV participatory video activities (including interviews that were not in the final edits of the films). The data collected through the interviews is substantial, however an extensive quantitative and qualitative analysis of the interviews go beyond the scope of this paper. To provide context for our discussion, we present a synopsis of key themes in the interviews. We do not present a critical analysis of these themes with reference to existing literature. Our coding approach was to assign subject codes, similar codes were grouped into parent codes to identity key themes (Gibbs, 2007; Fisher et al., 2021). All analysis was undertaken in NVivo (Version 12, QSR International Ply Ltd).

2.9. Voices of the Vezo outputs

During the four PV workshops, over 90 interviews were recorded. From the raw footage seven films of seven to 15 min

FIGURE 2
Photos from the Voices of the Vezo participatory video workshops: **(A)** Camera and interview training with the workshop participants, **(B)** a participatory video group interviewing a fisher, **(C)** example of a storyboard created during group editing, **(D)** VOTV facilitator and workshop participants working together on the group edit.

in length were produced (two films from each community with exception of Ampassilava where the participants requested to combine their footage into one film).

The outputs of the VOTV project included two phases. The initial phase was a debut community showing of the film which happened within 2 days of the PV workshops. In each village, the community showing was held in a public space on a large screen using a projector (Figure 3). Audience numbers were ~200 people in Tampolove and Ambatomilo, ~100 people in Ampassilava, and ~50 people in Andavadoaka.

The second phase of the Voices of the Vezo included facilitating sharing of VOTV films with other Vezo communities, stakeholders and a wider audience. Films were subtitled in English and made publicly available on social media platform Facebook, YouTube and a dedicated website www.voicesofthevezo.org. Facebook was selected as it is the most popular social media platform in the study region. At the time of writing (September 2023), the films have combined views of over 400 times on YouTube and over 1,000 engagements (likes, shares, comments) on Facebook.

FIGURE 3
Creation of a temporary community cinema for the showing of the VOTV participatory video film in Ampasilava.

3. Results

3.1. A synopsis of the Voices of the Vezo interviews

The interviews in the VOTV films document a wealth of local insights of marine ecosystem change and related consequences for the local social-ecological system. Supplementary Table S1 presents a summary of codes and themes.

Changes in the marine ecosystem and catch declines were a key theme discussed in nearly all the interviews undertaken for VOTV. Many people provided evidence for catch declines by comparing the weight of catches in the past and now. Fishermen reminisced at the ease of filling whole pirogues with fish on a single fishing trip, equivalent to catches of between 500 kg to 1,000 kg, noting

nowadays, this is rare. Women primarily discussed catch decline in the context or decreasing invertebrate catch, particularly octopus. A decrease in the biomass and species richness in the nearshore environment was emphasized by many community members. People explained how, in the past, it was possible to get a good catch close to the beach, but this is no longer possible. Due to the decline in the nearshore environment, fishers now travel further away to deep water to fish.

The drivers causing catch declines was another key theme throughout the VOTV interviews. The most referenced driver was the modernization and increase in the amount of fishing gear. Elders and adults spoke of the past only using lines and *hafotse* nets, made from the bark of a local tree species. Compared to the past, people now own more fishing materials including modern nets, spearguns and masks and fins. The destruction of coral during gleaning was the second most referenced driver for marine ecosystem change. Corals are broken to catch octopus that are hiding underneath them. People also discussed the occurrence of other destructive fishing techniques including poison fishing (*laro*) which is prohibited in the Velondriake and Manjaboake LMMAs. Prohibited activities were always discussed in general or as activities that others were responsible for, however individuals/groups were not identified as being responsible. Some interviewees blamed the "younger generation" for using destructive fishing techniques, such as breaking corals during gleaning. Increasing population was also identified as a driver for catch declines as more people are fishing and gleaning. In the villages located in Velondriake, many community members attributed a decline in the marine resources to the increase in the number of children going fishing and gleaning. Community perception is that the age children start fishing has decreased in recent years. Children were not identified as a driver for catch declines in Ambatomilo. Less frequently mentioned drivers of change that were mentioned in the interviews included the creation of no take zones preventing good catches, diving at night and the sound of boat engines marine life.

Many interviews included discussion of the social consequences of catch declines. Several community members expressed concerns for the future and the impact of declining marine resources on their livelihoods and food security. Some people discussed an eagerness to move away from a livelihood reliant on fishing or gleaning but recognized that there were few other opportunities. Community members in each village talked about how in the past Vezo were also farmers. Several attributed a decrease in rainfall over recent years to farming no longer being a viable livelihood. In Tampolove and Ambatomilo, seaweed farming was a key interview topic for women in the community. While seaweed farming was identified as an important source of income, several community members expressed concern about outbreaks of seaweed disease affecting production. In Tampolove, where there is sea cucumber aquaculture site, sea cucumber faming was recognized as an important source of income. Improved education was recognized as a pathway to help people find alternative livelihoods.

Many of the interviews discussed the potential of different solutions to help better manage marine resources. Marine reserves were the most referenced solution, although it was not always clear if people were talking about temporary fishery reserves or no take zones. In Ambatomilo, where there was no permanent no-take zone at the time of filming (November 2022), at least five people identified implementing a permanent reserve as a solution to improve the health of marine resources. In Andavadoaka, Ampasilava, and Tampolove people expressed concerns about the rules of temporary fishery closures not being followed. In particular, they identified the theft of octopus during periods when the fishery is closed as a reason that octopus catch has declined during periods when the fishery is open. Stopping the use of destructive fishing and gleaning techniques such as poison fishing, breaking corals and using small size nets were also referenced as solutions to help sustainably manage the marine resources.

Finally, several of the interviews included themes of culture and traditional beliefs. This included stories about the origin of each village and ceremonies including offerings to the ancestors and food sharing rituals. Some interviewees discussed taboo areas which would prevent people accessing certain areas on land and in the sea. When discussing traditional ceremonies and beliefs, many individuals noted their decline in current times.

3.2. Workshop participants feedback

The feedback sessions with participants revealed various themes related to the acquisition of knowledge and skills. The participants most frequently reported gaining new knowledge about the ancestral roots of their village, traditional fishing practices, and the transformations that have occurred in the marine ecosystem over the previous generation.

As a Vezo, it is good to learn about this. We learned about the elders' stories and how the marine ecosystem was in the past, it is good to have knowledge of the past.

Participants acknowledged that the PV project had provided a platform for discussing community issues and sharing stories with elders. For example, one participant explained she enjoyed "learning about the stories of the past" and she was "happy to talk to people in the village." The VOTV films were recognized by the participants as an effective way to gather and document marine ecosystem change and local knowledge in a way that is accessible to the wider community and future generations. Many participants expressed satisfaction in gaining new skills in filming and interviewing.

We have gained knowledge about the marine ecosystem we can share with our children and grandchildren.

In terms of feedback on the PV process, some participants expressed that they found it difficult to create questions for the interviews and would have welcomed more support from the facilitators at this part of the workshop.

4. Discussion

There are common challenges which arise within co-management arrangements in small-scale fishing communities, potentially undermining their ability to deliver desired social and ecological benefits. These challenges include lack of evidence concerning the social (Cinner et al., 2012) and ecological conditions

(Granek and Brown, 2005; Fidler et al., 2021), the integration of local ecological knowledge in decision-making (Moller et al., 2004; Ullah et al., 2023), issues related to trust between local stakeholders and external organizations (Fargier et al., 2014), difficulty in fostering local participation and sense of ownership (Carr and Heyman, 2012) and the inability to influence external broad-scale forces which exert direct or indirect pressure on the marine ecosystem (Granek and Brown, 2005; Long et al., 2019; Gardner et al., 2020). From the standpoint of local stakeholders, management partners and/or other collaborators, participatory video could provide a relatively low-cost and accessible means to help address these challenges, while directly engaging local community members (Bali and Kofinas, 2014; Bartindale et al., 2019; Mistry et al., 2021).

4.1. Participatory video as a tool for co-management

Failures in the communication process can lead to tensions and adversarial relations between fishing communities and co-management stakeholders (Kaplan and McCay, 2004). Challenges emerge in how to communicate knowledge across different groups and synchronize different knowledge types such as local ecological knowledge and scientific assessments (Linke and Bruckmeier, 2015; Stefanoudis et al., 2021). Videography is a powerful tool to document community knowledge in traditional cultures as it aligns with approaches of storytelling for teaching and learning (Mistry et al., 2016a). In Vezo society, storytelling is an important method of passing knowledge between generations (Astuti, 1995). However, even in remote societies, technology is superseding oral traditions with digital culture reducing opportunities for knowledge transfer through oral traditions (Scroggie, 2009). In regions where literacy and a culture of written documentation is low, a decline in oral knowledge sharing risks the knowledge being permanently lost. Participatory video films provide an alternative audio-visual method of communication, knowledge transmission and documentation (Bali and Kofinas, 2014). For example, the VOTV films record stories of traditional beliefs and ceremonies which the interviewees identified as becoming less common. Furthermore, insights of historic ecosystem and social-ecological conditions provide documentation of conditions during 2022 and may serve as evidence for future comparisons. Within the framework of co-management arrangements, PV films can be used for documentation and to communicate important issues between local resource users and co-management stakeholders. Beyond the co-management context, PV films can serve as educational resources, communicating local narratives that highlight the issues confronted by local communities.

The integration of local knowledge into co-management decisions can increase legitimacy of local management decisions (Friedlander and Gaymer, 2021; Funk et al., 2022). This is particularly the case where official fisheries data are lacking (Ullah et al., 2023). In Madagascar the status of fisheries is highly uncertain, demonstrated by the fact that catch reconstructions have been calculated as twice the volume reported by national fisheries agencies (Le Manach et al., 2012). However, the LEK of Vezo people of fish communities, species composition, seasonal trend and fishing grounds has been well documented by other authors (Astuti, 1995; Brenier et al., 2011; Langley, 2012; Lemahieu et al., 2018). PV can rapidly collect up-to-date LEK and share it widely with the community, offering a practical approach to gathering and assessing current social-ecological contexts while reflecting the community's current perspectives. Moreover, the community-driven process helps ensure the issues that are discussed in the PV films are likely to reflect the issues that community members consider most important. A benefit of recording this information through audio visual methods is that it can be directly shared back with the community creating a more transparent process for the implementation of management measures.

Co-management requires inclusive consultation processes that prevent management decisions that could further ostracize marginalized groups (Béné and Neiland, 2004). A key motivation for using participatory research methods is to encourage engagement from groups of society whose knowledge and viewpoints may otherwise be overlooked (Mistry et al., 2016b). The VOTV films included interviews with members of all cohorts of the community, including women and youth who, within the current co-management paradigms, remain more likely to be left out of decision-making spaces (Gardner et al., 2020). VOTV also engaged Vezo youth in making the films. The engagement and contribution of youth in small-scale fishery socio-ecological systems is often overlooked, despite making up a significant proportion of the workforce (Fry et al., 2021). In societies where decision-making is dominated by more affluent or experienced members of society, youth participation in decision-making is more likely to be obstructed (Kolding et al., 2014). Feedback from the VOTV youth participants included increased knowledge of the marine ecosystem, motivation to share this new knowledge and motivation to create films about other issues. The VOTV participant feedback indicates that PV, as several authors have found, can be effective at building agency and empowering participants to make their voices heard (Christie et al., 2014; Tremblay and Jayme, 2015; Fisher et al., 2021).

The successful implementation of conservation measures and resource management commonly require a shift of perception from local communities, particularly where reliance on resources is high. Through PV projects communities can be faced with narratives that challenge their own viewpoints which can encourage modified behaviors (High et al., 2012). For example, in a PV project in Malawi, farmers changed their perception of the value of composting and were encouraged to try new methods (Cai et al., 2019). Community perception in Velondriake is the principal determinant of spatial planning and resource management strategies (Gardner et al., 2020). Permanent reserves were determined by fishers perception of the opportunity cost of excluding fishing in key fishing grounds (Cripps and Harris, 2009) and mangrove conservation was defined by willingness of community to set area aside for conservation (Rakotomahazo et al., 2019). In the VOTV films, the dominant interview themes which emerged (e.g., the impact of destructive fishing techniques and small mesh net sizes) indicate the success of awareness raising schemes undertaken by co-management partners, Blue Ventures.

However, destructive fishing cited as a main driver of catch decline implies prohibited activities are still occurring. Community members referred to the implementation of reserves and stopping destructive fishing as methods to improve fish catches, potentially indicating a willingness to maintain or enhance management measures. In this light, PV provides the opportunity to systematize perceptions in a format accessible to the community, encouraging the mobilization of pre-existing knowledge and collective learning which could help change perceptions in the favor marine resource management (Tremblay and Jayme, 2015).

Finally, crucial pathways to establishing marine co-management include partnerships between the fishing communities and the partner organizations (government decision-makers, NGOs, universities). These partnerships must promote "local champions" and nurture information sharing and trust (Domondon et al., 2021). Activities undertaken with natural resource users which incorporate trust-building can increase communication and willingness to adopt sustainable levels of use (Meinzen-Dick et al., 2018; Norström et al., 2020). In the months following VOTV, the community in Ambatomilo voted to create the first no-take zone in the Manjaboake LMMA. Discussions about the creation of the no-take zone had started before VOTV, however local reports indicate that support shown for the creation of a no-take zone in the Ambatomilo VOTV films prompted action for its implementation (Maniry Soa, Pers Comm). Our research design does not allow us to infer causation or understand details of how VOTV may have influence local management decision in Ambatomilo. However, our findings align with observations from other authors that PV films could help prompt critical discussions which influence future policy (Christie et al., 2014).

4.2. Participatory video: practical challenges and considerations

PV is a dynamic research process that comes with practical and ethical challenges (Mistry et al., 2014; Fisher et al., 2021). A central motivation for researchers undertaking PV is to understand issues that are most important to the local community (Park, 2006). Therefore researchers/facilitators must provide enough instruction and guidance around the subject matter to enable the project while minimizing the introduction of external biases (Bartindale et al., 2019). During the VOTV project, we found it was a delicate balance between providing enough information for the participants to feel confident in the activities whilst not influencing the overall outcome. For example, while we provided training around the context and motivation of the films, we avoided suggesting explicit questions for the participants to ask during interviews. However, one participant expressed to the facilitators they struggled to formulate questions independently. Furthermore, filming is a technically challenging endeavor, particularly when outdoors. PV facilitators aimed to provide enough filming support to ensure there was usable material but avoid influencing the interviews. We observed that the presence of the facilitator would sometimes influence on the willingness of community members to give an interview. Some community members expressed they were eager to share stories with "outsiders" while others seemed more reluctant to speak while the facilitators were present. To minimize causing bias in the interviews, facilitators only accompanied participants for the first 1 to 2 h filming until they were more familiar with the equipment. After this, participants collected video material on their own with regular footage reviews with the facilitators to identify filming or technical issues. We found issues could usually be addressed with a small amount of additional training or instruction.

Filmmaking in collaboration with communities is also time intensive. In VOTV, most of the workshop participants were women. This was not planned by the VOTV team and is likely because there is an expectation of men to go fishing (Barnes-Mauthe et al., 2013). On one hand, we recognize this as a positive outcome of the project in that it provided a training opportunity and platform for voices of a more marginalized group in Vezo society (Gardner et al., 2020). On the other hand, the films made by only women may not capture a broad range of perspectives of the community. The timing of the workshop and filming activities was also an important consideration to ensure the films represented balanced viewpoints. In Ambatomilo, we postponed the workshop as the original timing clashed with the local seaweed farm harvest. This clash would have excluded the women of the group from an entire morning of training which could potentially reinforce existing power dynamics.

PV has been used as a tool to present knowledge and perspectives of groups that are often underrepresented in decision-making (Milne, 2016). This rationale was discussed with VOTV workshop participants during the training phase. The VOTV facilitators encouraged the participants to endeavor to include members of all groups of the community in their films. This was achieved with varying levels of success with some of the films having a broader representation of community members than others. The issue of representation is likely to be a key challenge in any PV project with potential solutions differing depending on the local social and cultural context (Bartindale et al., 2019). PV will not erase power imbalances in the community, however, facilitators can have significant influence on reducing existing power differentials (Packard, 2008). Ongoing reflexivity at each stage of the process is required to recognize and respond to power imbalances and potential exclusion of marginalized voices (Pruitt, 2021). For example, during the training stage facilitators can work with participants to create a list of people in the community they plan to interview. The list could be based on social groups and therefore could provide the opportunity for the facilitators to work with the participants to consider the inclusion of groups that might otherwise be overlooked before the start of the filming.

Furthermore, a consideration in any PV project is the potential of conflicting interests or the inclusion or exclusion of sensitive material or viewpoints that could further exacerbate marginalization or power dynamic issues (Bartindale et al., 2019). In the VOTV films, a common theme of interviews was the occurrence of destructive fishing techniques indicating these prohibited activities are still occurring in the LMMA. This has been previously acknowledged by Gardner et al. (2020) who discusses the challenges BV and the VA have faced in successfully applying rules under the LMMA *dina*. We suggest that the framing of the VOTV films played a pivotal role in encouraging many community

members to openly discuss the occurrence of prohibited activities. The films centered on the drivers of change in the marine ecosystem rather than focusing on the community members themselves, reducing the potential for blame or identification. Minimizing the potential of PV to have negative social consequences will be reliant on context as opposed to universal PV guidance (Pruitt, 2021). In this vein, partnership with facilitators who have a deep understanding of the community dynamics is essential.

Lastly, in this paper, our primary objective was to conduct a review and offer guidance on the process of PV where external parties are seeking to engage with communities. However, it is important to emphasize this process should be adapted to suit the needs of the local context. It is important to understand prior to the project where local groups may already be leveraging media as a means of local communication and education. For instance, in the same region as the Voices of the Vezo project, the second author, with other colleagues, has effectively utilized film and music as powerful tools for health education and the implementation of new marine management measures (Blue Ventures, 2022). This in-depth understanding of how video media is used within the local context offered invaluable insights when designing the VOTV process. Where there is the opportunity to do so, collaborating with local media experts will help ensure the process is relevant to local media engagement and culture and likely strengthen the overall impact of the project.

5. Conclusion

This paper has demonstrated the potential of participatory video as a tool in conservation co-management arrangements. A key and transferable finding is the potential for PV to promote transparency and collective learning and empower marginalized groups in the stewardship of marine resources. Through synthesizing local perceptions and knowledge of complex social-ecological systems, PV can be used as a tool to support locally relevant marine management measures and document historical knowledge during times of rapid change. As conservation scientists and practitioners, we must continue to develop strategies that encompass the sharing of information and resources with local resource users and promote local leadership in the communities in which we work. Participatory video offers an excellent opportunity for an interdisciplinary and collaborative method of engagement in a conservation co-management context, supporting small-scale fishing communities and other natural resource dependent communities in their efforts to sustainably manage the natural resources on which they rely.

Data availability statement

The datasets presented in this article are not readily available because participants were only asked to consent to AC and Blue Ventures in sharing data. Enquiries about data should be directed to amber.carter@ed.ac.uk.

Ethics statement

The studies involving humans were approved by University of Edinburgh GeoSciences Research Ethics & Integrity Committee. The studies were conducted in accordance with the local legislation and institutional requirements. The Ethics Committee/Institutional Review Board waived the requirement of written informed consent for participation from the participants or the participants' legal guardians/next of kin because of the high prevalence of illiteracy among the population in the study region. Instead, informed oral consent was obtained from participants. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

AC: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Resources, Writing—original draft, Writing—review & editing. SM: Conceptualization, Investigation, Methodology, Project administration, Resources, Visualization, Writing—review & editing. JA: Data curation, Investigation, Project administration, Writing—review & editing. PA: Writing—review & editing, Methodology. AT: Supervision, Writing—review & editing. AW: Supervision, Writing—review & editing.

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Conflict of interest

SM and PA are employed by Blue Ventures.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fhumd.2023.1266066/full#supplementary-material

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